

**Community Paramedicine: Is This Part of a Community Health  
Solution for Colerain Township?**

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## ABSTRACT

Colerain Township Department of Fire and Emergency Medical Services (CFEMS) has experienced a steady increase in demand for services that includes non-emergency transports, repeat calls to the same customer, and calls to customers who are in need of additional social services-based assistance. These types of responses increased significantly during the past year, however, the department's staffing and response model has not been modified to address the demands. This applied research project was conducted to determine if Community Paramedicine (CP) was a viable solution for CFEMS to use as a means to address this problem. The project employed evaluative research methodology to identify: (a) what factors are causing the increase for these types of calls for service, (b) is there a need for CFEMS to change its culture to embrace a new non-emergency response model, (c) what kind of partnerships are needed to develop the proper collaboration in the development of such a model, (d) does a change in scope of practice need to be addressed, (e) is CP a solution for CFEMS to use to address the emerging social need. Principle procedures utilized for this research project included an extensive literature search, personal interviews, an internal departmental survey, and an external fire department survey. Results of this research project revealed several causes for the increase in demands for social-based services as well as the need to address culture change within the department. Additionally, results demonstrated that the current scope of practice for the department's personnel was adequate to address the most current community need and the needs of a CP program. Research for this project supported the recommendations that CFEMS adopt a CP program along with several other strategies to help support such an initiative.

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## INTRODUCTION

### **Statement of the Problem**

The problem that this research addressed was if Community Paramedicine (CP), also described as Mobile Integrated Healthcare (MIH), is a solution for Colerain Township Department of Fire and Emergency Medical Services (CFEMS) to address the increasing demands for service from the community in terms of number of emergency calls, repeat customers calling for the same ailment, calls for service that require intervention yet are not classified as an emergency, and 911 calls requiring specialized services that are typically not rendered by a traditional EMS response model. For CFEMS, these types of responses have increased by 32% during the past year; however, their staffing and response model have not been modified to address this increase for demands in service.

Demands for increased service has the potential to develop a negative impact on the services currently provided. First, the increased amount of non-emergency responses places a greater, unnecessary toll on the emergency response system. The fire department operates six paramedic ambulances that cover approximately 43 square miles. This geographical size alone presents a challenge to the agency as they try to minimize or maintain effective response times. Ambulances that are responding to non-emergent, repeat calls are unavailable to respond to more urgent, medical emergencies (i.e. chest pain, difficulty breathing, and cardiac arrest). This requires a second ambulance, from perhaps a further distance, to respond causing an increase in that response time.

Secondly, the type of assessment and treatment that is required to be delivered on these non-emergency calls requires specialized training that falls outside of the traditional practices and roles of the emergency medical technicians (EMTs) and paramedics. The department's

EMTs and paramedics are trained proficiently at delivering an emergency medical assessment. This type of assessment requires an in depth analysis of the current symptoms which the patient is reporting. That assessment is geared to extract a field diagnosis from the present illness and an array of differential diagnoses. However, the assessment of the subacute and semi-chronic patient requires a certain skill set not found with many current EMTs and paramedics. This type of assessment requires viewing the patient's medical history and physical exam with new lenses. An assessment that addresses the subacute or semi-chronic patient requires a holistic overview of the patient's entire medical history such as medication compliance, fall risk assessment, and chronic disease management. This approach to patient assessment is not a component of the training received by emergency response EMTs and paramedics.

Traditional response models have yet to prove to be effective in treating such issues. For some time, CFEMS had seen itself faced with these increases. It was hopeful that some other influence on healthcare would create a resolve to this growing problem. Much of the burden of resolve has been placed on social services like Cincinnati's Council on Aging (COA). However, the waiting list for COA's elderly services is lengthy, which means those that are in need of immediate assistance are unable to receive the necessary help within a reasonable time frame.

A social services remedy has yet to occur. The increases for these particular types of calls for service have continued to tax the department's emergency response system while placing residents outside of their lowest healthcare cost setting. That is to say, the setting in which their daily maintenance healthcare costs are the lowest.

Currently, no real solution exists to address the problem of an aging demographic whose needs outpace the available resources. In 2015, Colerain Township housed 58,762 residents. Residents that are aged 65 years of age or older represented 14 percent of that population. In that

same year, CFEMS responded to 6,734 emergency medical calls that resulted in patient contact, with 2,693 of whom, were 65 years of age or older. This means that 14 percent of this age population group was responsible for nearly half of the fire department's ambulance run volume.

Each day in the United States, 10,000 people turn 65 years of age (Hogan, Ortman, & Velkoff, 2014). This aging demographic has significantly taxed the available resources of the fire department. This aging trend, which is anticipated to continue in the coming years, will continue to have a significant impact on the department's ability to provide the proper resources to the necessary residents.

### **Purpose of the Study**

The purpose of this study is to determine if CP is an appropriate strategy to address the problem. In addition, the research will help identify and describe proactive strategies and tactics that CFEMS can use to create a new response model that effectively addresses the rising concerns of these demands while creating a culture that embraces a proactive approach to that model development. This information may be used by the administrative staff and project committees to implement changes in policy that are driven towards emergency medical response.

### **Research Questions**

The methodology applied in conducting this research was evaluative research. The research questions this study will investigate are: 1) What factors are causing the increase in the less emergent type of calls for service? 2) How may CFEMS need to change its culture to embrace a new, non-emergency response model? 3) What kinds of partnerships are needed to develop the proper collaboration in the development of such a response model? 4) Does there need to be a change in the scope of practice, from a legislative stand point, to cover the needs of

a new response model? 5) Is a Mobile Integrated Health Care (MIH), Community Paramedicine model a potential solution to addressing the emerging need?

### **BACKGROUND AND SIGNIFICANCE**

Colerain Township, characterized as a culturally diverse 43.2 square-mile urban, suburban and rural community with a population of 58,762, and is one of Ohio's largest townships. The department's emergency services coverage encompasses the entire unincorporated limits of the Township, as well as one specified densely populated residential area of an adjoining township through contractual agreement. The fire department operates from five fire stations, one administrative facility and a combination residential live burn and five-story training tower complex.

The department provides a variety of services including fire suppression, technical rescue, emergency medical advanced life support transport, operations and technician-level hazardous materials incident response and community risks reduction programs (i.e., fire and life safety code enforcement and public education) to accomplish its mission. The Insurance Services Office (ISO) Class 1 fire department is a modern, all-hazards organization. The department maintains a motorized fleet of 50 emergency response and non-emergency vehicles.

Fire department services are provided by means of a "combination" staffing system comprised of 160 career and part-time employees. The department has a fire chief, deputy chief of operations, assistant chief of administrative services and three divisional captains (community risk reduction, EMS, and training and education). Two clerical personnel and a vehicle maintenance manager and technician provide additional support services. Primary staffing coverage for emergency response is through the use of career and part-time firefighters and

emergency medical technicians (basic and paramedic levels) operating on a 24-hour shift, three platoon system.

CFEMS responded to over 7,500 medical calls for service in 2015. There was a 32% increase in calls for service that are either repeat in nature, have a significantly negative impact on the quality of life and well-being of the residents, or are classified as non-emergent thus taxing the response system. Some of those non-emergent calls for service include the repeat fall customer, the repeat lift-assist customer, or the patients who fall into the subacute, chronic, or semi-chronic classification. This means that while the patients are ailing from significant medical conditions, there is not an emergent health need requiring 911 service or other emergency medical treatment. This classification of patients lack the proper education and resources needed to manage their disease process. The emergency 911 system and emergency departments have begun to replace the primary care physician in the healthcare model.

The negative effects of this growing problem in Colerain Township is the continued degradation of the quality of life of many of their residents. This has become a growing problem because for so long, the culture in the department has been very reactive and internally focused. The fire discipline has led the charge from a proactive services standpoint. For the fire discipline, there has been a very proactive approach in terms of fire safety implementing and enforcing building and fire codes. However, the EMS discipline has been very reactive. In other words, EMS waits until the medical emergency happens instead of promoting health and wellness to prevent the medical emergency from happening in the first place.

CFEMS responded to nearly 1000 falls in 2015. This accounts for approximately 13% of the total EMS call volume for the year. The State of Ohio has classified older, adult falls as a growing epidemic having a significant impact on healthcare costs. Moreover, most mechanical

falls, or falls that are caused by tripping, losing balance, or by general weakness, are preventable. This means that an aggressive approach towards a fall prevention program could help reduce the number of falls that are experienced by CFEMS (Ohio Department of Health, 2014).

Over the last two years, there has been a 12% increase in reports of poor living conditions. Residents of Colerain Township living in unsanitary conditions and/or dilapidated structures has become an increasing and alarming trend. This trend created a significant safety hazard in terms of fire safety (i.e. fire load, access for firefighters and paramedics, and egress from them as the resident). This problem is not specific to the aging population. It spreads in nondiscriminatory fashion across all demographics negatively impacting residents of varying age and socio-economic status (Colerain, 2016).

These conditions also presented a health hazard due to poor and leaky plumbing (leading to mold), as well as an increased rodent presence. These health hazards represented causes for preventable disease occurrence which in turn can lead to increased and unnecessary medical expenses and burden on the healthcare system.

There has been a growing trend in the community of Colerain Township to utilize the emergency medical services for non-emergency purposes. During the past year, CFEMS had been called to assist with personal transport to physician's appointments, to get prescriptions filled, and to assist with other home health related concerns. These types of calls for service have increased nearly 13% in the last two years (Colerain, 2016).

EMS service has also been called to transport residents to the emergency room simply because their primary care physician was unable to schedule an appointment for them during a time when they could arrange transportation. This trend mimicked other EMS response agencies

where health organizations and members of the health community unknowingly contributed to the problem (Barnett, 2012).

To help understand the scope of this problem, information collected in this research will identify ways to discover the underlying causes for the increase in these types of calls for service. Determining the root cause of the issue will assist the department in finding real solutions that address the problem from a foundational level.

This is a problem that will not be solved by CFEMS alone. This research will help identify the different types of agencies that may be needed to assist with this problem solving effort. Various agencies such as the local health department, local COA Chapter, and the local zoning department all have the ability to bring individual and jurisdictional authority and boundary to each situation. It can be determined how each agency's role can be embedded into the solution.

Additionally, this research will determine if CFEMS' current scope of practice as emergency medical technicians (EMTs) and paramedics is sufficient to deal with the medical need of the patients that fall into this different model. There is a provision in state legislation that allows for EMTs and paramedics to function in a non-emergency setting, however, they are only permitted to function under their current scope of practice.

The potential impact this study could have on CFEMS is the development of a new response model, increased quality of customer service, increased collaboration between local services, decreased healthcare costs by keeping residents in their lowest healthcare cost setting, injury prevention, and an overall increase in health and well-being to the residents of Colerain Township.

## LITERATURE REVIEW

The purpose of the literature review was to gather and review relevant information specific to the need of addressing the increased demand for special services that are currently outside the scope of a traditional emergency response model for CFEMS. This includes the search for statistical data that supports the problem in Colerain Township as well as policies and programs that have proven to be effective in providing an appropriate response to that problem.

The Ohio Department of Health (ODH) published data that generally mirrors and supports the rate of falls in Colerain Township. The following statistic helps paint the picture, on a larger scale, the fall epidemic affecting agencies across the state. “From 2000 to 2012, Ohioans aged 65 and older experienced a 167 percent increase in the number of fatal falls and 136 percent increase in the fall death rate” (Ohio Department of Health, 2014).

The concept of fire based EMS agencies developing a response model that proactively addresses injury and medical illness is not a new one. “The idea of utilizing EMS providers to manage healthcare has been discussed in the United States since the 1990s” (Breyer, 2016). Many agencies across the United States have already implemented such MIH programs. These programs vary widely in their capabilities and structure based on the specific need of the community.

Collaboration has been determined to be a key component to developing a real solution to the problem. Developing a solution that addresses the root cause is imperative. Any other problem solving effort will only perpetuate the issue thus supporting the increase in the number of runs where special needs are required. This is the approach has been implemented for some time. The end result has been a tax on current services. Identifying specific stakeholders and agencies that have additional, applicable resources will help address the issue at its root cause

Mathis & Merrell, 2014). A recent report by the Center for Disease Control and Prevention and The Public Health Institute agrees that a collaborative ownership is necessary.

A key overarching concern in the community health improvement process is the degree to which there is shared ownership for health among hospitals, public health agencies, and other stakeholders in local communities. Building shared ownership for health among diverse stakeholders in local communities offers the benefit of mobilization and leveraging of resources to achieve measurable improvement in health status and quality of life (Barnett, 2012).

One of the goals within the healthcare system is to provide a continuity of care that extends from primary care-based medicine to hospital-based treatment. This requires that all medical entities that exist within a patient's care plan that lie in between these two areas of healthcare must also be integrated and involved in the patient care plan. This includes home healthcare agencies, hospice care agencies, and emergency medical response personnel. This collaborative effort in patient care is an important piece in providing the highest quality of care (Mathis & Merrell, 2014).

Failure of these health entities to provide that continuum of care can cause confusion and unnecessary increases in healthcare costs. "Home care agencies not partnered with EMS are often unaware when their patients call 911 and are taken to the emergency room" (Anastasio, M., Bruce, D., and Mezo, J., 2015). The potential result is the lost opportunity for the patient to be evaluated in the home thus leading to unnecessary hospitalization and therefore, superfluous healthcare cost incurrence. Additionally, a lack of communication and collaborative effort between agencies can cause confusion when attempting to carry out a pre-determined patient care plan (Mathis & Merrell, 2014). Family members or caregivers of patients who are entered into hospice are usually given specific instructions should the patient's health begin to suddenly

deteriorate. “Unfortunately, in the panic of seeing their loved one struggle, many families call 911. This starts the domino effect” (Anastasio, M., Bruce, D., and Mezo, J., 2015). Often times, 911 is summoned prior to hospice officials. This can cause unnecessary treatment and transport of the patient resulting in otherwise avoidable medical cost.

To avoid these types of cost incurrences, collaboration between medical agencies is imperative. MIH is not an entity that is designed to replace home health or hospice agencies. They should be designed to augment them and facilitate a new level of care that helps better bridge the gap between primary care and hospital care.

This collaboration of care can be one solution to reducing hospital readmission rates that are considered to be preventable. The cost associated with unnecessary re-admissions is astounding. “In fact, a single preventable return trip to the hospital more than doubles the cost of care for Medicare patients. For example, Medicare pays, on average, \$15,000 for an episode of care without a readmission incident, but that number increases to \$33,000 for a single readmission” (Brown, 2012).

The Centers for Medicare and Medicaid Service (CMS) first tried to resolve the re-admission problem by publicly posting re-admission rates of hospitals in 2009. The thought was that modern day consumerism would drive patients to choose hospitals based on the reputation of their care. This approach was not as effective as predicted. In 2012, CMS launched their Hospital Readmissions Reduction Program (HRRP). Hospital were to be held accountable for their own readmission rates through reduce reimbursement for criteria patients. “Under HRRP, hospitals with high rates of readmissions for acute myocardial infarction, heart failure, and pneumonia will see a one percent reduction in

Medicare payment in 2013. Penalties will continue to incrementally increase over the next two years—two percent in 2014 and three percent in 2015” (Brown, 2012).

In an attempt to further instill a level of accountability, in 2015, hospitals were assessed reduction in reimbursement rates for any circumstance surrounding a readmission event. The reduced reimbursement no longer applied to the original disease process criteria. “CMS’ penalties are an ‘adjustment factor’ that will be applied to Medicare reimbursements for care for patients admitted for any reason” (Rau, 2014).

While the over-utilization of inappropriate medical resources and hospital readmissions remain forms of medical waste, CP and MIH programs have demonstrated an ability to save hospital agencies money by reducing preventable hospital readmissions. Hospital readmissions are costly to insurance payers like Medicare. Using congestive heart failure (CHF) as a sample disease process often blamed for high re-admission rates, hospitals are losing millions of dollars within a one month of discharge. “According to Medicare, nationally, hospitals have an average re-admittance within 30 days rate of 32%” (Beers, 2016).

Determining the need for a change in scope of practice is a big questions across the country. Recent surveys have indicated that most Community Paramedicine (CP) or MIH models nationwide have not offered a change to scope of practice prior to implementing a CP program. “A soon-to-be-published National Association of State EMS Officials (NASEMSO) survey of state EMS offices finds that only three of 49 respondents (6%) allowed CP scope beyond current scope of practice” (Manz and McGinnis, 2015). The need for a change in scope of practice will be determined after the needs of the community have been evaluated.

Future educational requirements will need to be assessed if paramedics or EMTs begin functioning within a new, non-emergent role. To date, very few accredited MIH or CP programs exist across the nation. The state of Ohio reflects that same statistic. “To my knowledge, there is currently no certified or accredited program in the state for MIH or Community Paramedicine education” (Little, 2016). If a change in scope of practice is determined to be a functional need for fire department paramedics and EMTs to assess the non-emergent patient in the field, then education and training would play a crucial role in any program. Standards of care and protocols would need to be developed. Additionally, new skill sets that are identified as being necessary to treat and assess non-emergent patients will need to be instructed.

One of the budgetary concerns associated with the development of a new non-emergency response model is training. As more and more states are inserting MIH into their health systems, training for such systems is becoming more widespread and accepted as a standard. “Half a year ago, 145 educational institutions had sought copies of standardized community paramedic educational curriculum developed by the Community Healthcare and Emergency Collaborative (CHEC)...the number has risen to more than 200” (Erich, J., 2014). This represents a 38% increase in agencies using the curriculum. In order to meet the new educational demand, departments wishing to add this tier of medical response to their operations should plan on paying for the necessary education.

“The cost is \$2,310, plus \$260 for textbooks and a Fisdap/Scheduling Fee of \$80. Students earn 14 college credits” (Hennepin Technical College, n.d.). That costs represents tuition costs for a Hennepin’s CP program. This program includes 144 hours

of classroom education and 196 hours of clinical training. Another budgetary concern is the cost of replacement of the personnel who need to take off of shift for the training.

“Although EMTs and paramedics use their education, skills, protocols, standing orders and direct medical oversight to establish "care plans" for their patients, these plans for the next minutes of emergency care are very different from comprehensive care plans for managing chronic conditions encountered by community paramedics” (Manz, D., McGinnis, K., 2015). Developing comprehensive care plans involves a myriad of assessment components. Medication reconciliation is one of those components. While most paramedics grasp the concept of drug interactions and side effects, reconciling medications in a way that helps drive compliance and avoids interactions with other medications found in the home leads one to believe perhaps additional training and a change to scope in practice is warranted ” (Manz, D., McGinnis, K., 2015).

In summary, the reviewed literature has influenced this research project by illustrating the challenges and complexities of meeting the increasing medical needs of Colerain’s residents. It has also provided information that demonstrates the need for identified gaps in healthcare to be bridged by nonconventional methods. The information obtained from this literature will be used to support an initiative that incorporates a standardized approach to the development of a non-emergency response model designed to connect community residents with the necessary resources to increase their overall quality of life.

## **PROCEDURES**

The author of this applied research project utilized the evaluative research method to obtain the information required to answer the necessary research questions. The development of this project and research began by capturing, in graphical data terms, the overall health of

Colerain's community. This was an important first step in developing an in-depth understanding of the true status of the health of the community and identifying the health needs of the community. Without having an understanding of the current health situation, it would be impossible to address the health needs effectively.

To accomplish this assessment, emergency response data were collected from the emergency medical reporting database utilized by CFEMS. At the time of data extraction, the reporting software used by CFEMS was TripTix®. TripTix®, a National Emergency Medical Service Information System (NEMESIS) compliant data collection software, was the department's electronic patient care record (ePCR) tool. Specifically, the information that was collected related to the situation that was found, or what the EMTs and paramedics treated while in contact with their patients.

The data, collected in January of 2016 by the author of this research, compared two years' worth of emergency run data. The five most frequent medical calls were identified for 2014 and 2015. These data were utilized to determine the top five call types the department received by residents who summoned 911 for service. Calls for service that involved a non-resident was not utilized in the research data.

Next, health data specific to Colerain Township was collected from the Hamilton County Department of Epidemiology (DOE) located at 250 William Howard Taft Dr. 2<sup>nd</sup> Floor, Cincinnati, Ohio 45219. That data revealed the top five illnesses reported to the DOE that affected the residents of Colerain Township. Those data were collected from disease and injury surveillance throughout the county.

An electronic and anonymous online survey titled *Non-Emergency Response Model Questionnaire* was developed and conducted to assist the author in obtaining information relative

to the opinion of the department's personnel regarding the development of a non-emergency response model. The results were used to determine how well the concept of Community Paramedicine was understood by the department's personnel. Additionally, the results were used to determine whether a culture change was to be addressed should such a new model be incorporated into the operations of the fire department.

A draft version of the survey was completed on April 12, 2016 and submitted to Chief Frank Cook, Chief of CFEMS, and Assistant Chief Allen Walls, Assistant Chief of CFEMS, for validation. Data were collected from this survey on a weekly basis for the period of four weeks. Forty-five responses were collected from department personnel which represents a 26% response rate. The complete survey instrument is contained in Appendix 1.

An additional electronic survey titled *Solutions for Frequent Users of Service* was developed and disseminated through the Ohio Fire Chief's Association's email distribution list to various fire department agencies within the State of Ohio. The purpose of that survey was to determine if other fire department agencies were faced with similar concerns as they pertain to responding to and assessing customers who are experiencing gaps in medical treatment and resources. Additionally, the survey was designed to determine the opinion of other fire service leaders as to what level of engagement their department should have on the subject matter. Further data extracted from the survey determined if the respondents believed a CP or MIH model could be a solution to their frequent users of service problem.

This electronic survey gathered respondent's department demographic data including service types, EMS delivery model type, types of coverage, and run volume. It was the opinion of this author that those data allowed for benchmarking analysis as well as to determine if gaps in medical coverage exist across all urban, and suburban boundaries.

A draft version of the survey was completed in July 2016 and submitted to Chief Frank Cook and Assistant Chief Allen Walls of CFEMS, for validation. Once finalized and distributed, results were compiled weekly for a four week period. A total of 46 responses were received and utilized for analysis. The complete survey instrument is contained in Appendix 2.

An interview was conducted on August 12, 2016 with Laurie Petrie, Vice President of Communications for the Council on Aging of Southwestern Ohio (COASO). This area's chapter of the COA is the state-designated Area Agency on Aging (AAA) serving five counties in Southwestern Ohio including Butler, Clermont, Clinton, Hamilton and Warren counties. The nonprofit organization serves a variety of individuals in need of special assistance designed to help them age in place. Petrie claimed that the goal of their organization was to keep the aging population in their homes, which is to say, their lowest healthcare cost setting (personal communication, August 12, 2016).

The COASO has a vast number of resources available to the aging and special needs adults in the area. While their services provide great value to the residents of their communities, COASO is overwhelmed by the strict number of individuals who are in need of service. Petrie claims that on any given day, a waiting list of 400 people or greater exists for their elderly services programs. She further explained that this is an unacceptable number of people and that perhaps another avenue is needed to help bring resources to the doorstep of the community (personal communication, August 12, 2016).

A meeting was conducted on July 18<sup>th</sup>, 2016 between the COASO, Larry Bennett Esq., (Program Chair Fire Science and Emergency Management, College of Applied Science, University of Cincinnati), and the author of this research. The meeting was held at the office of the COASO at 175 Tri-County Parkway, Springdale, Ohio 45246. The purpose of that meeting

was to determine the interest of CFEMS in conducting non-emergency site visits to the client base of COASO.

During that discussion, it was identified that the COASO had been engaged in a pilot program with the Ohio Department of Medicaid and its MyCare Ohio project conducting site visits to individuals who had been discharged from recent medical stays in local hospitals. The pilot program's intent was to determine if post discharge follow-up to patients with criteria-based illnesses would reduce the potential for reducing hospital readmissions. The purpose of the site visits was to perform an assessment on criteria-based patients and determine medication compliance, rehabilitation compliance, and physical progress.

The COASO had been overwhelmed by the sheer number of criteria-based patients and was requesting assistance with the follow-up program. It was identified that one weakness of the COASO's involvement in the follow-up pilot program was the lack of the medical capabilities component. Simple physical assessment capabilities were lacking on behalf of the COASO's staff conducting the follow-up visits.

### **Assumptions and Limitations**

The author, for the purposes of this research first assumed that the data collected from the ePCRs were documented accurately. While a robust Quality Assurance (QA) and Continuum Quality Improvement (CQI) process were in place, the situations found and field diagnosis on emergency medical calls for service is left to the interpretation of the individual paramedics and EMTs. Secondly, the health data extracted from the ePCRs represented only that health data from patients who summoned 911. It is assumed that there are many illnesses that exist in residents who do not call 911.

It is also assumed that the department's personnel's response to the survey was honest and given with the intent of providing valuable insight to the author's research. Some bias towards a non-emergency response model was taken into consideration for the purposes of this research.

## RESULTS

For this research project, five research questions were developed based upon the problem statement and purpose of the research. Relevant literature was collected and examined for information to answer each of the research questions. Relevant information was also collected from two survey questionnaires. The results of that literature search and survey questionnaires are organized by research question.

*Research Question #1.* What factors are causing the increase in these types of calls for service?

A number of factors were identified as contributors to the increase in non-emergency calls for service for CFEMS. First, there has been a cultural trend of non-efficient use of the nation's healthcare system. A severe lack of connection to necessary medical resources has caused a significant shift of over-utilization of hospital emergency rooms.

Research confirmed that there is a growing trend of emergency room over-utilization in the United States. From 2000-2010, emergency room visits increased by 20 percent (Milligan 2015). In 2009 alone, 45 percent of Medicare patients arriving at hospitals by ambulance were never admitted to the hospital. Yet, the cost of those emergency room visits cost CMS \$1.98 billion that year. Emergency room over utilization is a significant issue that not only leads to increased health care costs and readmission penalties, but also longer wait times, lower patient satisfaction, and system inefficiency (Milligan, 2015).

A recent study conducted by the Centers for Disease Control (CDC) stated that nearly 80 percent of individuals who sought medical treatment in a hospital emergency room, over a twelve month period, did so because of the lack of access to other healthcare providers. Many of these emergency room transports resulted from transportation via fire department ambulance (Doyle, 2013).

*Research Question #2.* Is there a need for CFEMS to change its culture to embrace a new, non-emergency response model?

Implementing a new, non-emergency response model like CP, for the purpose of addressing the social issues outlined in the problem statement, would require that Colerain's personnel step outside their traditional roles as firefighters, EMTs, and paramedics. The fire service has a traditional role of responding to fires and medical emergencies and rendering fire suppression efforts and emergency medical care. This non-emergency response model would require the utilization of a different skill set not used during typical emergency medical care.

The *Non-Emergency Response Model Questionnaire* survey revealed a collective analysis of the personnel's opinion of such a response model. First, 78% percent of the respondents agreed with the statement that they feel they understood the concept of Community Paramedicine and its role in the fire and EMS profession. Eleven percent of the respondents stated that they did not agree, while the remaining 11% were neutral. The survey provided a Likert scale of 5. This survey question received an average Likert score of 3.96 out of 5.

Secondly, 76% of the survey respondents stated that they understood how a Community Paramedicine could be created and implemented in Colerain Township. 3% of the respondents stated that they did not agree, while 18% were neutral. This survey question received a 3.84 on the Likert scale.

Next, 62% of the survey respondents stated that they agreed that a Community Paramedicine model was important to the department and should be implemented. Twenty percent of the respondents stated that they did not agree while 18% were neutral. This survey question received a 3.49 on the Likert scale.

Additionally, 69% of the survey respondents stated they agreed that a social services based Community Paramedicine Model was an appropriate entry point for CFEMS while, 18% did not agree, and 13% of the respondents were neutral. This question received a 3.78 on the Likert scale.

Lastly, when asked if they would be willing to be part of a Community Paramedicine model, 33% of the respondents stated they agreed and 40% stated they did not agree, while 27% of the respondents stated they were neutral. This question yielded a 2.80 on the Likert scale.

*Research Question #3.* What kinds of partnerships are needed to develop the proper collaboration in the development of such a response model?

The *Solutions for Frequent Users of Service Survey Questionnaire* collected data from 47 fire department agencies throughout the State of Ohio. The results yielded responses as to which agencies should be partnered with to effectively launch a CP program. The survey revealed a variety of agencies.

When asked what other agencies departments feel may be a useful resource to address their frequent “users of service” problem, respondents indicated the following: (a) Local Council on Aging 46%; (b) Board of Health 32%; (c) Adult Protection Services 14%; (d) Addiction Services 14%; (e) Hospitals 14%; (f) Faith-Based Organizations 8%; (g) Primary Care Physicians 8%; (h) Home Health 8%; (i) Community Education Resources 3%.

Community health assessments were found to be an important component to any community health improvement plan. It is important for a community to understand not only its health risks, but current state of health (Barnett 2012).

For CFEMS, the Hamilton County Public Health Department is an agency that can provide a health assessment tool that provides valuable information regarding the health status of Colerain Township. Epidemiologists from the Hamilton County Public Health Department conduct research to identify risk factors associated with disease and injury in different communities (Hamilton County Public Health, 2016). The information generated can be used for community planning as well as disease and injury prevention. Data found here can be used to determine health data specific to Colerain Township.

PCPs were found to be an integral part of many existing CP programs. One Seattle, Washington based CP program uses the patient's PCP for follow-up after a 911 call is placed. Patients who were identified as being sub-acute in medical nature, and not transported to a medical facility, were referred to their PCP. A follow up call was conducted one month later to both the patient and the patient's PCP to assure that the referral resulted in a follow up visit (JCREC, 2010).

Instead of an automatic trip to the emergency room for sub-acute patients, a Winnipeg, Canada CP program created alternate patient transportation options. Upon the completion of a patient assessment, the patient was provided appropriate treatment on scene per protocol. Patient transportation, then, was implemented to not only emergency rooms, but also urgent cares clinics, and PCP offices (JCREC, 2010).

*Research Question #4.* Does there need to be a change in the scope of practice, from a legislative stand point, to cover the needs of a new response model?

The burden for scope of practice development for EMTs and paramedics is placed upon each individual state. Scope of practice varies from state to state in depth and range of permissible field capabilities. Whether a scope of practice change is needed, or not, depends widely on the type and depth of the CP program. The question EMS systems need to keep asking is what skills need to be performed in order to achieve the desired result within any given program. Agencies must determine if those skills are outside of their current scope of practice or just a new place or role where they're applying education already possessed (Manz and McGinnis, 2015).

A research study was completed by Prehospital Emergency Care in 2013 which compiled data from research articles that measured a patient-related or system-related outcome related to paramedic provision of expanded scope of practice (Bigham, Drennan, Kennedy, & Morrison, 2103). The results showed that the scope of community paramedicine was tailored to the needs of each individual community. There was no distinction between rural or urban settings and all CPs received additional training above and beyond the scope of practice for a locally identified paramedic (Bigham et al., 2013).

The change in scope of practice included competencies such as assessment of minor acute and chronic illnesses and injuries, providing nontraditional pathways to render assessment and treatment, follow-up from PCPs, and providing on-site health education and chronic illness awareness.

*Research Question #5.* Is a Mobile Integrated Health Care (MIH), or Community Paramedicine model a potential solution for addressing this emerging need in Colerain Township?

While data demonstrating success in existing CP programs was limited, some data existed that supported varying degrees of success and failures. The author of one particular *Journal of Emergency Medical Services (JEMS)* article highlighted three different forms of CP programs that engaged paramedics by reducing the number of unnecessary ambulance transports to the hospital, reducing hospital readmissions of chronically ill patients, and increasing patient access to primary care (Bledsoe, 2014). In terms of reducing the number of unnecessary ambulance transports, no real strategy has been found to be effective (Bledsoe, 2014). The author stated that there are two primary reasons for that lack of success.

First, the limited insight of the patient and types of disease processes encountered have not allowed a significant breakthrough in the reduction of transports. Additionally, the author found that a number of EMS agencies do not want to see a reduction in the number of ambulance transports. For many departments, decreased transportation rates equates to decreased reimbursement rates. Although many believe that frequent users of service are usually uninsured, many actually do have some form of healthcare insurance. This is often found to be government programs such as Medicare or Medicaid (Bledsoe, 2014).

In the State of California, one CP program had data that demonstrated accomplished success in both a hospital readmission reduction model as well as a model to reduce the number of unnecessary ambulance transports. The University of California, San Francisco conducted an independent study of California's CP pilot programs. One particular study showed that a patient follow-up based CP program designed to reduce hospital readmission was successful. Patients who participated in the pilot project had lower rates of readmission for four conditions: congestive heart failure, acute myocardial infarction, chronic obstructive pulmonary disease, and pneumonia (Gerber, 2014).

In another pilot program designed to reduce the number of unnecessary ambulance transports to the emergency room, EMS services experienced a 37 percent reduction in emergency room visits by those that participated in the pilot program.

## **DISCUSSION**

The literature review provided data that were beneficial in delivering information pertinent to the purpose of this study and its research questions. The results of the study illustrate both similarities and differences in principles of CP, ideals about necessary changes in scope of practice for EMTs and paramedics, as well as relative success of ongoing CP programs.

Research concluded that there is a significant breakdown in the Nation's healthcare system, particularly at the PCP level in terms of access. Four-fifths of adults surveyed in 2006 have a primary care physician or a regular care source. While this is a seemingly high number, only 27 percent of them could easily reach their physician by phone, obtain care or medical advice after hours, and experience timely office visits (Bodenheimer and Pham, 2010). There exists a significant gap to bridge. There was little information to dispute the need for some form of intervention.

Healthcare demand is increasing across the nation as the population of society that is 65 years of age and older continues to grow. EMS systems have been impacted by the increasing need for their services, with requests for emergency ambulances rising by as much as 8% annually (Bigham et al., 2013). Research has demonstrated a distinct connection between the lack of primary care access to the increased use of emergency rooms for primary care purposes.

If one of the resolutions to this growing social problem in Colerain Township is CP, then the need for any departmental culture change needed to be addressed. The department's personnel were surveyed to determine the perceptions and knowledge of CP. Thirty percent of

the department's workforce responded to the questionnaire. Seventy-eight percent of the respondents stated that they feel they understood the concept of CP and its role in the fire and EMS profession while the remaining 22% were either neutral or believed they did not understand. In addition, 62% of the respondents agreed that CP was important to the department and 69% of the respondents agreed that social services-based CP was a good starting point for a program in Colerain Township. However, when asked about participating in a CP program, only 33% of the respondents stated they would be interested while 40% stated they would not be interested.

While the data obtained from this internal department survey suggests that the majority of the respondents feel a CP program is important, a much smaller collection of personnel are willing to be part of such a program. The findings of this survey do align with information collected during the research of this topic. Agencies should expect their personnel to be open to the idea of CP, but they should not expect their personnel to quickly adapt to the cultural change needed to successfully implement a CP program (Mathis and Merrell, 2014). The results of the survey do indicate that the majority of the department's personnel are open to the idea of CP in Colerain; however, many are not yet willing to commit to being part of implementing a CP program as part of a social healthcare solution.

Based on the data gathered, it is indicated that a new non-emergency response model, such as CP, would not be successful without the support of the fire department's personnel. For many employees, change is not always welcomed due to fear of the implications of that change. Change is often perceived to be intrusive and disruptive (Adenle, 2011). Implementation of a CP program was classified as a significant change in job description and therefore culture change should be considered.

Partnerships and collaborative investment were found to be key elements to any social healthcare resolution. Collaborative assistance provides the necessary support to create a continuity of care across all levels of healthcare. Determining the overall health of a community through health assessments requires health department involvement. Fire department resources alone are not sufficient to gather the appropriate data.

The CDC recommends the involvement of hospitals, public health agencies and community stakeholders to engage in the social healthcare solution (Barnett, 2012). Results found by the author of this research seem to substantiate that of which was discovered in the literature review. While health departments, hospitals, and communities were identified as main stakeholders within the continuity of patient care, results from this research identified PCPs as being an integral part of the social healthcare solution as well.

CP programs from Seattle Washington and Winnipeg Canada were both researched and found to integrate the patient's PCP at each level of care. Care involved either the post EMS call follow up with a PCP or EMS transport directly to the patient's PCP (JCREC, 2010). This PCP engagement provided for continuity of care, proper utilization of the nation's tiered healthcare system while engaging primary care, and reduced unnecessary treatment and transports of patients to emergency room facilities.

These reduced transports to the emergency room then have the potential to reduce the number of hospital admissions that continue to place a financial burden on CMS. Research conducted during the literature review revealed that CMS payments for a single medical incident can double when a patient is readmitted to the hospital (Brown, 2012). Utilization of the PCP healthcare tier can drive down those readmissions by introducing proper care at the proper level.

Researching the potential need for a change in scope of practice for EMTs and paramedics to effectively implement a CP program and properly address the community's needs revealed conflicting data. While the literature review revealed that most CP programs didn't offer a change in the scope of practice, additional research revealed that most effective CP programs had implemented a change in the scope of practice.

The changes in scope of practice for EMTs and paramedics is determined by legislation at the state level. This means that scope of practice varies greatly across the nation with no continuity from one state to the next. This was somewhat limiting for agencies that have implemented CP programs as they were confined to the skills and capabilities allowed by their respective states.

In a recent study published in the *Prehospital Emergency Care Journal*, the study of patient outcomes as related to expanded scope of prehospital care practice showed that every CP program contained within the study obtained some type of training above and beyond that of their initial paramedic training. Interestingly, data discovered in a 2015 NASEMSO national survey regarding change in CP scope of practice revealed that only 3% of 49 respondents to the survey initiated a change.

Furthermore, if a change in the scope of practice of a community paramedic was initiated, that change involved additional training in areas of management of acute, minor injuries and illnesses. In these areas of patient management, specialized training in chronic wound care and chronic disease management were most often rendered. Additionally, non-emergency assessments, health education provision, case management, and chronic disease awareness were skills learned above and beyond initial EMT or paramedic training (Bigham et al., 2013). These areas of patient management are areas typically not rendered in an emergency setting and

therefore needed to be implemented, if necessary, to be part of a successful community health improvement plan involving a CP program.

Collecting data of existing CP programs across the nation was completed to evaluate their content, scope of practice, types of collaboration, and success. Foundationally, those data were used to determine if implementing a CP program in Colerain Township would be beneficial in improving the overall health of the community. The goals of various CP programs in existence around the nation were all very similar. Those goals were primarily reducing non-essential ambulance transports, getting individuals connected to the right medical resources, and limiting hospital readmissions (Bledsoe, 2014).

The variances in these CP programs, however, was the reporting of and degrees of success in obtaining those goals. One particular study revealed marked success in reducing non-essential ambulance transports to the emergency room by 37% (EMSI, 2017). Conversely, another study reported that CP programs across the nation were strategies that proved no effectiveness.

While considering the reasons reported for that lack of success, it appeared that perhaps the CP programs alone, were not responsible for the failures. From a cultural standpoint, some agencies were not willing to engage in such programs due to the fear of experiencing reduced ambulance transport reimbursement rates (Bledsoe, 2014). Financial constraints are a marked concern for CP program implementation.

Fire department agencies around the country understood that CP program implementation had costs associated with it. That cost incurrence combined with potential loss of reimbursement rates further prohibited the success or sustainability of these types of programs. As of the time of

this research, the data that existed about the success of CP were not compelling enough to engage CMS or other healthcare payers in reimbursement (Butcher, 2017).

Fire Department agencies having the desire to implement a CP program would have much to consider. First the goals of the program must align with a community needs assessment. Decision makers must understand the scope of the medical issues within their own communities. This is vital as most CP programs were developed around a community's health need. There is no one particular model that suggested one particular method of CP program development or implementation (Manz and McGinnis, 2015).

## RECOMMENDATIONS

The purpose of this research was to determine if CP or MIH was a solution for CFEMS to address the increasing demands for service placed upon it by its community in terms of number of emergency calls, repeat customers calling for the same ailment, calls for service that require intervention yet not classified as an emergency, and 911 calls requiring specialized services that are typically not rendered by a traditional EMS response model. This research was used to determine the following recommendations:

### **1. Continue to investigate the cause for the increased demands for service.**

In order to develop successful solutions to address the demands of the community, it is important to understand the origins of those demands. Each community is unique in its demographics and healthcare need. The anticipated results of this action would not only be the increased capability to make informed decision-making regarding program development and implementation, but also a continued engagement within the community that garners support from the community that the fire department agency serves.

### **2. Continue to engage fire department personnel in the education of community health issues and the role of CP.**

The department should develop a strategy that addresses continuing education for its personnel on a consistent basis. This education should contain community health data, healthcare trends, and reasons for the need for program development to address those needs. The anticipated result of such a strategy will be increased support and involvement of the department's personnel in a non-emergency response model such as CP.

### **3. Establish ongoing partnership with the Hamilton County Public Health**

#### **Department.**

Collaboration with the health department will provide CFEMS the means to access public health data from the department of epidemiology. The data from the department of epidemiology should continue to be utilized to compare to department run data to address healthcare trends. The anticipated result of such a collaboration is the ability to develop a clear understanding of the healthcare needs of the township.

#### **4. Develop a community health collaborative.**

A collaborative should be comprised of community leaders, local businesses, religious communities, local school districts, public safety personnel, local health department, agency medical direction, and local medical and healthcare resources (PCPs, local COA, and local home health agencies). This collaborative should be charged with: (a) evaluating community health risk and status. (b) establish each agency's role in the health care problem. (c) developing comprehensive strategies to address the community's social healthcare issues. (d) support local community events that drive healthcare education and resource allocation. (e) evaluate success of such programs and determine strategies for continued improvement.

#### **5. Develop strategies to compare current scope of practice with community health needs.**

The anticipated result of such a strategy will be the ability to develop protocols that appropriately address the needs of Colerain's community. Any skills or practices that are needed above and beyond the current use or scope of the department's EMTs and paramedics should be addressed with the department's medical direction team.

**6. Engage department medical direction in necessary program development.**

The anticipated result in medical direction involvement is the acquisition of a wealth of medical knowledge and research background. Additionally, this recommendation would assist the department in implementing any needed change in internal and external protocols as well as changes in policy.

**7. Implement a social services based CP program to address the immediate medical threats to the community.**

A social services based CP program should be implemented to address Colerain's largest, immediate health threats. A comprehensive CP program should address fall prevention efforts, opiate addiction, and unsanitary and dilapidated residences that currently house residents. The anticipated result of such a program will help connect residents with the necessary medical resources, provide medical and health education, and engage the community in a higher quality of life while implementing this community risk reduction measure.

**8. Develop strategies to fund and sustain CP program implementation.**

The result of such a strategy would help sustain the CP program initiated by the department. Potential sources of funding should be, for example, State of Ohio EMS, federal safety grants, and Ohio Injury Prevention Partnerships. In addition, CFEMS should research funding opportunities that involve local collaboration.

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**APPENDIX 1 – Non-Emergency Response Model Questionnaire**

1. I understand the concept of Community Paramedicine and its role in the fire and emergency medical services.

Strongly Agree \_\_\_\_  
Somewhat Agree \_\_\_\_  
Neutral \_\_\_\_  
Somewhat Disagree \_\_\_\_  
Strongly Disagree \_\_\_\_

2. I understand how a Community Paramedicine Model can be created and implemented for Colerain.

Strongly Agree \_\_\_\_  
Somewhat Agree \_\_\_\_  
Neutral \_\_\_\_  
Somewhat Disagree \_\_\_\_  
Strongly Disagree \_\_\_\_

3. I feel that it is important to implement a non-emergency response model, such as a Community Paramedicine Program, here in Colerain.

Strongly Agree \_\_\_\_  
Somewhat Agree \_\_\_\_  
Neutral \_\_\_\_  
Somewhat Disagree \_\_\_\_  
Strongly Disagree \_\_\_\_

4. I feel that the social services model that includes opiate overdose reduction, fall prevention, and *Healthy Homes4Colerain* initiatives are good entry points for Colerain to implement a Community Paramedicine Model.

Strongly Agree \_\_\_\_  
Somewhat Agree \_\_\_\_  
Neutral \_\_\_\_  
Somewhat Disagree \_\_\_\_  
Strongly Disagree \_\_\_\_

**APPENDIX 1 continued**

5. I would like to be part of this new response model and learn more about how I can be involved with one of the three programs.

Strongly Agree \_\_\_\_\_

Somewhat Agree \_\_\_\_\_

Neutral \_\_\_\_\_

Somewhat Disagree \_\_\_\_\_

Strongly Disagree \_\_\_\_\_

**APPENDIX 2 – Solutions for Frequent Users of Service Questionnaire**

Department Name:

Department Contact Completing Survey:

Contact Phone (not required but can be useful for follow-up or clarification):

Date:

Department Size:

Annual Total EMS Run Volume:

1. Would you classify your department as mostly:

- A. Urban
- B. Rural
- C. Suburban
- D. All the Above

2. Would you classify your department as:

- A. Career
- B. Part-Time
- C. Volunteer
- D. Combination

3. Please select the choice that best describes your EMS delivery model.

- A. ALS
- B. BLS
- C. First Responding Agency
- D. Tiered Response

Please answer the following questions to the best of your ability.

\*For the purpose of this survey, a frequent user of service is defined as a resident who summons 911 often for non-emergent medical needs which are not able to be met by traditional fire and EMS related services. Rather, these patients are in need of other social-based services.

4. Our department is currently experience a frequent service user problem. (Yes/No)

5. Does your department track its frequent users of service? (Yes/No)

6. I feel our personnel are adequately trained to appropriately address the needs of these frequent users of service. (Yes/No)

**APPENDIX 2 continued**

7. When thinking about the unmet needs of your frequent users of service, what other agencies do you feel may be a useful resource to your department in handling these situations? (Open Ended)
8. Generally speaking, do you feel it is your department's responsibility to provide assistance to these frequent users of service? (Yes/No)
9. Could a social services-based Community Paramedicine model (Mobile Integrated Healthcare System) be a solution to your department's frequent service user problem? (Yes/No)