Bridging the Gap: Can Paramedics or Nurses Play a Role in Reducing Excessive 911 EMS Use?

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Certification Statement

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

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Abstract

The specific problem addressed by this study was the failure of the New Smyrna Beach Fire Department (NSBFD) to perform a pre-event needs assessment to support developing programs to reduce the incidence of non-emergency 911 EMS use. The purpose of this applied research project was to conduct a pre-event needs assessment for non-emergency medical services placed through the 911 system. The study used a qualitative applied research method with primary data collected through interviews with five subjects that have excessively used the EMS system for non-emergency care. The research questions focused on identifying the underlying medical and social factors contributing to overuse of EMS for non-emergency medical services in New Smyrna Beach. They also sought to identify strategies and approaches that could be implemented to reduce overuse of EMS for non-emergency medical services. The procedures involved use of purposeful sampling to identify subjects and a semi-structured interview format that used standardized initial questions as well as follow-up questions. Content analysis was used to identify the themes and patterns in the interview data. The results identified transportation issues such as distance to public transportation and ineligibility for medical transportation as major factors contributing to overuse of EMS for non-emergency medical services. The results also indicated that expanding eligibility for medical transportation and providing non-emergency in-home care services were feasible alternative strategies to reduce EMS. The NSBFD should perform a cost benefit analysis prior to implementing an alternative medical transportation service. If the service does not reduce non-emergency EMS use, the NSBFD should consider implementing the strategy of in-home care using registered nurses or paramedics.
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Introduction

The New Smyrna Beach Fire Department (NSBFD) provides ambulance and emergency medical services (EMS) to the residents of the city with the service accessible through the 911 system. The NSBFD faces an issue from a small number of residents excessively using the city's EMS for routine and sub-acute services. Some of these residents call 911 several times a week requesting ambulance or EMS with many of problems involving diabetes or respiratory complaints that are not emergencies. Because paramedics and nurses employed by the NSBFD must answer these calls, they are not available in the event that a genuine emergency arises requiring their services. The specific problem for the NSBFD is that it has failed to perform a pre-event needs assessment to support developing programs to reduce the incidence of non-emergency 911 EMS use.

The purpose of this applied research project is to conduct a pre-event needs assessment for non-emergency medical services placed through the 911 system. The project is delimited to an investigation of the use of the 911 system for routine and sub-acute services by residents in New Smyrna Beach, Florida. The findings of the research will be used to make recommendations to the NSBFD concerning strategies to reduce the overuse of EMS for non-emergency medical services and the approaches to implementing the strategies.

The research used a qualitative action research method to develop identify strategies for reducing overuse of EMS for non-emergency medical services at the NSBFD. The research will collect primary data with interviews of subject matter experts, who are defined as the individuals who excessively use 911 services for non-emergency situations. These subjects are the individuals most familiar with the factors causing the excessive use of EMS for sub-acute medical conditions. A purposeful sampling approach was used to identify the subjects for the
study. Five interviews were conducted with subjects, using a semi-structured format. Each subject was initially asked the same questions with follow-up questions based on the response. A content analysis approach was used to analyze the data obtained from the interview, which was the basis for answering the following research questions.

The first research question of the study was: What are the underlying medical and social factors leading to the overuse of EMS for non-emergency medical services in New Smyrna Beach? The second research question of the study was: What intervention strategies could reduce the overuse of EMS for non-emergency medical services in New Smyrna Beach? The third research question of the study was: How can NSBFD implement one or more intervention strategies to reduce overuse of non-emergency medical services?

**Background and Significance**

The NSBFD provides both fire and rescue services to the city of New Smyrna Beach, Florida. The city has a population of approximately 25,000 and encompasses a geographic area of 39.7 miles. Both Interstate 95 and Route 1 are major highways passing through the city, which increase the need for EMS for traffic injuries involving transient motorists. As a result, the need for EMS services is generally higher than normal for a city with the New Smyrna Beach population base.

The NSBFD has 61 full-time firefighters including the chief, battalion chiefs, and lieutenants. Among the employees, 22 hold paramedic licenses. The NSBFD is organized into three battalions at four stations, with staff divided into three shifts to provide continuous coverage. The NSBFD operates one fully equipped emergency life support vehicle with advanced live support (ALS). In addition, the six fire trucks operated by the city contain ALS
equipment that can be used at any emergency location. As a result, each station has ALS
capability, although only one vehicle is available for transport.

The NSBFD uses the emergency Medical Priority Dispatch System (MPDS) system to
prioritize the use of EMS services and vehicles. The employees at the Public Safety Answering
Point (PSAP) have received training and have access to materials to allow them to prioritize
vehicle dispatch. In general, the PSAP will obtain information from the caller through
appropriate questioning, dispatch EMS services, and if necessary provide the caller with pre-
arrival instructions. The NSBFD also uses the MPDS code system to assign priority to the
available vehicles based on the condition reported in the call to the PSAP. For extreme
emergencies such as inefficient breathing, the NSBFD will dispatch the closest vehicle with ALS
to the location to stabilize the patient while awaiting patient transport, which can include a fire
truck with ALS equipment. The response priority diminishes as the severity of the symptoms
decreases.

The NSBFD receives an average of 6.9 calls to the 911 PSAP for EMS services each day,
and approximately 2,500 calls a year. Approximately 20% of these calls or 500 are from a group
of people with medical disorders that are not life threatening and the presenting symptoms do not
represent an acute situation requiring EMS. This situation creates a significant public safety issue
in New Smyrna Beach in the event of multiple incidents occurring simultaneously requiring
EMS or fire services. On many occasions, a serious medical incident has occurred requiring ALS
and emergency transport when the NSBFD ambulance was dispatched to a call that could be
classified as non-emergency and having a relatively low dispatch priority. While the PSAP
dispatches a fire truck with ALS equipment to the second call, the individual with the medical
emergency often has to wait for transport until the NSBFD ambulance is available or the NSBFD
makes alternative arrangements with a private ambulance service. At the same time, the use of fire trucks for EMS compromises the ability of the NSBFD to respond to additional fire or medical emergencies. In effect, the use of EMS for non-emergency medical conditions significantly affects the ability of the NSBFD to meet its mission objectives of protecting the lives and property of the citizens and visitors to New Smyrna Beach.

The issue of inappropriate use of EMS for non-emergency medical conditions also has financial significance for the NSBFD. The dispatch of the NSBFD ambulance or other vehicles with ALS equipment has costs in the form of supply consumption and wear on the vehicle and equipment. At the same time, the NSBFD has substantial budget constraints because of lower revenues for the city over the past several years. Identifying approaches to reduce the incidence of inappropriate use of EMS could contribute to the ability of the NSBFD to meet budgetary objectives.

The issue of inappropriate use of EMS and its affect on the NSBFD is related to the courses concerning leadership issues in emergency medical services and emergency medical services incident operations. The applied research project involves a leadership initiative through a needs assessment concerning the use of EMS for non-emergency services in New Smyrna Beach. The applied research project also includes developing recommendations to reduce use of EMS for non-emergency services, which involves proactive leadership for resolving issues that have an adverse effect on the ability of the NSBFD to meet its mission objectives. The research also involves potential changes to EMS operational protocols that could lead to reduce incidence of calls for EMS involving non-emergency medical conditions.
Literature Review

The literature concerning the use of EMS for non-emergency medical services discusses the three topics of: 1) a definition of non-emergency use and inappropriate care; 2) factors contributing to non-emergency use of EMS; and 3) strategies to reduce non-emergency use of EMS. The literature generally indicates that non-emergency use of EMS is a growing problem for which there is no standard solution. Previous research examining the issue, however, suggests that identifying the root cause of non-emergency EMS and providing alternatives for chronic users may result in more efficient use of EMS resources.

Non-Emergency and Inappropriate Use

There are no standard criteria for identifying non-emergency and inappropriate use of EMS that researchers have adopted (Carrett, Fassa, & Domingues, 2009). The criteria for defining inappropriate use of EMS are significant because more stringent criteria will lead to the perception that there is a high incidence of non-emergency EMS use in a region. In contrast, relaxed criteria for determining whether an EMS call is appropriate can lead to the perception that there are relatively few non-emergency calls in a region.

The Hospital Urgencies Appropriateness Protocol (HUAP) is one approach to determining whether a case is urgent. The HUAP protocol considers conditions of severity such as altered vital signs, treatment such as the need for immediate IV medication, and origin of the need for EMS services (Carrett, Fassa, & Kawachi, 2007). The failure to meet the criteria for emergency services established by the HUAP protocol is an indication that the patient has made inappropriate use of EMS. Another approach to defining inappropriate use of EMS for non-emergency care relies on the final diagnosis after the patient arrives at an emergency department. A non-emergency situation consists of any diagnosis that did not involve an acute condition that
created a medical need for transport (Snooks, Wrigley, George, Thomas, & Smith, 1998). In
some cases, the definition relies on a broad definition of medical need.

An alternative definition of non-emergency care involved an EMS-need based on an
assessment of whether the service could have been rendered at an alternative care setting such as
a physician's office or an urgent care center (Hauswald, 2002). If the medical treatment did not
require the use of an emergency department, the use of EMS was inappropriate. A third approach
to inappropriate EMS use relied on whether the EMS service was reimbursable by a third-party
payer. If the third party payer denied a claim for reimbursement because ambulance and
emergency service was not suitable for the medical condition the patient complained of, the EMS
was considered inappropriate (Hauswald & Jambrosic, 2004). Yet another definition of
inappropriate use simply examines whether the medical condition is non-urgent and whether the
patient has viable alternative means of transportation to a hospital (Richards & Ferrall, 1999).

Regardless of the specific definition used for inappropriate EMS use, the general trend is
toward increase use of EMS for non-emergency and medically unnecessary transportation
(Weaver, Moore, Patterson, & Yearly, 2011). Between 1997 and 2007, the percentage of
medically unnecessary transports increased from 13% to 17% on a national basis. The percentage
of transports also does not fully reflect the total number of calls for non-emergency or non-
urgent care, which are substantially higher than the actual number of individuals transported.
Certain areas that have a high indigent or elderly population also have a much higher level of
medically unnecessary EMS calls and transports when compared to areas with a younger
professional population.
Factors Contributing to Non-Emergency Use of EMS

Some research indicates that the time of day may be a factor associated with inappropriate use of EMS, but there is no agreement concerning the time of day that inappropriate use is more prevalent. According to Carrett, Fassa, and Domingues (2009), individuals are more likely to use EMS for non-emergency services during the morning and afternoon, and less likely to inappropriately use services at night. In contrast, Snooks, et al. (1998) found a steady increase in the use of emergency services including ambulance services and emergency department care for routine medical care outside of normal working hours. Larkin, Claassen, Pelletier and Comargo (2006) found that the highest rate of inappropriate use of EMS services occur between midnight and 8 AM with a high proportion of these EMS calls involving mental health issues. These various findings suggest that inappropriate use based on time of day may differ in various locations, but may tend to be higher at night in general.

The research examining the use of EMS for non-emergency medical care has found a correlation between socioeconomic status, with lower income individuals more likely to use EMS for routine medical care (Carrett, Fassa, & Domingues, 2009). Individuals in lower socioeconomic groups were 2.6 times more likely to use EMS for both emergency and non-emergency situations when enrolled in a third-party payment plan such as Medicaid (Siepmann, Mann, Hedges, & Daya, 2000). These findings are similar to those of Richards and Ferrall (1999) who determined that patients with high school and grade school education were more likely to use EMS services than patients with higher level of education.

Although many low-income individuals in urban locations are aware of alternatives to EMS for routine care, they also perceive a number of access barriers (Wilkin, Cohen, & Tannebaum, 2012). The ability to afford community clinics, hours of operation, and
transportation to the medical services create difficulties with accessing routine medical care. In contrast, users perceive EMS services as convenient for transportation to emergency departments for accessing medical care. In addition, pain, uncertainty, and anxiety lead individuals to use EMS for non-urgent care despite the availability of primary care clinics (Wilkin, et al., 2012). In effect, low-income individuals with a medical problem recognize that characterizing the problem as an emergency is more likely to result in prompt and efficient access to medical care. These findings, however, were based on data obtained through a focus group with a relatively small sampling.

In general, however, research has produced conflicting findings concerning the existence of a correlation between the type of insurance available to an individual and the use of EMS or ambulance services to obtain medical care. Richards and Ferrall (1999) determined that patients with no insurance or Medicaid were less likely to use EMS for non-urgent medical care than patients with private insurance or Medicaid. In contrast, Meisel, Pines, Polsky, Metlay, Neuman, and Branas (2012) found a higher rate of EMS use among patients with no insurance and patients with Medicaid. This research examined 61,000 visits for emergency services, finding that 13% of uninsured visits, 11% of private insurance visits, and 16% of Medicaid visits arrived by ambulance. Larkin, et al., (2006) determined that patients with private insurance paid for from their own resources had the lowest rate of inappropriate use of EMS for non-emergency purposes. These authors concluded that individuals who pay for their own insurance are also more likely to have alternative means of transportation for medical services and are therefore less reliant on EMS for transportation.

These various findings concerning the correlation of insurance with inappropriate EMS use suggest that EMS use for non-emergency care may depend heavily on the type of payment
system established by the community and the third party payers for the service. At the same time, the amount of payment from certain government reimbursement systems such Medicare is well below the actual costs of making the EMS call (Committee on the Future of Emergency Care, 2007). As a result, public EMS services such as those provided by fire departments cannot recoup the cost of operations.

Research has also identified mental health issues as a factor leading to inappropriate use of EMS (Rosenbaum, 2010). Individuals with delusions or dementia may call 911 yet refuse treatment or transportation when the EMS arrives. These individuals may also fail to meet the criteria for involuntary hospitalization, which involves posing a danger to themselves or others. The problem is particularly difficult for elderly individuals with dementia who may be lucid at the time of arrival of the EMS. Earlier research by Richards and Ferrall (1999) also found that mental health issues presenting as altered status was one of the more common motivations for EMS calls. In addition, a high percentage of these patients elected to use ambulance transport to a medical facility although their conditions were not acute and they had alternate transportation available.

Additional research has confirmed that individuals with behavioral and mental health issues account for a higher percentage of medically unnecessary EMS calls than individuals with non-mental health related conditions (Cuddleback, Patterson, Moore, & Brice, 2010). In many cases, behavioral conditions resulting from alcohol or substance abuse provided the motivation for the EMS call, with the condition not acute. Nonetheless, the patient could not make a rational determination as to whether the EMS should transport the patient to a hospital. As a result, the EMS provided the transport because of uncertainty concerning the actual condition of the patient although these patients are rarely admitted to hospitals. In contrast, behavioral health calls
related to more serious disorders such as schizophrenia lead to hospital admissions. These findings also suggest that the majority of inappropriate use of EMS service related to mental health issues come from alcohol and substance abuse issues.

Research conducted by Patterson, Baxley, Probst, Hussey and Moore (2006) examining non-emergency EMS use for children in South Carolina identified race-based disparities and types of disorder as key factors in EMS misuse. The incidence of EMS calls for non-emergency conditions of respiratory and conduct or behavioral disorders represented 16.4% of all EMS transports of children under the age of 17. In addition, a correlation existed between unnecessary transport and the factors of race, location of residence, and coverage by Medicaid. Non-white children and rural children were more likely to request unnecessary EMS services than white and urban children.

The elderly and particularly the elderly who have suffered injuries are more likely to use EMS services for routine medical care (Fleischman, McConnell, Adams, Hedges, & Newgard, 2010). Approximately 30% of the elderly receiving EMS transportation have routine or non-acute conditions. In addition, 67% of the elderly using EMS for transportation for routine or non-acute conditions have previously suffered an injury. These findings suggest that the elderly who have been injured require some type of transportation assistance with access to alternate medical transport possibly reducing demand from this group for EMS transportation. Some evidence, however, suggests type of insurance coverage rather than age is the critical factor in the use of EMS for non-emergency care. While the elderly are covered by Medicare that covers ambulance transport, the highest rate of use in non-emergency ambulance transport is among people under the age of 40 covered by Medicaid (Richards & Ferrall, 1999).
Strategies to Reduce Non-Emergency Use of EMS

According to Tintinalli, Cameron, and Holliman (2010), there are four general strategies available to reduce inappropriate use of EMS for non-emergency care. The first approach involves screening calls for EMS to sort genuine emergency calls from non-emergency calls for routine services. This approach requires that the PSAP have a registered nurse answering calls at all times. A second approach is to educate the public concerning the circumstances in which it is necessary to call for EMS. The third approach is to provide alternative transportation for callers who do not have an emergency problem but call for EMS services. The fourth alternative relies on a treat and release approach in which EMS is dispatched to calls with paramedics having the authority to determine if the patient should be treated and released without transport to a hospital.

Some cities in the United Kingdom have adopted the triage screening strategy to reduce non-emergency EMS use by having nurses and paramedics perform some degree of triage when an individual calls to request EMS (Dale, 2004). The nurse or paramedic obtains information from the patient and determines if the medical problem represents an emergency based on clearly defined criteria concerning the reported symptoms. After the system was implemented in London, the triage process determined that 52% of the calls did not require the dispatch of an ambulance. A review of the medical records of 239 of the individuals the nurses and paramedics determined did not require emergency services found that only 2 required an ambulance within 14 minutes of the call. Neither of the cases was life threatening. Based on these findings, the triage system was expanded.

The triage approach, however, may not be suitable in the United States because of the liability issues that could develop for a municipality in the event of an error in the triage classification. Nonetheless, some municipalities have considered using a triage system based on
the telephone pathway management approach used by HMOs when authorizing medical services for members (Walz, Krumperman, & Zigmont, 2011). In this system, the 911 caller would speak with a nurse who uses an algorithm to assess whether the situation requires an ambulance with paramedics. The pathway management approach also combines the concept of alternative medical transportation by providing non-emergency callers who do not require EMS with options such as calling a taxi to provide transportation.

Including a triage nurse in the decision concerning whether a patient is an emergency or non-emergency situation can substantially reduce inappropriate use of EMS without compromising safety. Research conducted by Smith, et al. (2001) on the effectiveness of an EMS telephone referral system determined that a telephone referral system with a nurse performing triage was as effective as dispatching an EMS unit with a nurse on each call. In effect, the nurse could determine through the telephone contact whether the medical situation was an emergency requiring the use of EMS. In many cases, the nurse referred the call to home care or a physician. In the cases representing a genuine emergency, the nurse referred the call back to the EMS dispatcher. The study also found no adverse outcomes from the nurse referrals.

Another strategy used in some jurisdictions was to conduct an educational effort in the community to reduce improper use of the 911 system (Samson, 2004). This approach has been successful with reducing misuse of 911 for police, but may not be effective with EMS because of the social and psychological issues contributing to the use of EMS for routine medical services. Walz, Krumperman, and Zigmont (2011) note that public education programs such as "Make the Right Call" have reduced inappropriate use of 911 systems for EMS, but the issue still remains significant. The findings of some research indicate that users of EMS for routine medical care are often aware of the alternatives in their communities (Wilkin, Cohen, & Tannebaum, 2012). The
behaviors of users of EMS for inappropriate routine medical care suggest that public education programs have only limited value for addressing the issue.

Another approach to the problem of non-emergency requests for EMS services is to establish a two-tier system in which the dispatcher determines if the call is non-emergency and dispatches a basic life support vehicle (Wilson, et al., 1992). The ambulance dispatched in response to a non-emergency call is driven by a single paramedic who can assess the patient to determine if the issue is indeed, routine in nature. The ambulance can transport the patient if the condition requires emergency services. Stout, Pepe, and Mosesso (2000) examined the effect of this type of approach on EMS services in Seattle. The city had instituted a system in which a fully equipped advanced life support (ALS) ambulance and paramedics were dispatched to an emergency 911 call. A basic life support (BLS) ambulance with medical technicians was dispatched to 911 calls suspected as non-emergency. The system was managed with the advanced systems status software that directed ALS and BLS vehicles to their destinations as necessary. The BLS ambulance could transport a patient if necessary and could request an ALS ambulance if a patient require stabilizing prior to transport. The research determined that the approach created financial and operational efficiency without compromising quality of care.

Additional approaches that some municipalities have implemented to deal with inappropriate EMS calls include a two-tiered EMS system for emergency and non-emergency calls (Stout, Pepe, and Mosesso (2000). This involves establishing a separate 311 call system for non-emergency services (Walz, Kruperman, & Zigmont, 2011; Wilson, Gratton, Overton & Watson, 1992). The strategy has been used by some police departments for reducing misuse of EMS is to establish a 311 telephone system for non-emergency services based on the assumption that the number is as easy for people to remember as the 911 system (Committee on the Future of
Application of the approach to EMS, however, requires users to determine whether the situation involves a routine or emergency medical situation, which is a decision that they may not be able to make. In addition, the city would have to develop a response system for non-emergency situations that functions in tandem with 911 EMS.

The two-tiered approach described by Wilson, et al. (1992) and Stout, Pepe, and Mosesso (2000), however, requires some duplication of resources, and has been used only in larger cities. In addition, there is evidence from research indicating that paramedics cannot safely determine which patients are suffering from routine medical problems and do not require transport to an emergency department (Hauswald, 2002). This finding is based on a comparison of paramedic recommendations concerning the need for transport of patients and a review of medical records.

The two-tiered calling system has been only partially successful in reducing the amount of inappropriate EMS use. Because of the possibility that a caller will use the 311 system when intending to use the 911 system for a genuine emergency, the 311 system should be integrated with the PSAP operation to ensure that emergency vehicles can be rapidly dispatched if necessary (Walz, Krumperman, & Zigmont, 2011). The system may also fail to deter use of EMS for routine medical treatment if a third-party payer is financial liable for any costs associated with EMS care. According to research conducted by Siepmann, et al. (2000), financial liability for EMS use is a significant deterrent to inappropriate use. The findings of this study supported the conclusion that financial considerations have a significant effect on EMS utilization rates for both emergency and non-emergency situations.

Patterson, et al. (2006) identified a community-intervention approach that could lead to lower non-emergency use of EMS service. This approach involved providing clinics and other
medical services for the population in the geographic area that generates the highest rate of inappropriate use of EMS services for routine medical services. The 911 system referred callers in the geographic area deemed non-urgent to the clinic or other medical services facility such as an urgent care center. This type of system, however, requires a relative large population and a significant financial commitment by the municipality to provide 24-hour services. In addition, the assumptions of Patterson, et al. are not consistent with the findings of Wilkin, Cohen, and Tannebaum (2012) who determined that people may not use alternative services as long as EMS services are available.

There is also some evidence that a few jurisdictions allow paramedics to refuse to transport patients when they believe that the transport is not medically necessary (Knapp, Kerns, Riley, & Powers, 2009). The refusal primarily involves callers that have no alternative means of transportation, but is implemented only after communicating with a medical supervisor such as a registered nurse. In a few jurisdictions, EMS personnel also staff transport vans for medical services to provide services to individuals without alternative means of transportation.

**Summary and Implications of the Literature Review**

Although there was no consensus in the literature concerning the definition and measures for inappropriate use of EMS for non-emergency or routine care, there was general agreement that the issue creates significant difficulties for providing appropriate EMS in a community (Weaver, et al. 2011). Factors with a correlation to use of EMS for non-emergency or routine services include time of day (Larkin, et al., 2006); socioeconomic status (Carrett, Fassa, & Domingues, 2009); the type of insurance if any (Meisel, et al, 2012; Richard & Ferrall, 2009); mental health issues (Rosenbaum, 2010; and age (Fleischman, et al. 2010). There is also
evidence that there are disparities in the use of EMS based on race and the type of disorder, particularly among pediatric users (Patterson, et al., 2006).

Although municipalities have tried various strategies to reduce inappropriate use of EMS for non-emergency calls, the strategies have only been partially effective (Tintinalli, Cameron, & Holliman, 2010). These strategies have included triage screening at the PSAP (Dale, 2004); triage linked with telephone referral (Smith, et al., 2001); educating the public on the proper use of EMS (Walz, Krumperman, & Zigmont, 2011); two-tiered calling systems using 911 and 311 (Stout, Pepe, & Mosesso, 2000); and a community intervention system with clinics located in high use neighborhoods (Patterson, et al. 2006).

The majority of the research examining issues related to inappropriate use of EMS relied on quantitative approaches involving statistical analysis of the characteristics of the patients or the scope of services and decision-making authority of the EMS team. The findings of the research suggest that certain factors such as age or mental health status contribute to use of EMS for non-emergency needs. Previous research, however, has not focused on qualitative analysis of the reasons that some individuals use EMS for non-emergency medical care. A qualitative approach could be beneficial for developing strategies for reducing non-emergency EMS use targeted to the specific needs of a narrow population.

An additional implication of the literature is that strategies to reduce inappropriate EMS use require some degree of structural change in the way the organization administers the EMS system. One of the possible structural changes noted in the literature involves expanding the decision-making authority of the registered nurses involved with the PSAP (Smith, et al. 2001) or the paramedics after they arrive at a call (Knapp, 2009). The literature also implies that a combination of approaches may be effective for reducing non-emergency EMS use, with several
strategies working in tandem more likely to influence chronic abusers of the EMS system than a single strategy.

**Procedures**

The procedures were based on a qualitative action research approach to conduct a pre-event needs assessment for non-emergency medical services placed through the 911 system. The action research approach collected primary data through interviews with five individuals who chronically use the 911 system for non-emergency EMS services. Content analysis was used to identify the factors leading the subjects to use the 911 system for non-emergency EMS services. The findings were the basis for identifying feasible EMS strategies for the NSBFD to reduce inappropriate use of the 911 system for non-emergency EMS services.

The action research used a purposeful sampling approach to identify individuals in the community who have chronically used the 911 system for non-emergency medical services. A purposeful sampling approach is appropriate when the objective of the research is to obtain information from subject matter experts who have a thorough understanding of the topic under investigation (Patton, 2002). The criteria for inclusion in the study population were: a) individuals who have used EMS services in New Smyrna Beach more than three times in the past year; b) individuals who were not admitted to a hospital resulting from the use of EMS services; and c) individuals who did not require EMS in the opinion of the paramedics delivering the services. The selection criteria identified 23 individuals who used the NSBFD EMS services for non-emergency medical care.

The researcher contacted the prospective participants in the study by telephone, explaining the purpose of the study and the role of the participant as interviewee. This process led to five individuals agreeing to provide information about their use of EMS. The prospective
participants also received assurances of confidentiality with all information they provided identified only by a number assigned to each interviewee. The interviewees were recorded with the permission of the interviewee to facilitate analysis of the data. Each interviewee also completed an informed consent form that explained the purpose of the research, the precautions to maintain confidentiality, and the right of the participant to withdraw from the study at any time.

The interviews used a semi-structured format in which the researcher acting as interviewer initially asked the same questions of all participants. The interviewer then asked additional follow-up questions based on the response of the interviewee. The interviews took approximately one-half hour and were conducted in the homes of the interviewees, which was an environment in which they were most comfortable. The Appendix contains the initial questions posed to the interviewees. These questions were framed in relatively simple language to ensure that they were understandable to the interviewees. The interview procedure followed the recommendations of Cassell and Symon (2004) concerning neutral and non-judgmental behaviors on the part of the interviewer to avoid influencing the interviewees. As a result, the interviewer did not comment on the information provided by the interviewees even if the interviewees asked for an opinion. The interviewer also made notes concerning the behaviors of the interviewees based on the assumption the information could be relevant to interpreting the data.

Content analysis was used to identify the themes and patterns in the data provided by the interviewees. This approach uses three coding steps. Initially, open coding identifies the general themes discussed by the interviewees, which decomposes the data. Three of the five interviewees had to mention the same general theme for it to be included in the analysis. Axial coding is the
second step in the analysis process, which involves identifying the patterns within each theme. The axial coding further deconstructs the data to determine the meaning that the subject of the study place on issues related to use of EMS services. Because the axial coding patterns are a refinement of the data, the criterion for inclusion of the information as a pattern was mention by two individuals. The final step is descriptive coding, which recombines the data to provide a coherent narrative that is useful for answering the research questions. The analysis process requires multiple readings of the interview data to ensure that it accounts for all direct and indirect meanings of the interviewees (Ezzy, 2003).

The information obtained from the analysis of the data obtained from the interviewees supports the needs analysis, which is the output of the action research process. The needs analysis is based on the assumption that the interviewees are representative of the chronic 911 callers who use EMS for routine and non-emergency medical care. The needs analysis was the foundation for the recommendations specific to the NSBFD for strategies to reduce the incidence of 911 calls for non-emergency EMS.

The research method has limitations that can affect the quality of the findings. The qualitative action research approach has an inherent limitation of relying on the subjective understanding of the participants in the research of the issue concerning inappropriate EMS use in New Smyrna Beach. A related limitation is the relatively small size of the sampling, which consisted of only five individuals. As a result, the findings and conclusions of the study may not be representative of the general population in New Smyrna Beach. Another limitation of the research is the potential that research bias in the collection and analysis of the data. Researcher bias could have influenced the interviewees during the data collection phase of the study despite efforts to maintain interviewer neutrality. The criteria for inclusion of data in the open and axial
coding phases provided some objectivity for data analysis it is possible that researcher bias influenced the findings and conclusions.

**Results**

The results of the research present the findings from the analysis of the interview data. It also presents the findings as answers to the research questions. The results of the research also contain the needs analysis related to the use of EMS for non-emergency medical services.

**Interviews**

The five interviewees consisted of three women and two men. All of the interviewees were over the age of 55, four were single, and one was married. Three of the interviewees received Medicaid benefits and two of the interviewees received Medicare benefits. The analysis of the interview data identified the four major themes of: 1) mobility and transportation issues; 2) attention from paramedics; 3) substance abuse issues; and 4) insufficient regular medical care for chronic diseases. The presentation of the interview data is organized around these four themes, which also contain the significant patterns related to the themes.

**Mobility and transportation issues.**

All five of the interviewees mentioned mobility and transportation issues in relation to their use of EMS services. The mobility issues were associated with obesity in two cases, which limited the ability of the interviewee to engage in a normal range of daily activities such as travelling to a physician. The other interviewees indicated that they had difficulties with mobility, but there was no visible evidence of any type of infirmity that would limit their movements. The transportation issues involve the perception that the public transportation system in New Smyrna Beach was too difficult or too costly to access. The public transportation system in New Smyrna Beach consists of buses operated by Volusia County, which is known as the Voltran system.
The general pattern that emerged in this theme of mobility and transportation issues is that the interviewees often lived several blocks from bus routes. As a result, the interviewees believed that the effort of walking to a bus stop to attend doctor's appointments was too great, particularly in the hot summer months. One interviewee noted: "Takes a long time for me to walk to the bus stop…and by the time I get to the Center [Medical Center of Atlanta in Daytona] I have to change buses." Most of the interviewees indicated that they had some type of medical services in Daytona. The interviewees also indicated that the bus schedules were relatively infrequent with a lengthy wait in the event they missed a bus.

None of the interviewees mentioned the cost of the Voltran system as a significant barrier to using buses for transportation. They also indicated, however, that they would not use EMS if there was any cost or fee associated with the service. There was a general perception among the interviewees that EMS should be a free service paid for by the city or county.

Four of the interviewees indicated that they did not use the Voltran Paratransit system because they found the application requirements too burdensome or they lived too close to an existing bus route by the Country eligibility criteria. One of the interviewees noted that she had applied for Voltran Paratransit eligibility, but had been refused based on the four block distance between her residence and the nearest bus stop. This interviewee stated: "Takes me half an hour to get there…to get to the bus stop. I have to walk so slow. And that means a half an hour back. I just don't have the strength."

Three of the interviewees indicated that they had some private transportation available from friends or relatives, but did not want to burden others with helping them obtain medical care. One interviewee also stated that there were few alternatives to EMS for obtaining medical services during the night. "Can't take a bus in the middle of the night. There just ain't none. And"
nobody I know's willing to take me after dark." The interviewees also suggested that insufficient availability of alternative transportation during the night was the primary factor related to their use of EMS.

**Attention of Paramedics**

The data provided by the interviewees contained an implicit theme concerning the value the interviewees placed on the personal attention provided by the paramedics when they made a 911 call for services. The theme was based on the discussions by the interviewees concerning their behaviors and the behaviors of the paramedics when they called for EMS. In general, the interviewees indicated that they enjoyed the special and personalized treatment they received from the paramedics. Within this pattern were the two themes of relief of loneliness or boredom and attention seeking behaviors.

Three of the interviewees made statements indicating that they were lonely and did not have a substantial amount of contact with others. These interviewees blamed their chronic medical conditions for their lack of socialization. One interview stated: "The people that come with the ambulance…they spend time talking to me." Another one noted that "Sometimes on the way to the hospital…we just don't talk about my sickness." The statements generally indicate that the EMS services provided some benefits for the interviewees beyond merely treating symptoms and transporting them to the hospital. Another interviewee mentioned that he has used the NSBFD service so often that the paramedics know him by his first name.

Two of the interviewees also indicated that the use of EMS services resulted in more attention and more rapid service once they arrived at the emergency department. "They don't make me wait," one interviewee stated. "They take a look at me as soon as we get there." This
suggests that the users of the EMS system for non-emergency services perceive benefits from prompt treatment upon arrival at a hospital.

**Substance Abuse Issues**

None of the interviewees directly admitted that a personal substance abuse issue had a relationship to their EMS use. Four of the interviewees, however, mentioned substance abuse issues in their lives. In addition, the interviewees noted that substance abuse was a factor in "other people's" use of EMS services for non-emergency medical conditions.

Two of the interviewees suggested that they had an alcohol abuse problem periodically, and one interviewee had a drug addiction problem in the past. The interviewees perceived that substance abuse was a common factor prompting 911 EMS calls for non-emergency treatment in two types of situations. The first type of situation involves another person who is unruly because of drug abuse. "'bout five years ago, I called you people for my girl. She was acting all crazy from something she put up her nose and I didn't want no cops taking her in." This suggests that some people in the community view EMS as an alternative to police when an individual under the influence of drugs or alcohol is creating a disturbance. The second situation involves the individual under the influence of a substance calling for EMS services when there is no actual medical emergency. Two of the interviewees noted that they were aware that some people with substance abuse problems have less inhibition to calling for EMS services, even when they are aware that they are using an illegal substance. The interviewees, however, suggested that this type of situation is rare and involves individuals with additional mental health issues.

**Insufficient regular medical care for chronic diseases**

An additional theme in the data provided by the interviewees was their perception that they could not obtain regular medical care for disorders such as diabetes, chronic high blood pressure,
and arthritis through normal medical channels. This perception was largely subjective and based on factors that the interviewees believed were preventing them from obtaining routine medical care. While transportation was one of the issues, others were long wait times for obtaining appointments and physical or emotional discomfort when away from home.

The interviewees noted that they often faced long wait times for obtaining appointments with physicians, particularly if they needed specialist care. They also believed that they could not get appropriate care at the urgent care center in New Smyrna Beach, although they had no objective reason for this perception. The interviewees also believed that they were much more likely to receive prompt care in the emergency department, with a 911 call for EMS services as the least burdensome method of accessing emergency care. The interviewees also indicated that using EMS for transportation to the emergency department was a particularly comfortable mode of transportation. Two of the interviewees particularly valued the ability to lie down in an ambulance and to avoid exertion.

When asked about alternatives to using 911 EMS to obtain medical care, two of the interviewees suggested that some type of in-home medical care would be helpful for reducing their use of EMS. One of these interviewees stated: "Sometimes...well, I'm just not sure what's going on. I wait a few days and if something don't change then I know I need to see a doctor. Maybe if someone stopped by to check me over, I would feel better." This interviewee implied that a routine visit by a healthcare provider could reduce anxiety and the perception that emergency care is necessary. The interviewees also suggested that in-home care would eliminate the need to travel to the doctor, which they viewed as a significant problem. While these types of services are available in New Smyrna Beach through various nursing agencies, the two interviewees mentioning this alternative did not believe that they qualified for in-home visits.
Needs Assessment

The information provided by the interviewees supports an intensive needs assessment for EMS non-emergency medical use. The needs assessment examines the perception of the chronic users of EMS for non-emergency medical care concerning the resources available in New Smyrna Beach for obtaining routine medical treatment. It also identified the gaps between the existing and required resources that should be closed to reduce non-emergency use of EMS.

The findings from the interviews indicate that excessive users of EMS services for non-emergency care require better accessibility to transportation for medical services. These individuals do not have private transportation. They also do not have a social network that can provide private transportation. At the same time, they believe that the distance from their homes to bus stops is too great to use the system to travel an extensive distance to physicians or hospitals. The excessive users of the EMS system also cannot easily access the alternative resource in the community of the Voltran Paratransit vans because they reside too close to public transportation bus stops.

The Voltran Paratransit system involves a door-to-door service that transports some disabled individuals to medical appointments. The eligibility requirements consist of an assessment to determine if the individual can use the regular Voltran busses, which are all wheelchair accessible. The assessment includes an in-person interview with the applicant and a functional evaluation by a medical professional. In some cases, eligibility will be granted to individuals residing in areas that do not have regular bus service, which includes only the outlying areas of New Smyrna Beach. As a result, the county rarely considers an individual eligible for Paratransit services. The findings from the analysis indicate that there is a significant gap between the existing public transportation system and the perceived needs of the segment of
the population that has chronic medical issues. The interviewees use EMS for non-emergency medical needs to fill this gap with the eligibility requirements of Voltran Paratransit eliminating medical transportation as a viable alternative to EMS.

The data the interviewees provided also indicated that there is a need in the community for more expeditious systems to provide medical care to individuals once they arrive at a hospital or clinic. While there is an urgent care center in New Smyrna Beach, the wait times for non-emergency treatment are often very long. The wait times are also lengthy when a patient arrives at an emergency department of a hospital such as the Halifax Medical Center in Daytona with a non-emergency condition. This suggests that there is a need in the community for a sufficient number of medical facilities to provide services to population without an extensive wait period. These medical facilities can include clinics that provide routine and non-urgent care to the population. The gap between the need for medical resources and the non-emergency use of local urgent care centers and emergency departments suggests that New Smyrna Beach requires additional community clinics to provide non-emergency medical treatment for residents.

The data from the interviewees also identified a need for more extensive in-home care services, which could reduce use of EMS for non-emergency care. The interviewees believed that in-home services such as a visit from a registered nurse would be a substitute for a visit to a physician. The perception of the interviewees creates a subjective need for in-home healthcare in the community that may be greater than objective need. There is a gap between the resources in the community or in-home care and the number of people who would require this type of care to provide an alternative to excessive EMS use for non-emergency care.
Findings

The first research question of the study was: What are the underlying medical and social factors leading to the overuse of EMS for non-emergency medical services in Mew Smyrna Beach? The data obtained from the interviewees indicated that medical conditions that result in weakness or frailty that prevents individuals from independently obtaining medical services contributes to the overuse of EMS for non-emergency medical services. While the data collection process did not attempt to identify the specific medical conditions of the interviewees, the three disorders they mentioned were diabetes, chronic high blood pressure, and arthritis. Although diabetes and high blood pressure do not produce immediate physical weakness, the interviewees believed that these disorders were sufficient to prevent them from obtaining medical care without substantial assistance. These findings indicate that the subjective belief of individuals concerning their physical health is an important factor contributing to overuse of EMS services for non-emergency purposes.

The findings from the interviews also indicate that the economic condition of the individual is a substantial contributing factor to the use of EMS for non-emergency purposes. The interviewees did not have the financial means to obtain private transportation for medical care, which forced them to rely on using public transportation. They perceived travelling on public transportation as excessively burdensome because of the physical condition. The interviewees were also relatively isolated socially and did not have an extensive support network that could provide assistance with transportation to the doctor. The findings further suggest that the EMS call functioned to some degree as a social event because of the interactions between the patient and the paramedics providing services.
The findings are somewhat ambivalent concerning the effect of alcohol and substance abuse on overuse of EMS services for non-medical purposes. While the interviewees noted that they were aware that alcohol and substance abuse led to more EMS use, they were less certain as to whether individuals under the influence of alcohol or substances required EMS services. According to the interviewees, alcohol and substance abuse plays some role in overuse of EMS services for non-medical purposes, but the role is relatively minor.

The second research question of the study was: What intervention strategies could reduce the overuse of EMS for non-emergency medical services in New Smyrna Beach? The findings from the analysis of the interview data suggest that the approach of expanding the eligibility of the Voltran Paratransit system could significantly reduce the use of EMS for non-emergency medical services. The findings demonstrate that many of the individuals overusing EMS are not eligible for Voltran Paratransit services because they are not sufficiently disabled or live too close to an existing bus line as determined by county regulations. According to the data provided by the interviewees, they believed that the distance between their homes and the bus stop was too great to use comfortably or safely. At the same time, they were ineligible for Voltran Paratransit pickup to obtain medical services. The use of EMS was a practical alternative for medical transportation services.

An additional strategy for reducing overuse of EMS for non-emergency medical services in New Smyrna Beach is to coordinate with healthcare providers in the city to expand the operating hours of the urgent care centers in the area. The interviewees suggested that they would be willing to use an alternative transportation service if they received as much attention as with a 911 EMS call. The EMS involves personal attention from paramedics and relatively rapid assessment and treatment after arrival at the emergency department, which are attributes of EMS
that the interviewees valued. These findings imply that some form of specialized service in urgent care centers may be necessary to support increased use of the Voltran Paratransit service as an alternative to EMS. The individuals using the service require expedited treatment to remove the incentive for using EMS.

Another possible strategy to reduce excessive use of EMS for non-emergency services is to provide care in home to many of the individuals with chronic medical conditions on an as-needed basis. In this approach, the user would request medical assistance but not transport to the emergency department, with a registered nurse or paramedic responding to the call and assessing whether ambulance transport is necessary. This strategy is similar to the 311 system used in some municipalities but would not require developing a separate call system and educating the public concerning is appropriate use. The effectiveness of this strategy would depend on the cost of providing in-home care services compared to the cost of excessive use of EMS for non-emergency care. In addition, the in-home care would require some limitations concerning eligibility to contain costs.

The third research question of the study was: How can the NSBFD implement one or more intervention strategies to reduce overuse of non-emergency medical services? The most feasible strategy for NSBFD is to develop a medical transportation system that uses vans and drivers who are not paramedics either in conjunction with Voltran Paratransit or as an independent service in New Smyrna Beach. Because Voltran Paratransit is a county wide service, it may be more feasible for the NSBFD to develop an independent medical transportation service. Implementing the strategy would require purchasing two vans with wheelchair accessibility and employing three drivers who are not fire fighters or paramedics. As a result, the NSBFD would have to determine the costs associated with the two vans and three full
time employees, and obtain sufficient funding in the budget. The data from the research findings suggests that some reimbursement for transportation costs may be available from insurance. The NSBFD would also have to develop a policy to ensure equitable access to the service without overtaxing the abilities of the vans and drivers to provide medical transportation.

The NSBFD cannot directly implement the strategy of expanding clinics and other medical services in New Smyrna Beach. The NSBFD, however, can participate with other municipal agencies to attract more healthcare providers to the city to ensure that residents have local access to medical services. In contrast, the NSBFD could become involved with implementing the strategy of providing a wider range of in-home care opportunities for individuals who excessively use 911 EMS for non-emergency care. Paramedics or nurses employed by the NSBFD could provide some in-home care to individuals identified as chronic users of the EMS system for non-emergency care, with the objective of reducing EMS use by the individual. The care would not be provided on a routine basis, but would be an alternative to a 911-EMS call. This approach would also require a high degree of inter-departmental coordination of services, particularly if the individual could benefit from non-skilled in-home care rather than from a visit by a registered nurse or a paramedic.

**Discussion**

The results from the analysis of data support the conclusion that the NSBFD could significantly reduce non-emergency use of 911 EMS by developing a medical transportation system. This type of system would provide chronic excessive users of the 911 EMS with an alternative to receive medical care for non-urgent conditions. This approach involves a modification of EMS system that uses a BLS ambulance for non-emergency conditions as discussed by Stout, Pepe, and Mosesso (2000). The medical transportation vans will not be BLS
equipped and are intended only for providing transportation for individuals with non-emergency and non-life threatening medical conditions. The approach also has similarities to the use of a 311 system for non-emergency medical transportation noted by Walz, Krumpelman, and Zigmont (2011), and Wilson, et al. (1992). As will the 311 system, the user will self-select either EMS services or medical transportation services.

The results from the analysis of the interview data suggest that the eligibility requirements for Voltran Paratransit may be a significant barrier to expanding this system to reduce non-emergency use of EMS. To a large degree, the findings concerning the barriers to accessing the Voltran Paratransit medical transportation service are consistent with those of Wilkin, Cohen and Tannebaum (2012) who identified structural barriers to the use of alternative means of medical transport as a contributing factor to excessive use of EMS for non-emergency conditions. The structural barrier is the presumption in the eligibility requirements that the existing bus service can meet the medical transportation needs of the majority of citizens in New Smyrna Beach because the buses are wheelchair accessible.

The findings can be interpreted to suggest that many residents of New Smyrna Beach requiring medical services are reluctant to use the bus system or other means of public transportation at night. The reluctance may be because of concerns for physical safety as well as the sparse scheduling. The unwillingness to use public transportation at night may be one of the factors leading to higher rates of EMS use at night for non-emergency medical conditions. This conclusion is consistent with previous research identifying a higher rate of EMS use at night for reasons such as convenience or safety (Larkin, et al., 2006). An implication of the findings is that medical transportation alternatives should be available during the night to reduce the number of EMS calls.
The results also support the conclusion that providing in-home treatment for chronic EMS users could lead to lower rates of 911 EMS use for non-emergency care. Registered nurses or paramedics providing this type of care would respond to calls identified as non-emergency with the option to request an ambulance if necessary. Ideally, the approach results in basic treatment of the individual in their home with the individual able to seek follow up treatment at a regular medical facility at a future time.

The findings support the conclusion that both medical conditions and social factors interact to contribute to overuse of EMS for non-emergency purposes. An interpretation of the findings is that the chronic medical condition of the individual creates a need for medical services but simultaneously creates difficulties with the physical ability to access services. The subjects of the study, however, appeared to have the physical ability to use public transportation. The subjects believed that they were so debilitated by their medical condition that they could not walk to a bus stop. This issue involving the intersection of a medical condition with the subjective belief of debilitation was not investigated by previous researchers. The findings also indicated that mental health and substance abuse issues contributed to non-emergency EMS use, which were noted by Patterson, et al. (2006). Because the participants in the study were not willing to admit to alcohol or substance abuse, the findings are inconclusive concerning the role that alcohol or substance abuse plays in non-emergency EMS use in New Smyrna Beach.

The findings can be interpreted as indicating that a social factor related to overuse of EMS for non-emergency care is the more personalized attention for medical treatment and transport than other means of transportation. This conclusion is consistent with the findings of previous researchers who determined that social interaction with paramedics is an important component of inappropriate use of EMS (Wilkin, et al., 2012). The interpretation is also
supported by the findings of Walz, Krumperman, and Zigmont (2011) who determined that social interactions with paramedics reduced the effectiveness of education programs intending to reduce use of EMS for non-emergency care. Based on the findings, any attempt to induce chronic EMS users to adopt an alternative such as medical transportation or in-home care must include a relatively high degree of social interaction between staff and user.

An addition interpretation of the findings is that various factors such as discomfort or uncertainty about their medical condition lead some individuals to use EMS services when other approaches are available. The findings of Fleischman, et al. (2010) suggested that some individuals with excessive concern about discomfort or safety prefer to use EMS regardless of the reason and provide support for this interpretation of the results. Based on the results, a medical transportation alternative must ensure that the individual perceive the alternative as safe and can travel to obtain medical services with a minimal amount of discomfort.

The results of the study have several significant implications for the NSBFD. Because structural factors play an important role in the excessive use of 911 EMS for non-emergency care, the NSBFD should adopt initiatives to address or change the structural factors. These factors involve: the current configuration of the bus routes in New Smyrna Beach; the Voltran Paratransit eligibility requirements; and the availability of urgent care and other types of clinics in New Smyrna Beach. Initiatives such as expanding accessibility to medical transportation either in conjunction with Voltran Paratransit or independently could reduce EMS demands for the NSBFD.

Another implication of the findings of the study is that it is not feasible for the NSBFD to address the needs of the community for EMS and medical transportation services by deploying additional resources based on its current budget. Regardless of the option the NSBFD uses to
reduce non-emergency EMS use, it will require additional funding for staff and equipment. The amount of the budget increase could be offset to some degree by the cost savings from less frequent use of the ALS ambulance or other NSBFD equipment for non-emergency EMS care. This cost savings is in the form of less use of supplies. The NSBFD, however, must maintain full paramedic staffing and supplies for the ALS ambulance even if all non-emergency use is eliminated.

Recommendations

The primary recommendation for the NSBFD is to conduct a cost-benefit analysis to determine whether expanding Voltran Paratransit or establishing a parallel medical transportation system for door-to-door medical transportation is a cost effective alternative to the current overuse of EMS for non-emergency medical care. The cost benefit analysis should include a more comprehensive survey of the population in New Smyrna Beach currently using EMS for non-emergency medical care to obtain an estimate for use of a medical transportation system. It should also include the cost of the NSBFD operating an additional ALS or BLS ambulance to meet the need of the community for emergency medical services. This information is necessary for preparing a budget for the service to determine the cost portion of the analysis. The benefit portion of the analysis involves the reduction in EMS use. This recommendation would support positive change in the NSBFD by determining whether a medical transportation alternative for chronic EMS users will increase the availability of the NSBFD ALS ambulance for 911 emergencies. It would also demonstrate that the NSBFD will take steps to meet the needs of the community by increasing the resources available for non-emergency medical care.

Following implementation of the medical transportation system, the NSBFD should monitor the number of non-emergency 911 EMS calls to evaluate the effectiveness of the
intervention. The medical transportation system should lead to a statistically significant reduction in the number of non-emergency 911 calls over time. In addition, the NSBFD should collect data concerning the opinion of users of the medical transportation system to ensure that the population in New Smyrna Beach views the system as a viable alternative to 911 EMS service.

At the same time, the NSBFD should develop a policy for use of the medical transportation system to reduce the possibility that the system will be abused. In general, the policy should grant eligibility for use to individuals with partially debilitating conditions such as advanced diabetes or coronary disease without regard to distance of the individual from a bus stop. The policy, however, should focus on encouraging individuals who chronically use EMS for non-emergency purposes to adopt an alternate approach to obtain medical care. As a result, some limitations to eligibility should be in place to discourage others who are not currently using EMS for non-emergency care from using the alternative medical transportation service.

The NSBFD should delay taking steps to implement the in-home care strategy until it has implemented and evaluated the medical transportation option. If the medical transportation strategy results in a significant decrease in 911 calls for non-emergency service, implementing the in-home care strategy may not be necessary. In effect, the NSBFD should consider the in-home care strategy as a secondary strategy that can be implemented if the initial medical transportation strategy does not achieve the intended results. This is because the in-home care strategy is likely to be more costly than the medical transportation strategy due to the need for employing professional paramedic or nursing staff.

Implementing the in-home care strategy will involve dispatching paramedics or a registered nurse employed by the NSBFD to 911 calls that are clearly identifiable as non-emergency situations. The initial selection criteria for determining whether an in-home care
rather than EMS is warranted can include asking the caller about the degree of severity of the situation. Prior to implementing this option, the NSBFD should conduct a survey of residents to determine the scope and frequency of services that may be required. Further research should be undertaken to determine if a BLS vehicle should be used as part of the in-home care. As with the medical transportation strategy, the NSBFD should conduct a cost benefit analysis to determine if the in-home visit option will provide sufficient benefits to outweigh the costs. After implementation, evaluation of the in-home care option should include an assessment of any changes in the volume of use of 911 EMS service by individuals who have received non-emergency care through the in-home care program.

A general recommendation to other public safety departments that may wish to replicate this study is to use a substantially larger study population to provide data for the needs assessment. The small size of the sampling may have skewed the findings towards certain strategies based on the circumstances of the participants. A larger sampling could provide a wider range of information that could identify other strategies for reducing non-emergency EMS use. A larger sampling may also be necessary for public safety organizations in highly populated urban locations to obtain a broad cross-section of opinion to support a needs assessment.
References


Appendix

Interview Questions

1. Think of the last time you called 911. What was the reason for the call?

2. Has this condition been a problem before?

3. If the EMS service couldn't get to you quickly for some reason, could you get medical help on your own?

4. How do you usually get to the doctor?

5. How far away is your doctor?

6. If you had to pay for EMS would you use the service?

7. If the city provided a van or small bus to take you to the doctor, would you use the service?

8. Think about other people who use 911 for EMS. Why do you think they call 911 when they don't have a medical emergency?

9. What other methods can you think of that can be used instead of 911 EMS for you to get medical care?