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Assessment Of EMS Workforce In Nebraska
With Future Strategies

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Abstract:

Well-trained and fully staffed Emergency Medical Services (EMS) play a key role in improving the health of the surrounding community through rapid response, on scene care, and transportation to an appropriate facility. EMS is an integral part of the community, vital to limiting the severity of injuries, preventing morbidity, and improving the health of their populations. In order to ensure Emergency Medical Services in Nebraska are able to meet the needs of their populations and continue providing high-level care, an assessment of the State's EMS workforce was conducted. By completing a workforce assessment, we gained a better understanding of the current workforce to ensure emergency medical services have proper staff and resources in place to provide appropriate care for the community, now, and into the future. A survey was distributed to all EMS agencies in the State to gather data on the workforce that is involved in pre-hospital care. The survey focused on a variety of recruitment, retention, education, and training issues within specific emergency medical services or regions. An analysis of the results found several areas of Nebraska already have an inadequate supply of EMS staff available for hire. The majority of EMS services indicated their ability to function would be impacted due to a lack of an ability to hire qualified providers in the near future, if not already. The reasons for these shortages include time commitment and education requirements for both volunteers and paid providers. Relative low wages contributed to shortages for paid providers and jobs outside of EMS were strong reasons for shortages in volunteer providers. A variety of possible solutions to alleviate these specific problems include recruitment and retention programs, offering education grants for training, hiring bonuses, increased wages, online education, and creating a career path for EMS providers. Long-term strategies include

standardizing EMS systems, forging partnerships between EMS and hospitals, and creating community paramedics capable of providing primary care. The results of this workforce assessment, along with possible solutions, will be distributed throughout the EMS agencies, relevant stakeholders, and the Nebraska Legislature to help facilitate conversations about ways to grow and improve our EMS workforce. Conversations between all relevant parties can help to create new strategies and policies to ensure the State of Nebraska has an adequate number of emergency medical personal to provide a high level of pre-hospital care and to decrease the severity of injury and morbidity, to the citizens of our communities.

Introduction:

During my service-learning project, my placement site was the Department of Emergency Health Systems (EHS) for the State of Nebraska. The EHS is a part of the Department of Health and Human Services located in Lincoln. The department consists of a director, four regional EMS specialists, and several other members that oversee different parts of EMS; including trauma registry, education compliance, and IT support staff. The EMS regional specialists serve as a liaison between services in their region and the state, providing a variety of services to ensure the emergency services have what they need and any questions are answered. The mission of the Emergency Health Systems is to coordinate and strengthen the level of pre-hospital care throughout the state to enhance the well being of our citizens. In order to achieve this aim, they work to increase communication between a variety of agencies involved in pre-hospital care, provide ongoing training with continuing education opportunities, and help to set treatment guidelines.

Emergency medical systems play a key role in a community to ensure the public has access to quick and effective care prior to arriving at a hospital. Emergency medical services are capable of providing rapid response care. Patients can then be rapidly transported, when necessary, to the appropriate facility while receiving care en route. The ability of the emergency medical services for rapid response, on scene stabilization, and care en route to an appropriate facility are crucial to limiting the severity of an injury or illness, improving patient outcomes, and creating a healthier community for all.

“In the United States, injury accounts for over 150,000 deaths and over 3 million non-fatal injuries per year” (The American Association for the Surgery of Trauma, n.d.). Traumatic injury is the leading cause of death for individuals under the age of 45, and the fourth leading cause of death for all ages in the United States (The American Association for the Surgery of Trauma, n.d.). Emergency medical services play a large role in providing on scene care and rapid transport to limit morbidity in the event of traumatic injury. Traumatic injuries can take many forms, including car accidents, falls, sports injuries, violent interactions, and a wide variety of other causes. Projections indicate that by 2030, road traffic accidents are expected to be the fifth leading cause of death worldwide (Debenham, Fuller, Stewart, & Price, 2017, p. 1). According to Debenham et al. (2017), “High-quality, prehospital trauma care is crucial to reduce the number of trauma-related deaths” (p. 1). The ability of EMS for a rapid response to a scene and rapid transport to an appropriate facility helps to get patients to definitive care, often surgery, within the golden hour, which has been shown to increase survival rates and decrease the severity of the traumatic injury (Bledsoe, Porter, & Cherry, 2006b, p. 10).

Strokes are the third leading cause of death in the United States with around 795,000 people affected per year and more than 140,000 deaths per year (Center for Disease Control and

Prevention, 2017b). EMS can dramatically reduce the impact of a stroke by saving time, which translates to saving brain tissue because the longer a stroke is allowed to continue without intervention, the more irreversible damage will be done (Abboud et al., 2016; French, McGeorge, & Jauch, 2015). Timely identification of a stroke by EMS and rapid transport to an appropriate facility allows patients to receive needed care within the therapeutic window reducing the severity of the injury and decreasing mortality rates (Abboud et al., 2016; French, McGeorge, & Jauch, 2015). Patients experiencing stroke-like symptoms transported by emergency medical services have a greater likelihood of receiving treatment in the therapeutic window due to emergency room receiving early notification from EMS staff, transportation to an appropriate facility, and shorter in hospital time (Abboud et al., 2016; French, McGeorge, & Jauch, 2015). EMS has a large role to play in stroke treatment and recognition to help decrease the amount of time between a person experiencing the onset of stroke symptoms and receiving definitive care in an appropriate emergency room.

In the coming year around 790,000 people will experience a heart attack, approximately every 40 seconds a person in the United States will have a heart attack with about 114,000 resulting in mortality (Benjamin et al., 2017). “Time is Muscle” is often seen in literature about heart attacks because as a heart attack progresses an increasing amount of heart muscle is damaged beyond repair (Berger, 2016; Duke Clinical Research Institute, 2017). In the event of a heart attack, emergency medical services provide a rapid response to a patient to begin providing medical interventions to help lessen the severity of a heart attack (Duke Clinical Research Institute, 2017; Bledsoe et al., 2006a, p. 176-81). Patients experiencing a heart attack that are transported to a hospital by EMS arrive at the hospital quicker versus self transportation with care en route leading to better patient outcomes (Berger, 2016; Duke Clinical Research Institute,

2017). Upon arrival at a hospital, patients transported by EMS have a shorter door to balloon time due to coordination between hospital and prehospital providers and transmission of EKG while en route leading to decreased severity and morbidity (Berger, 2016; Duke Clinical Research Institute, 2017). EMS can significantly decrease morbidity and severity of a heart attack through quick response, early treatment, transport to an appropriate facility, and quicker door to balloon times.

Emergency medical services respond to a variety of illnesses and injuries providing care to stabilize a patient and transport to an appropriate facility. The rate of diabetes in the United States has shown a surge over the last decade (Center for Disease Control, 2017; Rossman, 2017). In hypoglycemic or hyperglycemic incidents EMS has a pivotal role in quick recognition and an effective treatment to decrease severity and morbidity (Bledsoe et al., 2006a, p. 323). Transportation by EMS ensures medical providers are able to choose the appropriate receiving facilities to meet the needs of the patients, including a hospital with a catheterization lab or a stroke center capable of providing fibrinolytic or thrombolytic treatment to ensure patients receive high-level care. In addition to the traditional roles of 911 responses, EMS is becoming an active part of disaster response providing care and leadership (Catlett, Jenkins, & Millin, 2011). EMS continues to evolve into new areas and ways to continue to help the population they serve to ensure the best medical outcome from any accident or injury and finding new ways to prevent any injury or illness before they occur.

EMS requires a highly dedicated and trained workforce in order to ensure the ability to respond to all types of emergencies and provide appropriate care. A workforce assessment of emergency medical service personal will be conducted to ensure that we have proper staffing to meet the public's needs across the State of Nebraska today and into the future. Training to

become an emergency medical technician (EMT) or paramedic requires a long time commitment and limits the ability of services to hire qualified staff. An EMT certification requires 170 classroom hours in addition to clinical experience and field assessments. Students are also required to take CPR and have all proper immunizations. The requirements and education are demanding requiring a large commitment for any future EMS providers. After completion of an EMT, providers are able to enroll in a paramedic program to increase their knowledge, scope, and skills. The educational requirement for a paramedic certification is 650 classroom hours along with 500-600 hours of rotating clinical sites. Candidates also have to complete a variety of side courses for certification including advanced cardiac life support, pre-hospital trauma life support, pediatric advanced life support, and others. Once a candidate has completed either certification they are required to pass a national exam to receive their license. The training of an EMT and a paramedic requires a large amount of time, funding, and commitment; in order to ensure that we have a capable workforce we must have a constant supply of new providers available for hire.

Once a person has received an EMT or paramedic license they are required to meet a variety of conditions to renew their license. A set number of continuing education hours must be obtained in specific areas for renewal, along with attending refresher courses for all extra certifications like CPR or advanced cardiac life support. Obtaining and keeping an emergency medical service license requires a large time and financial commitment.

One of the complicating factors limiting the number of EMS workers is that the majority of them do not receive any compensation and work completely as volunteers. In rural areas, EMS relies on volunteer providers to cover their relatively smaller call volume. Volunteers generally work full time jobs outside of EMS and must complete the training during the evenings

and weekends. The large education and time commitments make it difficult for rural areas to find and retain EMS providers. A workforce assessment will help to examine our volunteer providers and ensure we can continue to have qualified personnel for all 911 calls.

Rural areas, already forced to rely on volunteer personnel for EMS, are facing extra difficulties due to a variety of issues that prevent them from receiving high level care (Harris et al., 2016; Jaffe, 2015). Research has shown a large gap between life expectancy in rural areas versus metropolitan areas and it is continuing to widen (Singh, Siahpush, 2014). The health of our populations in rural areas are facing difficult access to healthcare with decreased available services, increased travel times to receive care, and less providers available (Harris et al., 2016; Jaffe, 2015). Lack of access to health care, including EMS, has created unique problems for our rural populations.

Rural populations face many challenges that are related to demographic and behavioral risk factors that are more prevalent in those populations. The average age of citizens across the state is increasing as baby boomers start to reach retirement ages (Department of Health and Human Services, 2015, p. 7; Nebraska Humanities, 2017). “Between 2010 and 2030, the population aged 65 and over is expected to grow by 75 percent” and the population over 85 is also expected to increase at a rapid rate resulting in increased demand for EMS services (Department of Health and Human Services, 2015, p. 7; Nebraska Humanities, 2017). As the average age in rural areas increases so does the average age of providers in rural areas leading to concerns over future staffing. Rural populations have lower socioeconomic status that has a negative impact on the health of a population (Harris et al., 2016; Jaffe, 2015). People living in rural areas also have more chronic health problems along with increased unhealthy behaviors further depressing the health of these regions (Harris et al., 2016; Jaffe, 2015). Rural populations

are experiencing a variety of factors that have contributed to a decreasing health status that will create a large need for EMS providers in these regions.

Literature Review:

Research has been conducted at both the state and national levels over the years to determine the supply of EMS providers and resources that are available in a specific population. A review of the published statewide literature began in 2001 with a comprehensive survey of Nebraska State EMS. The report on the results of this survey concluded that services are growing and providing higher level care to patients, but that action is needed to change the perception and government support that was more consistent with the idea of a simple load and go concept (Mueller, Zhang, & Lucas, 2001, p. 25). A 2004 study titled, "Emergency Medical Service Volunteer Personnel in Nebraska: Workforce of the Present, Hope for the Future?" conducted by Ullrich, Mueller, Shambaugh-Miller, Hastings, and Steele looked at a variety of workforce issues. This study conducted a survey of EMS personnel to determine reasons people volunteer in EMS, discontinue EMS service, and problems in the EMS workforce providing a wide range of information on these topics (Ullrich et al., 2004, p. 2). In 2010, another survey was conducted that attempted to take a snapshot of EMS resources in the state to aid policy makers in identifying the needs in regions and gaps in services (Mason, Shaw-Sutherland, & Xu, 2010). Mason et al. (2010) focused their study on four major parts of EMS workforce assessment including services provided, transport services, staffing, and recruitment/retention.

In addition to the specific Nebraska EMS assessments, other authors have attempted to look at the EMS workforce on a national scale. From 1998 to 2008, an annual survey was conducted and analyzed for the "Longitudinal Emergency Medical Technician Attributes and Demographic Study or LEADS" providing a strong source of data about EMS workforce over

that period (Levine, 2016, p. s7). The LEADS study data has been used in a variety of studies including: Chapman, Lindler, Kaiser, and Nielsen (2008) conducting a national assessment of EMS workforce (p. 7), Patterson, Moore, Sanddal, Wingrove, and LaCroix, investigating job satisfaction and employee retention (p. e84), Blau and Chapman (2008) looking at retention of EMS personal due to future increased demand (p. s105), and Chapman, Crowe, and Bentley (2016) summarizing the ten years of data to provide guidelines to recruit and retain more EMS professionals (p. s7). The Chapman et al. (2008) study attempted to determine if the EMS workforce would be sufficient to meet future needs, methods to attract new and retain current EMS providers, level of resources needed, and what other data is needed to answer these questions (2008, p.7). Despite the large amount of information collected in this study, the authors were unable to draw definitive conclusions for several of the key questions, however the study indicated that workforce retention needed to be a focus with strategies to address wages, compensation, and career advancement (Chapman et al., 2008, p. 88). The study concluded that a better approach is needed for data collection and the infrastructure to analyze that data to enable future research to answer these pending questions (Chapman et al., 2008, p. 92).

While several studies are looking at EMS from a national perspective, an examination at the state level has not occurred for several years creating the need for a current assessment of the Nebraska State EMS workforce. The State Department of Emergency Health Systems is tasked with ensuring we have the appropriate resources and staffing for our services to respond to 911 calls. The data from this assessment will show what staffing we currently have available and provide guidelines to ensure we have the appropriate resources and staff to continue to achieve a high level function of 911 responses throughout the state.

Research Methods:

Research Question:

The Nebraska EMS Advisory Council, in cooperation with the Department of Emergency Health Services established a goal to assess the EMS workforce in the near future to determine current level of staffing and address future resources and needs. In order to fulfill this goal, a research project was created to examine the current level of staffing in EMS with a focus on recruitment and retention with the goal of ensuring that we have an adequate supply of qualified staff to serve the needs of the State's Emergency Medical Services.

Study Design:

In order to complete our workforce assessment, a survey was created to help gather the relevant data from emergency medical services throughout the state. After reviewing relevant literature, including current and previous attempts to look at EMS workforces, a forty-six-question survey was developed with a focus on recruitment, retention, and education. The survey was reviewed and tested by the Director of Emergency Health Systems and several Regional EMS Specialists to ensure quality. The survey and all data collection were done using the online company Survey Monkey with results directly inputted into a database for analysis. The survey used a modified Dillman method for both data collection and implementation (Dillman, 2011). A pre-notification letter was created to inform individual services that they would be receiving the survey, to inform them of the goals of the project, and the opening and closing dates. This pre-notification letter was sent out by each Regional EMS Specialist to all services in their region with the goal of increasing responses due to their previously established relationships with stakeholders. After a couple of days the survey was then sent out to each service's main email contact, which was previously provided by the Regional EMS Specialists. Services that had not responded were sent a weekly email reminder to complete the survey. One

week prior to the close of the survey a second letter was sent out by the Regional EMS Specialists to ask everyone to please complete the survey, and to thank everyone that had already completed the survey. The primary method of the survey collection was through the original link sent out in the initial email from Survey Monkey. A second email with a direct web link was sent to several services for an alternate method of completion upon request. Data from both collection methods was analyzed together with no distinctions.

Data Sources:

All 409 emergency medical services located in the State of Nebraska were invited to participate in the study. The list of agencies was prepared by the Emergency Health Systems office along with email contacts for each service to be used in the survey. Of the 409 services that received the survey, a total of 182 responses were collected for an overall response rate of 44%. Of the 182 responses, 13 were incomplete or missing some information for a completion rate of 93% of all responses. Descriptive analysis of the data was conducted on the state level broken down into advanced level services versus basic level services, variances between county populations with one group representing counties with under 10,000 and the other group representing counties with a population of over 10,000, and by services that place or do not place a cap on the number of volunteers.

Study Findings:

Demographics:

The State of Nebraska's emergency medical services are broken down into different types of groups based on level of certification and transport status. Out of the 182 services that responded to the survey, 24% reported they had advanced life saving services (ALS) with the capability for transport, 3% reported as ALS without the capability for transport, and 12%

indicated they had basic level services (BSL) without transport services. The vast majority of responding services (61%) are BSL with the ability to transport patients. Individual EMS groups vary on whether providers are volunteers or paid employees. The vast majority of services (78%) were considered all volunteer. The remaining services are split with 7% having a mix of paid provider and volunteer, close to 13% operating with all paid providers, and under 2% offer some compensation to volunteers.

A closer look at ALS services indicates an even distribution between paid and volunteer services throughout the state along with a couple of services with a mix of paid and volunteer employees. Sixty-five percent of ALS services operate in counties with a population of at least 10,000, with 15% operating in counties with a population of less than 5,000. Volunteer and paid providers in BLS services create a different picture with over 93% of reporting services operating with fully volunteer staffs. BLS staffs are predominately located in rural counties, with close to 71% operating in counties with a population of less than 10,000. BLS services run less calls per year, varying between 25 and 100 calls versus ALS services that run between 500 and over 1,000 calls.

The survey results indicated the vast majority of providers, roughly 80%, are between the ages of 35 to 55. BLS service ages are very similar to the overall state, with over 85% of providers falling in the age range of 35 to 55, but with a higher percentage of providers in the 45-55 age range. ALS services tend to be slightly younger with 65% falling between ages 35 to 55, however the 35 to 45 range is higher for this group at 52%. When the population of county and number of calls per year are considered, there is little variance in provider's ages. Emergency medical providers working on ALS have slightly lower ages and tend to be more predominately located in higher population centers.

Recruitment:

Eighty-eight percent of all emergency medical services in the State of Nebraska are not actively recruiting to fill any open paid positions. Breaking this down into ALS services shows a lower percentage not actively recruiting at 65% and an increase from 10% to 27% of services actively recruiting 2 or more providers. BLS services responses indicate even less services recruiting than the state average with 96% of services reporting they are not currently looking to fill any open paid positions. Manipulations for data based on county size or number of runs produce similar results for services levels of active recruitment.

Looking at EMS services actively recruiting for volunteer positions shows close to 73% have at least one open position and over 61% currently would like to hire three or more providers. This figure is hard to interpret because over 67% of services do not place a cap on the number of volunteers they are willing to hire. By looking at the 55 services that do have a cap in place on the number of volunteers hired, shows that over 56% are still actively recruiting for three or more open positions and only 33% are not actively recruiting. ALS services with a cap have 39% not currently recruiting and over 61% currently recruiting for three or more positions. BLS services with a cap show similar results with 30% not currently recruiting and over 54% recruiting for three more open positions. A decrease in county populations shows a small decrease in the number of services not currently recruiting and the opposite is true for counties with large populations.

Over 73% of services responding to the survey indicated they do not have an active recruitment plan in place and several indicated they make attempts at recruitment, but they do not currently have a formal plan in place. Breaking down recruitment plan by type of service identifies just over 17% of basic level services have a recruitment plan in place compared to over

27% for advanced level services. An examination based on the population of the county shows counties with smaller populations tend to have less recruitment plans in place. Services were asked to identify how effective their current recruitment programs are, with around 78% indicating they were semi or strongly effective and a small percentage responded their program was ineffective. The ratings of effectiveness recruitment stayed consistent when broken down by ALS versus BLS or by county population.

The availability of suitable candidates received conflicting responses. While looking at all responses, 43% of services indicated they are able to find suitable EMT providers and 41% of services indicated they are unable to find suitable EMT candidates. An examination of paramedics shows a similar mixed result with close to 8% finding suitable candidates and 17% stating they are unable to find suitable candidates. The results for advanced level services shows nearly 50% of services have trouble finding suitable paramedics and 23% report finding suitable paramedics for open positions. An examination of basic level services finds very similar results to the numbers from all responses with 42% finding suitable EMTs to hire and 43% reporting difficulty in finding suitable candidates. Finally, an examination of the responses about suitable candidates found that when the county population was considered, 41% of smaller counties were able to find suitable EMT candidates and 44% were not able to find suitable candidates. In larger counties, the results slightly shift with 45% able to find suitable EMT candidates and only 36% unable to find suitable EMT candidates.

The majority of services indicated hiring at least one provider over the course of last year. During the past year, 12% of services hired more than five providers, 24% hired between two or five providers and 39% hired one to two, and the remaining 25% indicated no one was hired over the last year. Filtering for only services that place a cap on the number of volunteers shows

similar results with 20% hiring more than five providers, 27% hiring between two and five providers, 38% indicated hiring one to two, and 15% indicated they had not hired anyone over the previous year. Filtering for advanced level services shows large amounts of hiring with over 29% percent of services adding five or more providers, 32% hiring two to five providers, 34% hiring one to two providers, and less than 5% responding with no hires over the last year. BLS services have not hired as many providers with 32% indicating they had not added any providers during the last year, 6% hiring five or more, 21% hiring two to five, and 41% percent hiring one to two providers. Filtering by county population shows the small population size group with similar results to the breakdown for BLS services and the large population county group results similar to the results for ALS services.

The next question examined if services provided, or were considering providing, a hiring or referral bonus. Only five percent of services were currently offering any kind of bonus and just over four percent indicated they had considered providing a bonus. Sixty percent of services indicated a lack of resources to be able to provide bonuses. Over 31% of services reported no current need to boost recruitment through a hiring bonus. ALS services have a greater likelihood of offering bonus with over nine percent in this category and less services indicating an inability to provide bonuses. Filtering by basic level services shows little variance from the overall results. The large population county group shows similar results to those for ALS services and the small population county group results are similar to the BLS services with slightly less respondents providing or considering providing a bonus.

The next part of the survey looked at barriers to recruitment with a variety of options listed and allowing for respondents to indicate how strongly they felt each was a barrier. According to the results, the largest barrier was time commitment with 78% indicating this is a

large or complete barrier and only 23% responding that it was a small or no barrier. Education requirements ranked second with 67% responding as a large or complete barrier and 33% indicating it as a small or no barrier. Wages/compensation and age were not considered major barriers at 60% and 56% respectively. Job stress was found to be relatively consistent as a small barrier for nearly half of all respondents. The largest barrier for ALS services alone was time commitment followed by the education requirements, but wages/compensation become a larger barrier with 35% rating it as a large or complete barrier. Filtering by BLS services shows an increase in wages/compensation as a small or no barrier, likely due to primarily volunteer services. However, time commitment and education requirements were classified as large or complete barriers at 81% and 76% respectively.

The next question asked respondents to identify the reasons from interested community members who do not apply. Time commitment and educational requirements were at the top and mentioned by 81% and 64% of potential candidates respectively. Job stress was the only other answer to be mentioned above ten percent of the time with wages, age, cost of certification, family commitment, inability to handle nature of EMS, and difficulty in treating family and friends in smaller communities. For ALS services the results were similar to the previous question with time commitment and education requirements decreasing to 57% and 35% while wages become a bigger issue at 10%. Looking at specifically BLS services, the time commitment (90%) and educational recruitment (74%) were mentioned by the vast majority of potential providers as reasons for not pursuing certification in EMS.

The final question about recruitment asked providers if they felt the function of their department would be hindered due the inability to recruit new providers. Just over half of all respondents indicated they felt that an inability to hire new providers would hamper the function

of their service. Examining responses by ALS services only shows a slight increase with 57% of services indicating hiring difficulties will hamper their departments. Slightly over 50% of BLS services responded yes. A variety of issues are affecting recruitment that vary based on the characteristics of each service that will need to be addressed for services to be able to continue to provide high level prehospital emergency care.

Retention:

The education and training to become an EMS provider has been shown to be a large barrier to recruiting new providers, which places a greater emphasis on the ability to retain employees. Respondents were asked how long providers stay active in their service. Over 53% indicated the average service length for members was greater than ten years and 38% reported an average length between five and ten years, with only 8% reporting less than five years. For ALS services, 30 % of the respondents indicated an average service length of ten or more years, 45% reported five to ten years, and 22% reported two to five years. The average service length for BLS services was longer with 62% reporting in the ten years or more range, 36% in the five to ten-year range, and zero percent reporting a range of zero to one year of service.

Close to 29% of all services that responded to our survey indicated they had lost zero employees in the previous year. Forty-seven percent reported losing 1-2 employees over the last year, slightly below 20% of services lost between two and five employees, and only 5% of services lost five or more. For ALS services, 20% reported no losses in employees for the year, 32% of services reported losing one to two providers, 32% reported losing two to five providers, and 16% indicated a loss of five or more employees. Fifty-two percent of BLS services lost between one and two employees, 16% lost two to five providers, less than one percent reported

losing more than five providers, and over 31% of responding BLS services reported losing zero providers.

Several reasons were given for ending service, but the two most prominent were the time commitment and moving. Continuing education requirements were mentioned by 10% of leaving providers and training requirements were identified 17% of the time. Several other answers were mentioned with around five percent and below were wages, too few or too many calls, politics, inability to meet squad's requirements, retirement, and moving on to new career. Filtering for ALS services only, wages were the main reason for leaving. In contrast, less than one percent of BLS services listed wages as a reason for leaving, but training requirements were a far more prevalent reason for leaving EMS.

The next couple questions examined what kind, if any, retention programs EMS services employed. Close to 81% of all services that responded to the survey indicated they do not currently have a retention program in place. An examination of ALS services located in large counties shows close to 67% reporting no current retention program in place. BLS services in smaller counties are closer to 85% reporting the lack of a retention program. An evaluation of the effectiveness of retention programs shows that 54% of respondents rated their program as semi-effective, 12% as strongly effective, and 36% reported their current program unsuccessful. Little change in the level of effectiveness was noted when a comparison was made between ALS versus BLS and small population versus large population counties.

The next part of the survey focused on the specific barriers to retention of EMS employees. Time commitment was identified as the largest barrier by 56% of respondents and continuing education was identified as a barrier 35% of the time. A job outside of EMS and age were the next largest barriers with 27% and 21% respectively. Stress and wages were listed in

about 10% of the responses. Filtering for ALS service respondents, wages were identified as an important barrier at 19%, time commitment was identified by 62% of survey participants, and 33% of respondents listed a job outside of EMS. Isolating responses for basic level services shows barriers in the same order as the overall results with time commitment as the largest barrier followed by continuing education requirements.

Respondents were asked if the service routinely pays overtime to ensure optimal staffing and 15% of services responded with yes. Filtering for advanced level services shows a very different picture with over 51% of services indicating the need to pay overtime wages to ensure optimal staffing. For basic level services, only 3% routinely pay overtime to ensure staffing partly due to a large number of volunteer services. Despite the use of overtime pay to ensure staffing for emergency services, 28% responded they were unable to respond to a specific call due to staffing issues, while 72% of services indicated they were able to respond to all calls in the previous year with adequate staffing. Twenty-seven percent of BLS services and 32 % of ALS services were unable to respond to a call due to staffing in the last year.

The next question asked if they felt an inability to retain providers hampers the function of their department. Responses were very similar to the results for question about recruitment impacting their ability to function with 46% indicting they felt their service would be hampered by an inability to retain qualified providers. Forty-four percent of BLS and 51% of ALS services indicated they felt their service would be hampered by an inability to retain providers. When the results were disaggregated by county size, small counties had very similar results to BLS services and large counties had very similar results to ALS services.

The final question in this section combined recruitment and retention to ask if they felt either or both would impact the functioning of their service. Only 26% of services indicated that

their service would not be impacted over the course of the next five years by an inability to hire or retain qualified providers. About 31% of services indicated they are already being impacted, 4% responded they expected to be impacted in the next year, and 39% indicated an impact in the next two to five years due to an inability to hire or retain qualified providers. Almost 27% of ALS and 26% of BLS services stated they would not be impacted by an inability to hire or retain providers with close to 39% of ALS and 28% of BLS services stating they are already experiencing the effect on their service.

Initial Certification:

In terms of initial certification, 36% of all services responded they lack a conveniently located educational institution in their area. About 33% of services indicated their service has a convenient location to gain EMT certification and 28% responded by stating they had a conveniently located facility to gain all levels of certification. Filtering for large population counties shows only 25% lack a convenient location for EMS training and over 45% have a location to receive certification for all levels. Small population counties have over 43% of EMS services indicating they lack a convenient location for training, only 39% responded they have a close location for EMT training, and nearly 17% have a location to train all levels.

Despite the lack of a close training facility for EMS, about 44% of services lacked the ability to offer online education as a means to pursue EMS certification. About 41% of services have the ability to provide online education for EMT certification and almost 14% of all services have the ability for online education for either an EMT or paramedic certification. Another option available for training new providers is to offer a local class. In this case, 49% of all services stated they had offered a class in their area for EMT certification. An additional 23% have attempted to hold a class in their area, but they were unable to get enough attendants to hold

a class. About 15% of services have considered or would be interested in holding a class and only 14% of services indicated they had not considered holding a class. Filtering for ALS services reveals less interest in holding a class, which is likely due to a large number of local convenient training centers that are already available.

After completing the educational requirement to become an EMS provider, candidates must complete the National Registry test to prove competency. Services were asked about convenient testing locations or ability for remote testing for this exam, with close to 50% stating they did not have convenient access or the ability to take the test online. Filtering for ALS services, large population counties revealed a slight increase in local convenient testing sources.

About half (45%) of all services stated that potential candidates finished the entirety of the EMS certification coursework, but they did not attempt to pass the National Registry Exam to gain a license so they could practice. ALS services report a higher number of potential candidates who complete the education and training requirements but never attempt to pass the National Registry Exam than BLS. About 53% of ALS services and 71% of BLS indicated potential candidates completed all the educational components for certification but were unable to pass the National Registry Exam. Only 38% percent of services indicated they have a program in place to help candidates pass the National Registry Exam despite the high number of candidates that struggle with the testing process.

The last question in this section discussed if the length and/or difficulty of the EMT course is an impediment to training new providers. Responses to this question varied; about 40% of respondents indicated they thought both the length and difficulty of the EMT program was hampering training new providers, while 33% found the length and difficulty not to be a problem. Three percent stated the difficulty alone was the impediment and 24% indicated the

length of the course as the major problem. ALS services predominately indicated that neither the length nor difficulty were an impediment to training new providers. In contrast, BLS service respondents indicated that only 23% had no difficulty with the current coursework.

Continuing Education:

A high percentage (80%) of all services indicated that it was important to have convenient in-person continuing education opportunities to help providers complete recertification. About 78% of services indicated they have access to online continuing education at their disposal. When services were asked if they felt the lack of testing, training, and continuing education opportunities in their county hampered their ability to recruit or retain providers, 37% of services responded yes. There were only minor differences found between ALS and BLS.

Financial Support:

Nearly all (90%) of BLS services offer financial assistance for continuing education opportunities to their employees to help them maintain certification compared to 79% of ALS services. Almost 87% of BLS services offer financial support for training of new candidates to become certified in EMS versus 74% of ALS services. The State of Nebraska makes funds available to services to help pay for training and/or continuing education. Over 21% of services responded stating they were unaware that this assistance was available and 20% of services stated they knew it was available but had not made use of this resource. Nearly 59% of services stated they had used this source of funds to provide for either new training or continuing education for their employees.

Career Support:

Nearly 56% of services have a program in place to help candidates advance in their EMS career and achieve a higher level of certification. When participants were asked if they could work in their local hospitals in full-time EMS positions, 23% of all respondents stated that all service levels were able to work in the local hospitals and 11% indicated only paramedics were able to cross over and work in hospitals. Unfortunately, 67% of EMS professionals were unable to work in the local hospital in their region.

Results:

Recruitment:

EMS services are currently recruiting for volunteer positions throughout the state for any level of provider. ALS and BLS services have low levels of active recruiting efforts for open paid positions at this time, but major efforts are underway to recruit volunteers. In order to better examine these numbers, a filter was applied to look only at services that have a cap on the number of volunteers they will hire. Using this filter shows that over 54% of BLS services are currently looking to fill at least three open volunteer positions and 61% of ALS services are currently recruiting at least three volunteer providers. Although it is not surprising, there is a relationship between areas where the population is decreasing and increases in recruitment efforts to hire more staff.

Despite large semi-successful recruiting efforts to fill open volunteer positions in EMS across the state, services overwhelmingly do not have an active recruitment plan in place. Recruitment plans tend to be slightly more common in ALS services and in counties with larger populations but less than half of the services have an active plan. When a recruitment plan is in place, services indicate they tend to be very effective at helping to find and employ new providers.

A large degree of discrepancy exists over the ability of services to hire suitable candidates with only half the services indicating they are able to hire suitable candidates. Despite multiple data filters, no clear consistent pattern emerged to identify the services that have been successful in finding suitable candidates. Over the past year, the number of providers in the State has been steadily increasing suggesting the availability to hire qualified providers. Last year less than five percent of services lost more than five employees but over 12% of services added five or more employees. This trend continues for the category of hiring between two and five with a net increase in total employees. Breaking down new hires by provider level shows the State is increasing the number of paramedics faster than the rate of emergency medical technicians. Despite the increase in available hires, our data indicated many services are still struggling to hire appropriate candidates.

Offering a hiring bonus or a referral bonus is one possible avenue to help boost recruitment for EMS. Currently, only five percent of services in the State are offering bonuses with the vast majority of services indicating they lack the resources to put this type of program in place. Bonuses are more common in ALS services that operate in counties with larger populations.

Time commitment was consistently listed as the largest barrier to recruiting EMS providers at any level across the State with educational requirements coming in second. For recruitment of advanced level providers, wages and the time commitment were the major factors preventing the recruitment of new EMS providers. The major barriers for recruiting new paramedics into paid positions were the lengthy two-year training program and the starting wages for these positions. When recruiting volunteer emergency medical technicians, wages were not a barrier, but the time commitment and education requirements were both seen as major

barriers to this population. Family commitments, a job outside of EMS, and stress of the job were all barriers for recruitment for paid or volunteer providers for all levels.

A final question in the survey presented some intriguing results over the future ability of services to recruit at any level throughout the State of Nebraska. Over half of all respondents indicated they felt their service would be negatively impacted if they could not hire qualified providers. With the extensive time and training involved to create new emergency medical technicians or paramedics, new policies need to be established before it is even more difficult for EMS services to hire suitable candidates. A new recruitment strategy needs to be identified in order to have qualified professionals ready to fill gaps in our EMS workforce to ensure that high level of care is provided to every citizen in the State of Nebraska.

Retention:

Retention of EMS providers is very high after the initial difficulty in recruitment. Over half the responding services indicated that the average service length was over ten years. ALS services indicate a slightly shorter average service length, but this does not account for employees that move between services. BLS services have a longer average length of service with many providers staying for their entire career as a volunteer in their community. Close to 30% of services indicated they did not lose an employee in the previous year.

Reasons providers leave EMS are similar to the barriers that are preventing higher levels of recruitment. All levels of providers indicated EMS was a large time commitment and it was difficult to complete continuing education requirements. Paramedics on ALS services stated that low wages were the main reason they often leave EMS to pursue a new career. For BLS services, training requirements were a very common reason given why employees leave. There are many reasons why providers leave EMS that are specific to the type of area and service.

Retention programs in EMS services are not prevalent with only 19% of services currently offering a retention program. Retention programs tend to be more common in ALS services and in larger counties. Respondents consider the existing retention programs less effective with 50% stating their programs are semi-effective.

Fifty-one percent of ALS services indicated they routinely pay overtime to ensure an optimal staffing level for EMS coverage. Despite large payments in overtime, 32% of ALS and 27% of BLS services reported being unable to respond to calls due to staffing shortages. Services have high employee retention levels, but they need the ability to hire new qualified employees to ensure they are able to respond to all calls and to decrease the amount of overtime that is paid to employees. Looking at the impact of low recruitment levels and the semi-effective retention levels creates the possibility that EMS providers will be dramatically impacted in their ability to provide high-level care to every patient in future years. Only 26% of responding services felt they would not be impacted by an inability to recruit or retain new providers. Thirty-one percent of all services indicated they are already impacted by an inability to hire or retain qualified providers and 43% expect to be impacted over the course of the next five years.

Education:

The majority of EMS services lack a conveniently located facility to achieve certification. This problem becomes even worse for services located in smaller population areas where an even greater distance is required to attend an educational facility offering EMS certification. Online education technology is also lacking with less than half of all services capable of providing online courses to help candidates train without having to travel long distances. Remote location classes have been held in some regions with instructors traveling to

provide training, but smaller area services are often unable to generate enough students for a class.

After completing the necessary education, candidates must complete the National Registry Exam creating another barrier to certification. Services have indicated they have students finish the course but do not take the exam or students who are unable to pass the exam. A small percentage of services have a policy in place to provide guidance and help students to pass the National Registry Exam. Services indicated that the length and difficulty of the exam have been hindering their ability to hire new providers.

In order to maintain an EMS certification, providers are required to complete a certain number of continuing education hours depending on their provider level. Most EMS services offer live continuing education courses in their area to help ensure their members receive enough hours for recertification. For anyone that needs additional hours, online continuing education hours are available along with a variety of state sponsored events that EMS providers can attend to obtain the required number of hours.

Discussion:

Recruitment:

Emergency medical services play a crucial role in the health care system by providing rapid response to patients, on scene care, and rapid and safe transportation to an appropriate receiving facility to limit the severity and morbidity of trauma or medical emergencies. For EMS services to continue to provide high-level care to every patient, a highly trained and educated workforce is required. This survey, which focused on assessing the EMS workforce, reveals that new steps need to be taken to ensure that EMS services can continue to hire from a qualified pool of candidates.

To increase the number of EMS professionals new recruitment approaches are needed. In order to evaluate the current recruitment efforts and problems, the workforce needs to be divided into a group of large counties and cities with predominately advanced level services and towns or villages with small populations and predominately basic level services. Despite the vast differences, the one main recruitment barrier for both groups is the time commitment to education and training for people choosing to enter this field.

For larger cities there appear to be fewer difficulties in recruiting employees. Larger cities tend to have training facilities conveniently located with an increased likelihood that graduates will continue to practice in the area after they have completed their education. The major recruiting difficulty for ALS services is low wages in comparison to the time commitment of gaining a paramedic license. This causes many potential candidates to choose nursing degrees instead. New methods to increase the wages of EMS need to be evaluated to help eliminate the loss of EMS providers to similar higher paying medical jobs.

The recruitment barriers in rural areas involve a unique set of problems. As mentioned in the introduction, rural areas have an older population, which increases the demand for EMS calls, and a declining supply as more providers are at or nearing retirement age. Because of the lack training facilities, many community members who leave the area to complete their education often do not come back. Without a local training facility, community members working a full time job do not have the time to travel and complete an EMS course. Technology and long distance learning approaches need to be evaluated as an option for alleviating this problem. While clinical training will need to remain a hands-on instructional component, classroom learning could be completed with an electronic model allowing students to learn from home and decreasing the need for students to travel for education. By eliminating the difficulty

for people to gain an EMS education, we can train more providers and keep more of them in rural communities.

The first step to be taken for all EMS services is to assess other programs and then develop a comprehensive recruitment program that will generate greater interest from younger populations and increase the number of people entering EMS education programs. This is an opportunity for the state to create a program model that would allow local services to choose the specific components that would be most effective for their service agency. The program would need to be developed along two separate avenues, one focusing on the needs of the rural services and the other focusing on the needs of the larger cities. The plan should include visiting local junior and high schools to offer information about EMS education paths and attending career days. Educational grants could be offered to students to help cover the upfront costs of education with a guaranteed term of service after they graduate. Increased financial incentives could be offered to help areas currently lacking a qualified pool of candidates for open positions. Visiting schools and offering various financial incentives could help generate more interest from high school students who are interested in pursuing a career in EMS.

A second part of the new recruitment plan should involve recruiting EMS professionals outside of the state to relocate to Nebraska. These professionals could be offered sign-on bonuses or help with paying their education bills. In order to increase the attractiveness of EMS jobs, a career path needs to be created to allow upward movement of EMS professionals. A joint venture between EMS services and local hospitals or clinics that would allow all levels of EMS providers to work in the hospital or clinic setting would create high paying full-time jobs for emergency medical services and could help attract new providers. In addition, extra pay and

bonuses could be offered to professionals who work in areas with a surplus of personnel to travel for a couple days once a month to help areas that have staffing shortages.

Retention:

While retention of EMS providers is an area that needs to be addressed to ensure a qualified workforce, the results of the survey indicated that EMS providers tend to stay in EMS for a long time period. Survey results showed while services are losing employees, we have experienced a net gain in the number of EMS professionals working in the State of Nebraska over the last year. The time commitment and the continued education requirements were the most common reasons given that hamper the retention of employees. Wages were also a major factor when looking at retention in the advanced level services.

The State EMS office should create a comprehensive retention program model that could be tailored for individual services. These programs should be designed to help both smaller communities with a predominately BLS volunteer service and large cities with mostly paid ALS services. Retention programs could include components such as service recognition banquets and awards, pathways to gaining a higher level of certification, easier methods for achieving a higher level of certification, and possible benefits provided by the community they serve. Another component of retention programs would be methods to improve the function of the service by having open dialogue among all employees and management and creating a service where everyone plays an integral role in the overall functioning of the entire department.

A large percentage of Nebraska's EMS services are currently impacted or expect to be impacted in the near future by an inability to hire and retain qualified EMS providers. With the length of time required for individuals to gain EMS certification, it will be difficult to meet

future needs unless specific policies and programs are implemented to address the problems with recruitment and retention.

Education:

The ability for community members to receive EMS training and certification within their area is of crucial importance to help provide a qualified pool of candidates in rural areas. The ability to use technology to provide remote education offers an avenue for smaller areas to have local online classes to train new providers. Over the next couple of years with leadership from the State level, all services need to have the ability for online education for both initial training and for continuing education at their service.

The education component also needs to address how to ensure that candidates are taking and passing the National Registry Exam. To increase the number of candidates that take the test, remote testing sites need to be developed so people will not have to travel long distances. This should help to decrease the cost of obtaining certification and increase the number of people who are attempting or reattempting the test. Services also need to establish a program to help train and prepare candidates for the exam. This could begin at the state level by providing resources and organizing online test-help seminars for individual services. By increasing the availability of testing and providing resources to help ensure candidates are passing the exam, we can increase the number of EMS providers available for hire.

Continuing education was listed as a barrier to retain providers and this problem needs to be addressed. A statewide initiative to ensure all services have access to online continuing education is needed. The second phase would attempt to move from traditional classroom instruction to a model that allows people from across the state to participate in online continuing

education classes. By implementing this component, we can eliminate the redundancies of the same classes being held repeatedly throughout the state.

The State of Nebraska EMS office has some financial resources to help offset the costs of training and education. As noted in the survey, not all services are taking advantage of these resources and some are even unaware this funding. All services need to be made aware of these additional resources for training and continuing education. In using these resources, priority should be given to help areas that are struggling to recruit and retain providers.

Future Strategies:

A variety of specific strategies have been discussed in order to combat specific problems in the areas of recruitment, retention, and education to ensure a fully staffed and functioning EMS system throughout the state. The following sections look at some big picture ideas to change the composition of EMS by trying to alleviate future staffing problems.

The lack of clear structural guidelines at the federal level, as cities and towns implemented EMS system, has led to a fragmented system with many different types of services and manner in which those services are provided (Knott, 2003, p. 492). While the majority of states have provided protocols and guidelines that dictate the type of care that can be given based on the patients' needs, few states have cohesive guidance plans indicating how to set up and run an EMS system. This gap presents an opportunity for the State of Nebraska to create guidelines about how to develop, maintain, staff, and budget for a high functioning EMS service (Knott, 2003, p. 493). By forging links and similarities between EMS services in states, the state can help to integrate the EMS community into a group system that can offer mutual aid, personnel sharing, and offering initial and continuing education together. By sharing expertise in billing,

administrative functions, and holding joint classes, we can help to streamline functions, eliminate duplicitous efforts, and provide a higher level of care while saving money (Knott, 2003, p. 493).

After the integration of EMS systems across the state, the next step would be to develop a more formal agreement between the EMS system and critical access hospitals that would allow for increased efficiency and better access to health care especially in rural areas (Knott, 2003, p.494). Using paramedic and EMS staff in local hospitals when not responding to 911 calls helps to alleviate staffing shortages, provides increased opportunities for EMS staff to learn and use skills, eliminates the need for a separate ambulance building, and helps to streamline the healthcare system (Patterson et al., 2016, p. 145). A new state initiative, with appropriate funding, to produce guidelines to create uniformity in all EMS agencies allowing integration with local hospitals, presents an opportunity to decrease costs and improve access to primary and emergency care (Patterson et al., 2016, p. 153; Knott, 2003, p. 494).

A new community paramedic model allows for an expanded role for EMS providers in providing primary care (Mulholland, Barnett, & Spencer, 2014, p. 2; Patterson, Coulthard, Garberson, Wingrove, & Larson, 2016, p. 145). The founders of this new model argue that EMS is the logical choice to fill this new role due to their skills of patient assessment, medical treatments, and because they are already integral members of the community and health care system (Mulholland et al., 2014, p. 6; Wingrove & Laine, 2008, p. 32). Candidates would undergo additional training in areas such as sutures, otoscopy, and treatment of respiratory infections with antibiotics allowing them to treat more patients without having to transport them to a local hospital (Patterson et al., 2016, p. 145; Wingrove & Laine, 2008, p. 32). The role of the community medic could be expanded to include home visits for patients with chronic conditions to increase their access to primary care services by helping patients with medical

supplies, prescriptions, medication compliance, vaccinations, blood pressure checks, providing oxygen supplies, diabetic checks, behavioral health checks, and a variety of other functions (Mulholland et al., 2014, p. 3; Patterson et al., 2016, p. 149; Wiley, 2011, p. 7). A systematic review of current community paramedic programs outcomes conducted by Patterson et al. (2016) found improved management of chronic conditions and decreases in ER visits, fewer EMS transports, hospital admissions /readmissions, and preventing falls in elderly (p. 149). This new model would create additional career advancement opportunities for paramedics by expanding their level of education, increasing their pay, and providing extended care to patients in their region.

As the role for EMS providers expands and the integration of EMS systems into local hospital networks improves, there is a greater opportunity to change the continuing education requirements to maintain certification. As part of the new community EMS model, a variety of new training programs would occur, serving as hours toward recertification. Paramedics who have completed education programs as part of the new model should receive continuing education hours (Mulholland et al., 2014, p. 9). Continuing education hours, in the new model, would have a portion consisting of educating community members about understanding and changing risk behaviors related to chronic health conditions, providing blood pressure checks with care recommendations, and a variety of other educational activities aimed at improving the health of the community. Engaging in these activities can reduce the call volume of EMS professionals and create a healthier community.

Many EMS services have been using the concept of tiered responses in an emergency to maximize their resources and ensure that calls receive appropriate level of care. Tiering can take a variety of forms that involve ground units only or a mix of ground and air units. For a standard

tier system, an initial dispatch may involve first responders and/or emergency medical technicians to the scene. Once the level of care that a patient needs is determined, then secondary resources are dispatched, when necessary, including a paramedic unit or possibly a flight service. The use of helicopter transport in EMS has been shown to decrease morbidity especially in areas where the patient must be transported a long distance from the scene to an appropriate receiving facility (Andruszkow et al., 2013). Another method being used is a roaming paramedic in a non-transport vehicle that is strategically positioned to offer assistance whenever a tier is needed. EMS systems that provide only basic level service often have agreements in place with neighboring services to provide a higher level of care when necessary. By incorporating this type of system, it is possible to maximize the benefit of higher-level providers by utilizing them only on calls that require a higher level of care.

National programs are continuing to conduct research to gain a better understanding of national EMS workforce issues and potential steps that can be taken to ensure a qualified workforce. The State of Nebraska needs to continue to monitor these national programs and adopt them if they can benefit EMS providers in our state. Additional research should be conducted to gain a more detailed picture of the emergency medical services across the State of Nebraska along with possible solutions to determine specific policy actions that can be taken to ensure a qualified prehospital response system. More research into recruitment and retention programs should be conducted to determine where the greatest impact could be made and what policy changes are needed. A study looking at the feasibility of integrating EMS systems into a statewide network to streamline functioning should be conducted. A second portion of this study could address the benefits of integrating EMS into local hospitals to provide a career path for EMS professionals and increase primary care services in their communities. This assessment

should be viewed as starting point to begin conversations about the current EMS workforce and how we can train them to provide high quality care to every patient every day.

Limitations:

This study was limited by the relatively low response rate to our survey. With fewer than 50% of all services completing the survey, it may have led to conclusions that are not reflective of all EMS services. The completion rate of the survey participants was close to 93%, but it is possible that some reporting bias could exist in the surveys that were not fully completed. While descriptive analysis was used to analyze data, no attempt was made to analyze statistical significance, which limited the power, our conclusions. However, the conclusions in this study were very consistent with those of previous studies on the national level indicating a need for increased efforts on recruitment to ensure the continued function of EMS systems.

The variant structures of emergency medical services throughout the state create difficulty in ensuring the accuracy of our data. Survey questions, in some cases, did not account for all the different types of services to ensure appropriate grouping. One person identified as the director or manager provided answers to all questions, however, some questions required them to provide secondhand information that could be incorrect. In order to increase the validity of our responses, another survey should be completed by all EMS personnel throughout the state or a randomly selected representative group of EMS personnel to gain additional data from frontline staff.

Conclusion:

An effective and efficient emergency medical system across the State of Nebraska is essential to improve the health of the population by limiting the severity and morbidity of medical and/or traumatic emergencies through rapid response, on scene care, and transport to an

appropriate facility. In order to ensure EMS is capable of continuing to provide high-level care throughout the state, we need to take steps now to ensure that a qualified pool of providers is available. A state model for recruitment and retention programs should be developed and implemented to streamline these approaches to gain the maximum possible benefits. By creating an approach at the state level, individual services will be able to pick and choose the best components to meet their needs and maximize the recruitment of new providers.

A new policy should be created to help guide the development and function of EMS systems with the goal of creating uniformity and reducing redundancies. By streamlining the functions of EMS, a cohesive network of EMS services can be created that coordinates their activities across the state. The next step in this process is to integrate EMS systems into local hospitals to further reduce costs and increase the availability of primary care for rural residents. Additional research and feasibility studies are needed to evaluate new models (e.g., community paramedics) to create a more effective and efficient EMS system that is capable of providing a high quality care in both urban and rural areas.

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Service Learning/Capstone Experience Reflection:

The experience of my service-learning project with the Emergency Medical Systems of Nebraska was a rewarding experience that offered a large amount of insight. I was involved in a variety of projects that were occurring, specifically, helping with updates to rules and regulations. I learned how the state department functions and how it interacts with the specific EMS services throughout the state. The EMS department creates the policies and procedures that detail the type of care and how that care should be administered based on patient needs. I was surprised to realize the degree of autonomy each service has in deciding how to provide this service. Individual services are able to decide what level of care they will provide, whether they will be a transporting unit, how to staff, and whether to function with volunteers or paid providers. I was surprised to learn the state did not have more concrete rules and guidelines for EMS services. It was interesting to see how the state maintained overall control of licenses that allow services to function in EMS, but giving a large amount of autonomy to individual services.

The main part of my project was to conduct an assessment of the EMS workforce throughout the state. Working with the regional EMS specialist, we created a survey we sent out to all EMS agencies throughout the state to gain as much data as possible. By using the regional EMS specialists, I was able to draw on their knowledge to make a better survey, more tailored to EMS services in Nebraska. The regional EMS specialists also helped to increase the responses to the survey, by sending out an initial request and using their contacts to help increase interest and survey responses. The outcome of the project was a 46-question survey that was completed by close to fifty percent of all services. The survey data was given to the State, allowing them ability to go back and look at any question with all the responses, along with the ability to filter data across a number of variables. The State of Nebraska will be able to use this data to start to

examine current EMS workforce issues and began to develop plans to solve future shortfalls. My hope is this paper will create more discussion on how we can recruit more people into EMS and make better use of our current EMS resources. A large percentage of services indicated they were either hampered currently or worried they would be hampered in the future due to an inability to recruit and/or retain providers.

I worked on a variety of different service learning projects, along with helping on some administrative tasks while in Lincoln. The first big project I worked on was to determine the different types of ownership for EMS services, for example county owned, city owned, or a private company. A new bill had been passed by the state that had not listed all different ownership types, leading to a problem where they could not provide funding to county owned services due to them being left out of the bill. I created a spreadsheet to determine all the different types of ownerships and how many services fell in each group to determine how many services were affected. This information was then passed on to allow them to address the issue. The project I worked on during my final couple of weeks and am still working on is a new interactive map containing all hospitals and EMS agencies. The map will have multiple layers that can be selected to show you different amounts of information for hospitals like all level II trauma centers, hospitals with cath labs, and stroke centers. It will also contain all EMS agencies and training agencies with filters to allow users to look at all ALS services, BLS services, or services that will provide a tier. In order to complete this project, I am working to create a spreadsheet with all the relevant data, including geo locations to provide to our mapping department for production. My background as a medic helped to understand the types of layers that would be important for emergency medical services to help make transport decisions. Having the public health background with a variety of preparedness classes, I was able to plan for a

second portion that would add in a variety of disaster layers with locations of response teams, NIMS groups, isolation units, and with a long term hope to make the map show real time locations of responding units and where more help is needed. In a disaster, this would help to identify areas with extra staff or hospitals that are overwhelmed so patients could be diverted. This is a great project that has the potential to continue to grow and provide more information.

The biggest challenge of my capstone project was moving in a new direction after my initial idea proved to be unfeasible. I had been intending to use the EMS state database for a large amount of my data. Upon getting into the database and spending a couple days looking around and familiarizing myself with its usage, I discovered it was not completely setup for how I wanted to use it. The software has the ability to write new code and programs to be able to output any data you would like, but the time it would take to determine how to create those searches and having the software people create them would have taken too long for my capstone. I decided instead, to not do key informant interviews or database for information and instead sent out a survey to all EMS agencies to gather data. Despite the early delay and shift of direction the project moved along smoothly and I was able to get some great data. If I had a longer time period, I would have liked to have some new searches created in the EMS database to gain additional data to reinforce my paper.

I have gained an appreciation for all of the work that goes on behind the scene to help foster public health in the community. In order for EMS to function, it requires a state department to help guide, provide funding, and oversee licenses and certifications. The work they do provides the proper rules and regulations to ensure pre-hospital care is safe and effective. I have spent my career working as a paramedic to provide care to people that have been injured or fallen ill. I always have felt I could be doing more upstream work in public health to prevent

illness and injuries before they occur, and have now gained an understanding of what it takes to start to tackle public health issues before they impact the public. An instructor told me a long time ago, you can go out and pull baby after baby out of a river, but at some point you have to ask yourself why babies keep ending up in the river and through my public health education I now understand more ways to accomplish preventing health problems before they occur.

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