

## **The Problem of Repeat EMS Patients for the Hamilton Fire Department**

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## Certification Statement

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## **Abstract**

This evaluative research on the topic of the operational and economic impact of repeat patients addressed the time and financial cost associated with repeat EMS patients. Repeat EMS patients consist of less than 1% of the population, yet over 13% of fire and EMS calls were dedicated to their care. The purpose was to provide recommendations for management of repeat patients based on the following questions. 1. How does Hamilton's experience with repeat patients compare to other EMS agencies? 2. What are the economic and operational impacts of repeat patients? 3. What have other agencies done to address the negative impact of repeat patients? 4. What existing and pending cooperative resources are available that may be used to provide appropriate service to patients?

An internet and publications search was conducted to identify and evaluate existing research. A two-tiered survey of comparable agencies was conducted to compare demographics and statistics as well as to solicit information relative to successful management practices. The research has supported that Hamilton's experience is of median value regionally and is typical, nationally. Hamilton's opportunity for reduction in cost and call volume is best attained by implementing a process to identify and refer repeat callers to appropriate resources. There are opportunities for cooperatively improving how Hamilton serves its EMS customer base. Hamilton should actively evaluate and manage the cases of repeat EMS use by developing a procedure to refer those callers and query usage using the EMS database. Hamilton should also work cooperatively with community partners to direct repeat EMS patients, when identified, to the correct definitive management resources.

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## Introduction

### Statement of the Problem

Nationally, the use of emergency medical systems for non-emergency purposes costs taxpayers dollars and strains emergency medical systems (Kavilanz, 2009) (Johnson, 2014) (Auge, 2009). The Hamilton Fire Department (HFD) provides emergency medical services (EMS) in a fire-based EMS format. The term “repeat patient” consists of several discriminating criteria for those using the EMS system. The reasons for repeat callers’ use of the EMS system vary and include homelessness, alcohol-related illness, seizures, and respiratory disorders (Bledsoe, 2011). The terms “frequent flyer” and “abuser” are used widely to describe repeat patients due to the high frequency of their use of the system.

During calendar year 2013 HFD treated 408 individual repeat patients who called cumulatively 1157 times. Of those patients, 27 called five or more times during the year for a cumulative call volume of 238 calls. In calendar year 2014 repeat patients numbered 500 individual patients calling 1414 times. Of those patients in 2014, 31 called five times or more and were responsible for 277 calls. There was an unknown amount of additional callers that were not identified and may have increased this number. Patients who were not transported may not have been identified by name. The HFD had limited options to manage EMS patients. Those options included identifying the patient and determining that no medical need exists, treating the patient and transporting him or her to the emergency department, and treating the patient and not transporting based on resolution of his or her condition if patient made an informed and competent decision to refuse further medical care. There was not any option to transport a patient to any facility other than an emergency department. The state of Ohio limited the

authority of the medical director in exceeding the scope of practice for EMS providers (State of Ohio, 2014).

The problem this study will investigate is the impact of repeat EMS patients treated by the HFD based on cost and demand for service.

### **Purpose of the Study**

The purpose of this study was to provide research based information that will aid in developing policies, programs, and procedures to lessen the economic and operational impact of repeat patients and, where possible, improve the goal of meeting the mission of serving those patients. This study was intended to serve as a starting point for HFD to determine what changes in the EMS system are in the best interests of its citizens and patients. HFD can then work with partner agencies to implement those changes.

### **Research Questions**

The following questions will be answered by this evaluative research:

1. How does Hamilton's experience with repeat patients compare to other EMS agencies?
2. What are the economic and operational impacts of repeat patients?
3. What have other agencies done to address the negative impact of repeat patients?
4. What existing and pending cooperative resources are available that may be used to provide appropriate service to patients?

## **Background and Significance**

The vast majority of Hamilton's 62,258 residents (US Department of Commerce, 2014) do not use the EMS system in any given year. In the years studied patients seen by the HFD EMS system were compared to two criteria for designating them as repeat patients. The first criterion was any patient who was seen by the HFD at least twice in any 30 day period. The second was any patient who was seen by the HFD five or more times in any calendar year. This second group is referred to as "super users" for the purpose of this research, and their data are also included with the first group in all "repeat patient" data.

Using HFD's current EMS records management system, call volume and transport data were compared. With only two and one half years of data, long term trends cannot be quantified, but an upward trend in call volume was present. HFD's total EMS call volume for the calendar year 2012 was 9,720 calls of which 6,746, or 69.4 percent of calls resulted in patients being transported to emergency departments. The call volume for 2013 was 9,402 calls with 6,679, or 71.04 percent, transported and in 2014 the call volume was 9,822 calls with 7,027, or 71.54 percent transported. This indicated an upward trend over 3 years but a clearly low year in the middle. Over the three years, there was a slightly upward trend in the percentage of patients transported.

For the three calendar years studied, complete data sets describing the repeat patient and super user call volume were available for only two. The current records management system was implemented in the middle of 2012 and only a partial year was available for comparison. During calendar years 2013 and 2014, 1157 and 1414 calls were attributed to repeat patients, respectively (Mignery, Repeat patients within 30 days, 2013, 2015) (Mignery, Repeat patients

within 30 days, 2014, 2015). This represented 12.3 percent of the emergency medical calls made by the HFD in 2013 and 14.4 percent in 2014. In 2013, 27 super users were responsible for 3.56 percent, or 238 EMS calls with the highest user calling 18 times. In 2014, 31 super users were responsible for 277 calls or 3.94 percent of the calls with the highest user calling 21 times.

According to HFD's incident records, the department made 11,774 calls in 2013 for all fire and EMS emergency calls and 12,264 calls in 2014. Repeat patients, including super users accounted for 9.8% of all calls for service in 2013 and 11.5% of calls in 2014.

The actual number of repeat patients served historically by the HFD has not been evaluated; however anecdotal observations indicated that at least for the past 30 years, there have been patients who were frequent users of the system. With a declining tax base in the city of Hamilton, the general fund, which supports the fire division, must operate as efficiently as possible. The HFD has reduced staffing and reduced the budget in order to function within the means of the taxpayers, though the workload has risen. HFD staffing, overall, has been reduced from 113 to 96 over the course of the last four years, resulting from restructuring and the closing of two fire companies. This has caused a reduction of two cross staffed units which previously provided an additional potential for two engine companies to respond as paramedic units when necessary. Paramedic staffing has remained at three full time medic units, and a fourth is added as daily staffing permits.

The actual cost of providing EMS to the city has risen over time. Comparing line items from the fire department budget among the years 2012, 2013, and 2014 a trend in rising costs for providing EMS services was evident. Direct comparison is difficult with the change in salary allocation due to fire personnel being assigned to EMS jobs and fewer employees in the fire



budget due to reductions while the EMS complement remained steady. The HFD budget was separated into three areas. The “150” budget was fire suppression including personnel, supplies and training. The “153” budget was equipment and facilities. The “159” budget was EMS including personnel, training, and supplies. The budgetary impact was seen as increases in EMS line items by approximately six percent over the past two years while the fire line items and overall fire department budget has been reduced by fifteen percent. The largest areas of cost increase were personnel costs, drugs, and medication. Some reductions were noticeable in equipment and maintenance. As a summary, the average cost per call based on the EMS budget and vehicle, supplies and personnel costs was \$235. This did not include facilities and dispatch costs.

While the impact of these repeat patients on the HFD is high run volume and economic expenditure, the secondary impact on the medical system may be seen by the local emergency departments. Medicare funding to hospitals is contingent on a formula including preventable 30-day readmissions. Laderman, Loehrer, and McCarthy discuss the average impact on hospitals penalized as \$125,000 for the 2200 hospitals fined the first year of the Patient Protection and Affordable Care Act (PPACA) provisions (Laderman, Loehrer, & McCarthy, 2013). Hamilton’s largest private employer is Fort Hamilton Hospital, which also includes the largest emergency department to which HFD routinely transport patients. Bethesda Butler County is a smaller emergency department located in Hamilton to which HFD routinely transports patients. Each of these organizations is a stakeholder in proper patient care. Each may provide resources which would reduce repeat patients seen by the HFD as well as readmissions to the emergency department. Understanding and reducing the need for repeat patient calls may provide the best patient care and minimize liability in funding through PPACA penalties.

## Literature Review

Common topics of discussion in the medical community are repeat patients, appropriate use of emergency medical resources, appropriate use of family physicians, and continuity of care. Many times the discussion centers on access to medical resources. While any patient can be seen at an emergency department, private practices are not required to accept patients and many are already overloaded with the number of patients they can accept. Some are concerned about being financially able to continue to treat new patients once they have been accepted (Tozzi, 2014) (Galewitz, 2012). The portion of Hamilton's population at or below poverty level was 1.5 times the average in Ohio, and household income was 18.5 percent below Ohio's average by economic measures (US Department of Commerce, 2014). The need for medical care and a limited ability to pay share the characteristics which Bledsoe identifies as contributing to the frequency of EMS use in the community (Bledsoe, 2011). A study of the effect of the uninsured on the increase in emergency department visits found, during a repeated study of a diverse patient pool, that increased ED visit volume was not related to uninsured patients; however, the study was not focused directly at EMS calls (Weber, et al., 2008). Additionally, Weber, et al. quantified an increase in emergency department visits of 26 percent between 1996 and 2003, or roughly 3 percent per year.

A 23 month study conducted in Baltimore between 2008 and 2010 identified the medical and demographic profile of repeat patients in that city. The medical conditions that were identified as higher in repeat patients included respiratory disease, mental health conditions, seizure disorder, substance abuse including alcohol, diabetes, and asthma (Knowlton, et al., 2013). Included in HFD's 2013 patient data, the general impression noted by the paramedic treating the patient described 228 out of 1157 repeat patient calls as fitting within the complaint

types described by Knowlton, et al. (2013), and 513 calls classified as one of “Null Value,” “Altered Level of Consciousness,” “General Medical,” or “Not Known.” . In 2014, the general impressions noted by paramedics accounted for 281 out of 1414 calls meeting criteria identified by Knowlton, et al (Knowlton, et al., 2013), and 722 calls were classified as one of “Null Value,” “Altered Level of Consciousness,” “General Medical,” or “Not Known.”

Nationally several approaches to managing repeat patients were identified. In San Diego, the Electronic Resource Access Program is designed to track and access patient data and to direct appropriate resources to patients. The program is focused on the most dynamic and unstable frequent users of the system (Jensen & Dunford, 2013). San Diego’s super user profile, greater than 6 calls for any patient in a year, encompasses over 1000 patients, and 130 patients who called more than 20 times in a year (Kincaid, 2013). Based on data from the 31 month study, the result has been a decrease in cost and demand for the 51 clients enrolled. EMS encounters have been reduced from 736 to 459, and total costs have been reduced by \$314,306 (Tadros, et al., 2012). This represents a 38% reduction in EMS encounters for those patients. The actual participation rate is 5 percent of the super user population and a net reduction in call volume has been 277 calls for a population over 1000 super user patients.

The National Highway Traffic Safety Administration, which oversees emergency medical guidelines in the US, has published an agenda for the future. A portion of that lengthy agenda addresses integrated health services. One role of EMS in that agenda is to interact with patients to not only provide emergency medical care when necessary, but also to coordinate nonemergency care when appropriate (Emergency Medical Services, 1996). This position paper was reinforced with a subsequent education agenda in 2006 (Administration, 2006). Several states have incorporated a curriculum and protocol for community paramedicine building on that

agenda. This concept focuses on providing at-home scheduled visits from a highly trained emergency medical technician who would provide primary health care, under direction of a medical director, in areas where medical care is not readily available. Several states around the U.S., including North Carolina, Colorado, Minnesota, Maine, and Texas, have implemented variations of Community Paramedicine or a comparable Advanced Practice Paramedic (APP) program (Introduction To Community Paramedicine, n.d.). Other states, including Ohio until approved by the governor on June 30, 2015, restricted paramedic treatment to pre-hospital emergency care.

Ohio law provides immunity from liability for emergency medical responders who are providing services for emergency purposes (State Of Ohio, 2013). The scope of practice for Ohio first responders, EMT-basic, EMT-intermediate, and Paramedics specifically referenced emergency services in pre-hospital and hospital settings. The Ohio Department of Public Safety Mobil Integrated Healthcare Ad Hoc Committee has worked with partner agencies to revise legislation in order to allow paramedics to provide care other than emergency care. The Mobile Integrated Healthcare Ad Hoc Committee was established to "create a viable avenue for mobile integrated healthcare (community paramedicine) programs to be developed in such a manner that it can be designed to fit local needs and fill gaps in health care access and delivery." (State of Ohio, n.d.).

The state of Minnesota was the first state to create community paramedicine legislation. Minnesota has launched a successful program, initially conceived for providing care to rural citizens with long travel distances to health care, has been expanded to include repeat patients meeting specific measurable criteria. This state program has been cost-efficient in managing

patients with above average medical needs as well as reducing EMS calls in the jurisdictions in which they have been implemented. The program was launched in the summer of 2012.

The greatest resource of information is available through the Centers for Medicare and Medicaid Services website. CMS is currently conducting research with 107 partner agencies across the nation operating under provisions of the PPACA to develop “Initiatives to Accelerate the Development and Testing of New Payment and Service Delivery Models” (Health Care Innovation Awards, n.d.). Each of the projects has a scope, designated funding, and an expected 3 year savings projection. While many of the projects are focused on particular areas such as asthma treatment awareness, diabetes reduction, or focused mental health care programs, an equal amount is focused on reducing utilization of emergency resources and reducing readmission to hospital facilities. Many of these focus on coordination of care that is not emergency response in nature, rather associated care that prevents a known condition from deteriorating to an emergency situation. A distinct third portion of the initiatives focuses on a non-traditional complement of care providers seeing the patient and may include a nurse practitioner or even a physician responding to calls in order to provide treatment outside of the hospital setting, if appropriate (Centers for Medicare & Medicaid Services, n.d.).

Two projects funded through the CMS innovation center which were both round two grant recipients are specifically focused on emergency response are featured in the March 2015 issue of EMS World. They are the City of Mesa Fire and Medical Department’s Community Care Response Initiative. Mesa is providing on-site treatment of low-acuity patients, reducing duplication of efforts between the emergency department and primary care physicians. The department is staffing four units with a captain/paramedic and nurse practitioner (Busch, 2015). The acute patient is transported for emergency treatment; and each patient, acute or not, still has

the right to transportation, if he or she chooses. A second type of unit, staffed with a physician, provides low-acuity and post-discharge hospital follow-up services. “In 2014 . . . diverted 54% of ambulance transports to the emergency department among our 9-1-1 low-acuity patients who were evaluated by Community Care Units” (Busch, 2015).

The Icahn School of Medicine at Mount Sinai has a project titled “Bundled Payment for Mobile Acute Care Team Services.” The focus of this model is to provide a hospital-at-home setting, including a wide range of practitioners and specialists who can perform lab testing and radiology services (Busch, 2015). The role of the paramedic in this model is that of an on-scene technician taking direction from a physician to resolve medical issues and avoid hospitalization, if possible. The paramedic visits the home of a patient if the call cannot wait for a MACT unit to arrive, and he or she operates under ALS protocols in direct interaction with a physician directing at-home medications and treatments. The project focuses on the patient for the 30 day period after admission to a hospital to provide services at the patient’s home. After the 30 day period, the MACT team assures a safe transition back to community providers and provides referral service to appropriate services (Innovation Center, n.d.).

A project in Nevada, implemented by the Reno based Regional Emergency Medical Services Authority, is working to create “new care and referral pathways which ensure patients who have entered the 9-1-1 emergency medical services system with urgent low acuity medical conditions receive the safest, and most appropriate, levels of quality care.” Components of the system include community paramedics, a nurse health line, and ambulance transport alternatives. One of the goals of the program is to reduce ambulance transports (Innovation Center, n.d.).

During the course of the research there was enough evidence that repeat patients and super users are common occurrences in many EMS systems. While the specific criteria for those definitions vary from system to system, the basic concept is consistent. In order to determine if Hamilton's experience is typical in comparison to other regional agencies, data would have to be collected and compared, if available. Additionally, data would have to be collected in order to determine what other regional agencies have done, if anything, to manage their repeat patients and the success of these efforts, if any.

## Procedures

This study was conducted as a means to provide research based information that will aid in developing policies, programs, and procedures to lessen the economic and operational impact of repeat patients. Initially identifying any statistical similarities and differences among agencies to which HFD was comparable, such as size, scope of service, population, and population demographics as well as the geographical and political limitations within comparable agencies which provide services were considered as the most likely benchmarks for comparison. Defining and identifying the characteristics of Hamilton's service and customers was accomplished by a comparison of recent EMS call data focusing on repeat patient data for patients calling for service five or more times in a calendar year or twice within any 30 day period of a calendar year. The data were analyzed for quantification of calls and characterization of call complaints. A comparison of those patient call analyses with comparable agencies was used to determine whether HFD's repeat patient calls were unique to its jurisdiction or if other agencies have encountered similar demands and could offer effective solutions to the call burden.

A distribution list of contacts was requested through the Ohio Fire Chiefs' Association including southwest Ohio fire departments. Using the contact list, all agencies with an e-mail listing were solicited for a reply to the initial survey. Additionally, several noted contacts were missing and those were included, as well. Of the 154 contacts listed, 15 were not deliverable and 18 replied. The comparable data were requested from southwest Ohio fire agencies and all who responded were considered in light of their similarities to and differences from the City of Hamilton. Agencies which provided fire based emergency medical services, identified repeat EMS patients, and which could provide some statistical analysis of repeat patient calls were considered comparable. Agencies which were not able to provide statistical data or which did



not respond were not considered comparable. A follow-up survey was delivered to the 18 responding agencies, and three weeks later a reminder was delivered to those who had not, at that point, responded. In all, nine agencies responded to the follow-up survey with varying levels of data available. Three agencies were able to provide full data sets for comparison.

The secondary consideration of socioeconomic similarity was noted, as well. The US census data were queried and, where possible, a comparison of population living in poverty was determined for each responding political subdivision. Where a political subdivision was not available, such as many townships, the data for that county were used. A survey of published research was conducted to determine the impact of socioeconomic impact on relative call volume to evaluate the validity of that criterion.

Agencies surveyed were queried about any efforts to quantify and manage the volume of repeat patients. Those efforts were compiled for consideration. The results of those efforts, if quantified by the agency reporting them, were evaluated for potential economic and operational impact if implemented by the HFD.

A search of periodicals, professional journals, and funded research programs was conducted to identify any published efforts at managing repeat patient calls to determine what particular characteristics were contributing factors to repeat patient calls and frequent or repeat emergency department usage. Where results were noted, consideration for the effectiveness documented was compared to Hamilton's repeat patient statistics to estimate the potential impact of those efforts. A statistical analysis was conducted of those repeat patients based on documented impressions of the paramedic treating the patient to identify similarities or differences in the characteristics of HFD patients compared to published research.

A survey of local resources was conducted to determine which, if any, agencies or organizations could provide services to patients who fit the demographics listed by Knowlton, et al (2013). In order for an agency to be considered, it was identified as a government organization, non-governmental organization, or private provider whose resources fit the needs of the at-risk populations. Once efforts were identified and quantifiable results considered, the necessary identified resources were evaluated in light of feasibility for existing resources available internally or cooperatively to the HFD.

If resources could be dedicated to a promising outcome, recommendations were presented to consider implementation of programs or initiatives. If there were questionable outcomes or unsupported benefits, a recommendation was made to consider other alternatives or better understand the weaknesses of that particular program. If legal or political changes were necessary to implement a program, a recommendation was made to pursue those changes in proportion to the expected benefit that the changes would provide.

## **Limitations of the Study**

During the course of this research, the State of Ohio passed House Bill No. 64 which specifically permitted emergency medical providers to provide services in nonemergency situations under the direction of a medical director or physician advisory board. The specific impact of that legislation is yet to be seen and could not be considered in this research.

Data collection among agencies varied widely. Many agencies did not evaluate patient frequency and were not able to provide statistical data at all, let alone in a uniform format across a specific region. With particular agencies, there was also an opportunity for statistical inaccuracy. The raw data provided by the City of Hamilton identified that some inefficiency existed in uniquely identifying a particular patient. In several instances a variation of the spelling of a patient name resulted in creating a second patient or separating that patient into two groups. When compared closely, those patients may actually be one and the same. In many cases, no patient data were collected for non-transport calls. On those calls, there may have been no patient located or the patient information may not have been documented. In the latter circumstance, the actual number of repeat patients or super users may have increased.

The impact of income levels is difficult to compare directly. Three of the comparable respondents are not uniquely identified in the US Census data, and the counties which include them contain a very high population percentage living below the poverty level.

Cost analysis for the repeat patients and super users has not been itemized. The actual cost of patients has only been generalized and a true impact can only be measured by a more focused analysis completed in greater detail.

## Results

The results of the survey of the research considered survey responses in context with the information collected in the literature review. Each responding agency provided data that could be evaluated to various degrees. Several agencies were able to provide complete data sets and some were able to provide feedback in some areas but not all areas. The first question considered was “How does Hamilton’s experience with repeat patients compare to other EMS agencies?” Nationwide the literature review supports the hypothesis that repeat EMS patients and super users are a common occurrence. Regionally, the data suggest that the experience of a particular agency varies from others, but that the occurrence of those patients is present in nearly every location. Of the nine responding agencies, three comparables provided data that supported the statistical values of 2.84%, 16.19%, and 36.49% of all EMS calls in 2013 being attributed to repeat patients. Hamilton’s experience in 2013 was that 12.31% of calls were attributed to repeat patients. The repeat patient values for 2014 were 2.57%, 3.74%, 17.15%, and 31.66% from responding comparable agencies. Hamilton’s experience in 2014 was that 14.40% of calls were attributed to repeat patients. Super users accounted for 0%, 7.93% and 8.44% of calls reported by comparable survey for 2013, with Hamilton experiencing 2.53% in that same year. In 2014 those calls accounted for 0.64%, 0.84%, 6.13%, and 6.85% from respondents with Hamilton experiencing a super user call percentage of 2.82%. In each of these years, Hamilton’s experience was a median value. This suggests that Hamilton’s experience with repeat EMS patients is comparable to other regional agencies. Of all responding agencies which were able to provide data, none were able to be analyzed from the perspective of population at or below poverty level. In responding agencies, only one was a municipality, the remainder being townships not uniquely identified in census data.

The next consideration of the research was, “What are the economic and operational impacts of repeat patients?” Without a detailed analysis of each call and the actions taken, the cost cannot be quantified except in general terms. The percentage of EMS calls made for repeat patients was at least 12.31% in 2013 and 14.40% in 2014. Those percentages may have actually been higher due to the fact that not all patients who were not transported were documented by name. As an average, this was 13.35% of all EMS call and 10.65% of all HFD calls, including fire and EMS calls, over two years. Simply stated, the operational impact of repeat patients was that 13.35% portion of the work load and the system capacity was dedicated to those calls. The economic impact was the cost of staffing and equipment to provide capacity for those calls offset by the recovery of billing associated with providing that service. A more complex consideration would be the marginal impact of those repeat patients and super users if their need for EMS was typical among the EMS patients as a group.

In answering the question, “What have other agencies done to address the negative impact of repeat patients?” the answer varied slightly, but there were several common themes. Of the eight respondents only four provided any kind of data that suggested those agencies have been aware of the scope of their repeat patient situations. Three of the eight respondents replied that they have done nothing to reduce the occurrence of repeat patients. One agency responded that they have a program in place to work directly with seniors. The Safe Seniors Program in Ross Township has been focused on a safety audit of the home and follow-up visits as necessary to protect the aging population. The other four agencies work individually when a need was recognized. Those agencies worked with the Council on Aging, the Butler County Adult Protection Services (CAPS), local law enforcement, and on a personal level to identify the best resources for the patient. The agencies reporting the most success have worked directly with the

patient or with CAPS to find solutions for the patient. One agency has identified a specific demographic, a psychiatric patient, who may be effectively referred through local law enforcement personnel for appropriate treatment. One anecdotal story involved a mental health patient who was under court order to be institutionalized following excessive over-use of EMS resources. After a 30 day program, which allowed consistent medication and treatment, the patient was released, thanking the local fire chief for his role in helping her to become healthy.

The greatest body of data related to other agencies' actions has not been identified by the regional reply, rather national study and program results. Those agencies partnering with the Innovation Center have been able to clearly identify actions and benefits as well as quantify costs and savings. Those agencies which have realized the greatest benefit have identified their repeat patients by some measured standard and have made a focused effort to improve the care for the patient and reduce emergency department visits. Both San Diego, California and Mesa, Arizona have focused on the details of the particular patient, either as a super-user meeting a profile or as a low-acuity patient who may be more efficiently managed by a modality other than ambulance transport to an emergency department.

The fourth question asked by this research is, "What existing and pending cooperative resources are available that may be used to provide appropriate service to patients?"

Traditionally, resources have included those mentioned in the survey respondents. In many cases the default avenue for these resources has been to funnel them through the emergency department which would then make referrals to appropriate agencies. The County Adult Protection Services has been successful in finding the appropriate resources for the aging population. The Council on Aging has been successful in connecting seniors with care. Local law enforcement has been a good resource for assuring a psychiatric patient is admitted to a

facility for his or her own safety, but that does not assure that follow up care is appropriate or effective.

Considering the body of research available through the Center for Medicare & Medicaid Innovation, the greatest success in managing repeat patients has been identified, quantified, and publicized in San Diego, California; and Mesa, Arizona. Those programs, and similar programs, focus on identifying patients, making contact with them, and directing them to the most appropriate resources. The patients fall into the categories of either low-acuity patients or repeat patients and super users.

Local resources which have been identified include those which have a mission and resources to meet the needs of the super-user demographics identified by Knowlton, et al. (2013). Those local agencies and organizations may be accessed through a referring provider, such as the emergency department, EMS agency, or primary care physician. Connecting those patients to the providers takes place once the patient is identified and his or her specific need is known. Locally, there are multiple organizations, governmental and private or charitable, which have missions to serve the aged, the homeless, the addicted, and the psychiatric patient. A missing component is the ability to triage and treat the non-acute patient and provide services outside the emergency department on demand.

With the recent adoption of community paramedicine in Ohio, the Chief Medical Officer at Fort Hamilton Hospital, has reached out to HFD as the local EMS provider to resolve several of those issues. Those include providing better access to transport from the emergency department or hospital rooms to skilled nursing facilities, exploring mobile responses in a non-emergency setting to evaluate and provide care to patients, and to collect lab samples. These

currently fall outside the modality of how HFD currently seeks to meet its mission; however, these and other services may actually be beneficial in meeting that mission.



## Discussion

It is clear that Hamilton's experience with repeat EMS patients and super users is a driving economic force with operational impact providing emergency medical services. Hamilton's experience falls in the mid-range of responding local agencies. It is also clear that there are effective methods used to reduce those calls, thus reducing the economic and operational impact of those patients.

Based on the reduction in call volume realized by study groups which have been quantified, there is evidence to suggest that reducing repeat patients would result in an economic savings to the EMS system and the overall medical system. In particular, the San Diego ERAP program study quantified results based on reduced emergency calls across the board. The reduction of Hamilton's repeat patient calls, if completely successful, can also be quantified, though San Diego's actual reduction was 38% of calls, the population of super users was over 1000, and the net participation rate, 51 enrolled patients, can be estimated at approximately 5 percent. Mesa's experience was a 54% reduction of emergency department transports for low acuity patients. This is a significant reduction, however the criteria of measuring repeat patients was not specifically quantified. Several factors must be considered relative to the economic impact of reducing repeat patient calls. One is the potential for increased revenue for recovering the billing opportunities lost to mutual aid calls. The second is the revenue lost due to fewer billed transports. A third is the marginal cost of providing service, which includes primarily fuel, supplies, and medications. The actual financial savings, if consistent with the results found in San Diego, would be a 38% reduction of the calls attributed to five percent of Hamilton's super users per year. In simple mathematical terms, 5% of 38% of all super user calls, averaging 257 calls over two years, or a net decrease of only 5 calls per year. The effect on system capacity is

insignificant. A reduction in billing could be estimated at \$1175. For Hamilton to see any appreciable economic savings in any area, the enrollment rate would have to be significantly higher than that of San Diego.

The focus on quantifying costs and resources dedicated to repeat patients is only an indicator of purpose for conducting this study. The overarching goal is to meet the mission of the fire department of reducing the impact of emergency medical conditions, in part, rather than to reduce cost or call volume. Several successful programs as well as anecdotal individual successful interactions support the concept that direct, focused interaction with the individual patient can improve patient treatment and referral. The common component of these successful programs is that the patient's particular need was identified and a treatment plan or referral plan was created.

The effort to reduce repeat patients and the success of those efforts lies with identifying appropriate resources, connecting patients as early as possible with the appropriate resources and support. In addition to the governmental organizations such as CAPS, local and county health departments, police and fire agencies, there are many non-governmental non-profit agencies as well as private businesses which can provide necessary services. Fort Hamilton Hospital has recently launched a program called F.O.R.T., Fort's Opiate Recovery Taskforce, a broad-reaching, well-resourced program focused on opiate addiction treatment, one of the factors identified in repeat EMS patients by Knowlton, et al (2013). The Butler County United Way also is a resource in providing funding and access to agencies whose missions include mental health counseling, medical outreach, emergency shelter, and food kitchens and pantries.

## **Recommendations**

Managing repeat EMS patients for the HFD should be done actively rather than passively. To date, repeat EMS patients are treated when they call with little focused attention on what is best for the overall treatment of the patient. In HFD's current role as a treatment and transport service for the present call, HFD is missing an opportunity to be part of an integrated healthcare system and to be an advocate for the patient's overall medical treatment. With the focus in medicine being prevention rather than treatment, HFD must become part of that integrated system without duplicating the missions and efforts of other agencies. This should be done within the mission of the department with resources allocated as necessary to meet that mission. The primary role of HFD as an EMS provider should be to provide those emergency medical interventions when necessary while focusing on preventing them from recurring whenever possible. The roles of HFD should also be to recognize a developing medical situation and to provide referral and access to those other agencies whose missions focus on prevention, education, and support. Given the results of this research, the following recommendations are offered to reduce the economic and operational impact of repeat EMS patients.

The HFD should identify the best practices for referral of repeat patients based on known resources and the demographics of the caller. Local resources should be identified for specific complaints such as psychiatric patients who are not treated or not compliant, patients with alcohol or drug addiction, homeless patients, or diabetic patients whose conditions are not well managed. Those resources should include both governmental agencies as well as non-governmental groups with a mission and resources to assist the patients. This should be approached as a local or regional opportunity to publicize those resources and make access available to those who need them. If existing resources can prevent a known medical condition

from becoming an emergency, then those resources should be identified and access to them provided to the patient. Where appropriate resources are not adequate, an effort should be made to develop those within the community and to fund them appropriately.

The HFD should formalize a course of action which identifies and evaluates repeat EMS patients and super users on a routine basis. This should include a focus on including all patient contact information on each EMS call, regardless of transport, unless there is no patient located on a call. If a patient is located and refuses treatment, that patient should be identified with appropriate documentation relative to the refusal of service, either by the patient or paramedic. The patients' recurring use of the EMS system should be routinely audited. A recurring query which identifies patients whose call frequency fits the criteria for repeat patients should be run and the details of their conditions evaluated. There should also be a formal internal referral process to identify those patients by responding crews to the person responsible for oversight of repeat patients. Patients vetted as those willing to participate should be enrolled and included in the referral program.

The HFD should further take a cautious approach to actively engaging the management of repeat EMS patients as part of an integrated healthcare initiative focused on repeat EMS patients. The HFD should approach health care partners in the community with the resources to educate, treat, and evaluate the medical progress of those repeat patients. Referred patients should be enrolled in an evaluation and referral process and changes in their EMS system use evaluated for changes. HFD interaction should be overseen by either the current medical director or a physician advisory group with responsibility to evaluate the enrolled patients' progress. The benefit experienced by the patient should be reviewed and adjustments in the referral system should take into account those benefits perceived. The benefits of this program

should be evaluated from the perspective of economic and operational impact to the HFD, measured as a reduction in calls attributed to repeat EMS patients, as well as the benefit to the repeat EMS patient. The primary metric for benefit should be the frequency of need the patient experiences in using the EMS system. That need should be reduced and that patient's medical conditions and quality of life should be maintained or improved. The evaluation of improvement should be a cooperative effort of evaluation and consultation among the patient's doctors and, if beneficial, the HFD.

HFD should dedicate resources to follow up on patients within a plan developed by the physician or advisory group. With each patient, the physician or advisory group should have an expected outcome or status identified toward which each patient's program is focused. The increase in the scope of services should not be undertaken without a commensurate increase in funding separate from HFD's current funding stream. The minimal expected reduction in service and improvement in patient status does not justify significant expenditure that would detract from a financially lean system operating with no reduction in demand from the efforts.

Billing for the cost of implementing the change in services provided should be expanded to include all recoverable costs associated with providing the service. The costs recovered from providing services including home visits, blood draws for lab work, transportation related to medical care may well offset the costs of providing the expanded service. While a reduction in emergency transport will also show a reduction in billing for that particular service, the costs of expanded services may be included in a bundled payment similar to that currently being explored at the Icahn School of Medicine at Mount Sinai under their project titled "Bundled Payment for Mobile Acute Care Team Services." As this study progresses and the efficacy of the model is evaluated, consideration for partnering with a physician group or advisory board may further be

beneficial in providing a more efficient model for recovering costs associated with services. If available funding does not support expanding the modality of treatment within the HFD, then the efficacy of a different provider for those services should be explored.

As part of an integrated healthcare system, the HFD should approach local stakeholders in reducing medical costs related to repeat EMS patients by funding alternative treatment and transport methodologies. HFD should work to secure a pilot funding program with local insurance payers focused on payment for those services more cost efficiently managed outside of the emergency department on a preventative or routine basis. This should include payment for out-of-hospital services and follow-up preventative services for repeat patients enrolled in a pilot program.

The HFD should dedicate or reallocate resources to positioning its practices for the future state of providing and funding EMS. As the PPACA has driven the Center for Innovation to look for better ways to fund healthcare, those changes may well affect EMS and funding streams that HFD currently utilizes. The city of Hamilton, to a larger extent, should be actively engaged in understanding and forming those changes to reduce the risk to funding necessary services. The city should further work to assure that services are provided in the best interests of the patient while also being provided in a manner that costs can be recovered for appropriate services provided. This should include active legislative involvement and presenting the most efficient model for providing services.

In furthering this course of research, several recommendations follow which were identified as limitations and opportunities for improvement in data collection. The primary limitation identified was a lack of data. As part of the American Recovery and Reinvestment

Act of 2009, the use of electronic health records is incentivized for meaningful use of technology that generates social benefit. A similar database would be beneficial to tracking those EMS patients uniquely and accurately. That does not seem to be likely achievable in the short term, however local policies to correctly and uniquely identify patients on each and every patient contact would greatly improve the statistical availability of data. While the best of local records policies would be beneficial, with homeless and dependent users of mental health services, those patients may also be transient among several jurisdictions providing services.

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## Appendix 1 – Initial Survey

This short survey is intended to identify agencies which may be able and willing to provide statistical data relevant to repeat EMS patients. Please return the completed survey to the address or email listed above.

### Survey 1: “Repeat EMS Patient Basic Survey”

#### Agency and Contact Information

Your name \_\_\_\_\_

Agency \_\_\_\_\_

Position or Title \_\_\_\_\_

Email Address \_\_\_\_\_

Phone Number \_\_\_\_\_

How many square miles does your agency serve? \_\_\_\_\_

What is the size of the population your agency serves? \_\_\_\_\_

Please describe the service your agency provides.

Fire response only

EMS response only

Fire and EMS response

Has your agency identified repeat patients using your EMS system?

Yes

No

My agency does not provide EMS response.

Does your agency provide first-responder EMS?

No

Yes, for some EMS calls

Yes, for all EMS calls

May I contact your agency for additional statistical data related to EMS patients?

That would be great!

No, thank you.

Who would be the best contact in your organization to discuss EMS repeat patient information?

Name \_\_\_\_\_

Agency \_\_\_\_\_

Position or Title \_\_\_\_\_

Email Address \_\_\_\_\_

Phone Number \_\_\_\_\_

## Appendix 2 – Follow Up Survey

### Survey 2: “Follow-up Survey for EMS Agencies”

#### Agency and Contact Information

Name \_\_\_\_\_

Agency \_\_\_\_\_

#### Call Volume and transport ratio 2013 and 2014

How many EMS calls did your agency make in calendar year 2013? \_\_\_\_\_

How many patients did your agency transport in 2013? \_\_\_\_\_

How many EMS calls did your agency make in calendar year 2014? \_\_\_\_\_

How many patients did your agency transport in 2014? \_\_\_\_\_

Repeat Patients 2013 and 2014- I have used the criterion “at least twice in 30 days” to describe repeat patients for my agency.

Do you have a different criterion for repeat patients?

\_\_\_\_\_

How many repeat patients called in 2013? \_\_\_\_\_

What was the total call volume for repeat patients in 2013? \_\_\_\_\_

How many repeat patients called in 2014? \_\_\_\_\_

What was the total call volume for repeat patients in 2014? \_\_\_\_\_

Super Users 2013 and 2014- I have used the criterion “5 or more calls in a calendar year” to describe super users for my agency.

Do you have a different criterion for super users?

\_\_\_\_\_

How many super users called in 2013? \_\_\_\_\_

What was the total call volume to super users in 2013? \_\_\_\_\_

How many super users called in 2014? \_\_\_\_\_

What was the total call volume for super users in 2014? \_\_\_\_\_

Managing repeat patient call volume

Has your agency attempted to reduce the number of repeat patients or super user call volume? If so, what has your agency done to reduce the call volume?

- Priority dispatching
- Nurse Practitioner or other professional as call taker
- Other (please list) \_\_\_\_\_

To what extent have your efforts to reduce repeat patient or super user call volume been successful?

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Has your agency discussed using some level of fire-based community paramedicine to serve your citizens, and if so to what extent does your agency expect to utilize community paramedicine?

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### Appendix 3 – Initial Survey Results Summary

This short survey is intended to identify agencies which may be able and willing to provide statistical data relevant to repeat EMS patients. Please return the completed survey to the address or email listed above.

#### Survey 1: “Repeat EMS Patient Basic Survey”

Agencies responding, square miles, population served:

Agency	Square Miles	Population
Bradford Fire and Rescue Services, Inc	58	6,000
City of Springfield Fire and EMS	25.3	60,000
Colerain Township Fire and EMS	43.2	60,000
Evendale Fire Department	5.1	2,800
Goshen Twp	36	17,500
Liberty Twp Fire Department	30	42,000
Miami Twp Fire & EMS	33	42,000
Middletown Division of Fire	26.5	52,000
Monroe Fire Department	19.5	14,000
Sycamore Township	8	20,000
Mt. Healthy	1.4	6,100
Washington Twp FD	31.4	57,000
Loveland-Symmes Fire Department	13.6	28,412
Ross Township Fire Department	36	9,600
Deer Park-Silverton Joint Fire District	3	12,350
Fairfield Fire Department	20.5	42,000
Green Twp Fire and EMS	28	60,000
Anderson Township	31.4	45,000

Please describe the service your agency provides.

No respondents replied, “Fire response only”

No respondents replied, “EMS response only”

All 18 respondents replied, “Fire and EMS response”

Has your agency identified repeat patients using your EMS system?

15 respondents replied, “Yes”

3 respondents replied, “No”

No respondents replied, “My agency does not provide EMS response.”

Does your agency provide first-responder EMS?

No respondents replied, "No"

10 respondents replied, "Yes, for some EMS calls"

8 respondents replied, "Yes, for all EMS calls"

May I contact your agency for additional statistical data related to EMS patients?

18 respondents replied, "That would be great!"

No respondents replied, "No, thank you."



### Appendix 4 – Follow Up Survey Results Summary

#### Survey 2: “Follow-up Survey for EMS Agencies”

Agencies responding, call volume, and (calculated) transport ratio

Location	2013 Calls	2013 Transports	2013 Transport Ratio
Anderson Township	3113	2050	65.85%
Deer Park-Silverton Joint Fire District	1809	1160	64.12%
Fairfield Fire Department	4571	3612	79.02%
Green Twp Fire and EMS	4897	3732	76.21%
Hamilton City	9402	6679	71.04%
Liberty Twp Fire Department	1611	1540	95.59%
Loveland-Symmes Fire Department	2093	1553	74.20%
Mt. Healthy	1395	876	62.80%
Ross Township Fire Department	811	560	69.05%
Washington Twp FD	4505	4101	91.03%

Location	2014 Calls	2014 Transports	2014 Transport Ratio
Anderson Township	3271	2355	72.00%
Deer Park-Silverton Joint Fire District	1869	1146	61.32%
Fairfield Fire Department	4926	3885	78.87%
Green Twp Fire and EMS	5499	4103	74.61%
Hamilton City	9822	7027	71.54%
Liberty Twp Fire Department	1653	1472	89.05%
Loveland-Symmes Fire Department	2181	1567	71.85%
Mt. Healthy	1500	849	56.60%
Ross Township Fire Department	829	455	54.89%
Washington Twp FD	4943	4412	89.26%

Repeat Patients patient counts, call volume, and (calculated) ratios 2013 and 2014

Location	2013 Repeat Pt. Count	2013 Repeat Pt. Call Volume	% Repeat CV to Calls 2013
Anderson Township	115	504	16.19%
Deer Park-Silverton Joint Fire District			
Fairfield Fire Department			
Green Twp Fire and EMS			
Hamilton City	408	1157	12.31%
Liberty Twp Fire Department			
Loveland-Symmes Fire Department			
Mt. Healthy			
Ross Township Fire Department	4	23	2.84%
Washington Twp FD	590	1644	36.49%

Location	2014 Repeat Pt. Count	2014 Repeat Pt. Call Volume	% Repeat CV to Calls 2014
Anderson Township	139	561	17.15%
Deer Park-Silverton Joint Fire District	18	48	2.57%
Fairfield Fire Department			
Green Twp Fire and EMS			
Hamilton City	500	1414	14.40%
Liberty Twp Fire Department			
Loveland-Symmes Fire Department			
Mt. Healthy			
Ross Township Fire Department	7	31	3.74%
Washington Twp FD	525	1565	31.66%

Super Users counts, call volume, and (calculated) ratios 2013 and 2014

Location	2013 Super User Count	2013 Super User Volume	% SU CV to Calls 2013
Anderson Township	36	247	7.93%
Deer Park-Silverton Joint Fire District			
Fairfield Fire Department			
Green Twp Fire and EMS			
Hamilton City	27	238	2.53%
Liberty Twp Fire Department			
Loveland-Symmes Fire Department			
Mt. Healthy			
Ross Township Fire Department	0	0	0.00%
Washington Twp FD	55	380	8.44%
Location	2014 Super User Count	2014 Super User Volume	% SU CV to Calls 2014
Anderson Township	27	224	6.85%
Deer Park-Silverton Joint Fire District	2	12	0.64%
Fairfield Fire Department			
Green Twp Fire and EMS			
Hamilton City	31	277	2.82%
Liberty Twp Fire Department			
Loveland-Symmes Fire Department			
Mt. Healthy			
Ross Township Fire Department	1	7	0.84%
Washington Twp FD	41	303	6.13%

## Managing repeat patient call volume

Has your agency attempted to reduce the number of repeat patients or super user call volume? If so, what has your agency done to reduce the call volume?

One respondent replied, "Priority dispatching"

None of the respondents replied, "Nurse Practitioner or other professional as call taker"

Six respondents replied, "Other (please list)"

- Safe Seniors Program
- Working with local law enforcement to establish protocols for psychiatric runs. Many of our repeat patients have psychiatric history but do not need emergency medical attention or transport.
- While the above lack of information is present, in fact there are several patients that do meet the criterion throughout each year I just cannot research accurate numbers for you. With that said we occasionally will refer a case to Butler County APS if the needs of the patient indicate as such. There have also recently been cases of 911 abuse handled by the PD.
- When I become aware of a frequent patient, I will often intervene personally, access the situation, and attempt to determine a mutually agreeable solution. I have had some success with this method, sometimes permanently, sometime temporarily. It usually requires getting involved with family, or outside resources. (\*)
- We are currently working with Council on Aging
- Refer patients to outside agencies, i.e. Senior Services, Council on Aging, etc.

To what extent have your efforts to reduce repeat patient or super user call volume been successful?

- We have not tried anything.
- Currently we do not have any program to reduce the number of repeat patients or super user patients, but we are looking into community paramedicine as a way to possible cut down on their use of 911.
- The safe seniors program was established to reach out to our elderly residents and focused on areas of fall prevention, and preparation for a medical emergency. Once enrolled in the program our members will visit the home and establish a patient and EMS provider relationship. At the residence we gather useful information, ensure all smoke detectors are in working conditions. After the initial visit the department will schedule additional visits based on their needs. We even call the enrolled residents during inclement weather to ensure their medical needs are taken care of.
- We have had success in finding relief to when Butler county APS handles a case, creating a reduction in calls based on finding appropriate resources for the patient.
- The above method works about 70% of the time, at least temporarily. (\*)

Has your agency discussed using some level of fire-based community paramedicine to serve your citizens, and if so to what extent does your agency expect to utilize community paramedicine?

- No
- Only in long range planning, waiting on legislation and official direction from state EMS board.
- Yes, we have discussed the use of community paramedicine to help serve our community, but since this program is fairly new to the state and many communities are just learning about this program we are exploring every avenue to better serve our community.
- Yes, we have discussed this issue and feel this could have an impact on our services. We have attended the seminars that Larry Bennett has put on and are waiting on the State to make changes to the ORC. We feel if this passes we will take a serious look at the additional services we can provide to our community.
- We have been following the discussion on paramedicine in the area. However, it appears that this type of program is better suited to larger jurisdictions (or regional collaborative) than smaller entities. It appears that this type of program would increase the load on our current staffing, reducing our ability to meet our current EMS and fire needs.
- Very little discussion has taken place.
- No
- We are currently waiting for legislation to be passed before we move forward.
- There are no plans to implement such a program at this time. Will evaluate again in the future as more programs become established and have results documented.