Running Head: FIRE-BASED EMS IN HOOD RIVER, OR

# An Analysis of Fire-based Emergency Medical Transport Services in Hood River, Oregon

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# CERTIFICATION STATEMENT

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

Signed: _____

## Abstract

The problem was that the City of Hood River was uncertain whether existing fire-based ambulance transport services enhance or diminish fire protection services which were funded by tax revenues. The purpose of the research was to determine if fire-based ambulance transport services either enhance or diminish the provision of fire protection services which were supported by tax revenues in Hood River, OR. By conducting a thorough literature review of current publications and a local survey, industry professional interviews, and an analysis of data and budget reports, the results of descriptive research answered the following three questions: (a) what are the base costs of providing emergency services in Hood River, without providing transport EMS, (b) what are the incremental operational risks and benefits of providing fire-based EMS transport in Hood River, and (c) what are the incremental financial requirements and revenues of providing fire-based EMS transport in Hood River?

The results of the research indicated that the fire-based EMS transport system in Hood River, OR enhanced the provision of fire protection services. Literature review and original research of existing budget and call volume data indicated that operational benefits out-weigh the risks. Also, even though medical services are expensive, the revenue model that was in place in Hood River was sufficient to cover EMS-related expenses. EMS revenue was found to subsidize fire protection capabilities at Hood River Fire & EMS.

Recommendations were made to continue the fire-based EMS transport service that was in place in Hood River, OR. Finally, Hood River Fire & EMS should monitor staff for signs of burn-out and fatigue to ensure the safety of the responders and community.

Table of Contents



Table of Figures

# An Analysis of Fire-based Emergency Medical Services in Hood River, OR

## Introduction

Fire service-based Emergency Medical Services (EMS) has been part of the City of Hood River for over 60 years. Providing medical transport services, alongside firefighting, has molded the fire department into what it is today. The services rendered are critical to the community and its visitors. The City of Hood River has been faced with increased citizen expectations in all service areas, coupled with a demand for exceptional fiscal responsibility. To meet these demands, the City has asked that the fire department operate efficiently and maintain the current service level. The problem is that the City of Hood River is uncertain whether existing fire-based ambulance transport services enhance or diminish fire protection services which are funded by tax revenues.

The purpose of the research is to determine if fire-based ambulance transport services either enhance or diminish the provision of fire protection services which are supported by tax revenues in Hood River, OR. By conducting a thorough literature review of current publications and a local survey, industry professional interviews, and an analysis of data and budget reports, this paper will report the results of descriptive research to answer the following three questions:

1. What are the base costs of providing emergency services in Hood River, without providing transport EMS?
2. What are the incremental operational risks and benefits of providing fire-based EMS transport in Hood River?
3. What are the incremental financial requirements and revenues of providing fire-based EMS transport in Hood River?

## Background and Significance

Hood River Fire & EMS provides emergency services to the City of Hood River, located on the north-central border of Oregon and Washington, along the Columbia River. It also provides transport Advanced Life Support (ALS) ambulance service to 500 square miles of Hood River and Wasco Counties, at the base of Mt. Hood. It is an area founded on agriculture, which has become a bedroom community of Portland and an extreme sports tourist destination. Hood River is home to multiple sports, including windsurfing, kite boarding, mountain biking, and kayaking. The City is approximately three square miles with over 7,000 permanent residents and an estimated daily population exceeding 25,000. The mix of commerce, industry, and recreation has made Hood River one of the most popular places to visit and reside (Patrico, 2009).

Residents decided they needed organized fire protection in the City in 1904, so they formed the first fire department in the County. The agency began as an all-volunteer department and survived on tax dollars and donated funds. The volunteer department was staffed mainly by many store owners and their employees. Hood River Fire & EMS took on the responsibility of 24-hour per day transporting of sick and injured people by ambulance in 1949, creating the need to hire firefighters and medical responders.

In the 1980's, Hood River saw a major change in industry focus, from agriculture to tourism, requiring the fire department to examine expanding service provision. The wind that blew through the Columbia River Gorge became world famous for windsurfers, increasing the demand on the fire and ambulance service. In 1989, the City of Hood River began providing ambulance transport services to the majority of the County after assuming responsibility of a neighboring jurisdictions service. By the mid-1990’s, there were eight full time firefighters in the City of Hood River. Currently, 17 full time employees, including a full time Fire Chief and Fire

Marshal, are Paramedics. The paid staff is supplemented by 27 volunteers, 14 of which are Emergency Medical Technicians (EMT). Hood River Fire & EMS is the only 24-hour per day staffed fire station and EMS provider in the County.

Call volume increases have driven the need for staffing growth over the past two decades in Hood River. An increasing population base, along with more tourists and a higher demand for emergency assistance places a higher need on the fire department staff. Over 79% of calls for assistance are medical related, creating the need to have everyone on staff equally medically trained. Along with this call volume increase, a budget deficit was identified in the City's General Fund. This deficit became a focal point of the governing body in fiscal year 2008-09. Budget conscious elected officials identified the need to reduce staffing in the City, including the fire department, eliminating the Fire Marshal position and one Firefighter/Paramedic position over the next two years. Further reductions were made to the personnel and operating budgets, decreasing funding for overtime and removing funding for EMT-intern positions responsible for inter-facility medical transfers.

Along with these reductions came a decrease in the amount of revenue generated by the fire department ambulance service. Efforts were focused on finding ways to streamline operations and identify alternative funding sources. Both were accomplished successfully. The local hospital agreed to a multi-year contract for inter-facility medical transfers, restoring the EMT-intern positions. Also, funding from the Assistance to Firefighters Grant (AFG) program from the Federal Emergency Management Agency (FEMA) restored the Fire Marshal and Firefighter/Paramedic positions cut in 2009 and 2010. The local firefighters union agreed to salary and benefit concessions and operations were streamlined. These efforts were rewarded by seeing a restoration of ambulance revenue to levels higher than before the reductions.

Economic and operational sustainability are the highest priorities of the City of Hood River. Hood River Fire & EMS has an obligation to provide exceptional services to its citizens and the many people that visit the area. For this reason, both the fire department and the City will benefit from an examination of the operations and economics of continuing fire-based Emergency Medical transport services.

This applied research project will examine and identify the impact fire-based EMS has on firefighting services, both operationally and financially. This directly relates to the objectives of the National Fire Academy's Executive Leadership course. In Unit 3: Thinking Systemically, one of the objectives is to apply "systems thinking to the identification and diagnosis of adaptive challenges" (United States Department of Homeland Security [USDHS], 2012, p. SM 3-2).

Finally, by studying the operations and economics of fire-based ambulance services in Hood River, OR, this research relates to goals and strategic initiatives of the U.S. Fire Administration (USFA). Goal three of the USFA is to "improve the fire and emergency services' capability for response to and recovery from all hazards" (United States Fire Administration [USFA], 2010, p. 14). Also, the Emergency Medical Services (EMS) strategic initiative states that the "USFA will provide training and program activities to support fire-based EMS as an option for local community life safety strategies" (USFA, 2010, p. 17).

## Literature Review

Fire departments have evolved into providers of many different fields of service. One of the most common areas that fire agencies are involved with is medical services. Fire department-based emergency medical services (EMS) are a tradition with rich history in all types of departments across the United States, from volunteer to career. "EMS has emerged as one of the

most critical and popular services fire departments provide to the communities they serve" (Compton, 2006). In a survey done in Hood River, OR in 2010, a small cross section of residents was asked what emphasis certain fire department activities should be given (Wells, 2010). Of the 46 respondents to the survey, 97.8% of them answered that EMS should be "highly important, top priority," second only to emergency fire services with 100% high priority (Q. 4). This identified their desire for the fire department to place a priority on EMS in Hood River.

Steve Pegram (personal communication, January 2013), Fire Chief of Goshen Township Fire & EMS in Goshen, OH believes that people know and love his fire department because of the EMS contacts they make. People recognize his firefighters from ambulance calls where personal interaction is critical. Fire-only calls do not provide that same interaction.

Volunteerism may also be more enticing due to EMS provision by the fire department. Jesse Metheny (personal communication, January 2013), Captain at Cascade Locks Fire & EMS in Oregon, feels that he gets more volunteers because they can fill dual roles. Fire Chief Dan Woodson (personal communication, January 2013) of the Lebanon, OR Fire District agrees. Providing EMS increases staffing to help with other duties, like firefighting. Additionally, most fire departments in southwest Ohio have paid firefighting staff due to EMS revenues (S. Pegram, personal communication, January 2013).

One of the first indicators that the fire service was going to be a good EMS delivery system was in 1964 when Dr. Eugene Nagel wanted to teach first aid and cardiopulmonary resuscitation (CPR) to improve survival rates in the community. Dr. Nagel chose to educate Miami Fire Rescue firefighters since they were available, motivated, and willing (Congressional Fire Services Institute [CFSI], 2007). Since that time, many more communities have examined

the benefits of fire-based EMS and are recognizing the values the system provides (Ludwig, 2010).

Fire agencies have since become the largest provider of EMS in the United States. The 2011 National EMS Assessment indicates that 40% of the EMS agencies in the U.S. are fire department based (Federal Interagency Committee on Emergency Medical Services [FICEMS], 2011, p. 31). The report continues by stating that fire based EMS agencies maintain "the greatest percentage of EMS professionals" in comparison with all other EMS agency types (FICEMS, p. 110). In addition to being the largest provider of EMS, fire agencies are able to provide quick response times "largely because stations are strategically located and departments provide 24/7 coverage" (Deardorff, 2012). Many agencies have taken this a step further by changing their names to "fire and EMS department" to reflect their main mission (Janing & Sachs, 2006).

The International Association of Fire Chiefs (IAFC) released a position statement in May 2009 stating that "EMS is an essential component of the services provided by the fire service in the United States." They contend that the fire service is well positioned, strategically and geographically, to deliver EMS efficiently. (IAFC, 2009). Non-fire related publications also recognize the commonality of fire-based EMS delivery systems. Dyar and Evans (2010) noted in their book Management of EMS that "the most common service in the country is fire department-based, which means that a response-and-patient-transportation system uses cross-trained, dual-role firefighters" (p. 14). The International Association of Firefighters (IAFF) agrees with this statement. Since firefighters typically attack their work aggressively, they are a good fit for EMS (IAFF, 2009, p. 7). They also state that no other type of organization provides EMS as efficiently because of the rapid response that fire departments are geared toward using (p. 3).

This rapid response is because “fire risk grows exponentially” says Jason Averill from the National Institute of Standards and Technology (NIST) in 2010 press release (NIST, 2010a). He continues by saying “each minutes of delay is critical to the safety of the occupants and firefighters, and is directly related to property damage.” In 2009, NIST completed the first quantified research on the effects of crew sizes and response times on lifesaving and firefighting operations for residential fires (NIST 2010a). The report presents results from over 60 experiments in the laboratory and on the fire ground (NIST, 2010b, p. 9). It is the first time that varying crew sizes and response times were compared to firefighter safety and firefighting operations “using realistic fires” (NIST, 2010b, p. 9).

The results of the report show the effectiveness of four-person crews for low-hazard responses (NIST, 2010b):

> The four-person crews operating on a low-hazard structure fire completed all the tasks on the fireground (on average) seven minutes faster – nearly 30% - than the two-person crews. The four-person crews completed the same number of fireground tasks (on average) 5.1 minutes faster – nearly 25% - than the three-person crews. On the low-hazard residential structure fire, adding a fifth person to the crews did not decrease fireground task times (p. 10).

The research showed that having four-person crews achieves the industry standards presented in Standard 1710 of the National Fire Protection Association (NFPA). Two- and three-person crews were not able to assemble enough firefighters on scene within the allotted times meet the standard (NIST, 2010b, p. 11). NFPA 1710 “contains the minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical

operations, and special operations to the public by substantially all career fire departments" (NFPA, 2010).

Another standard that is required for fire departments to follow is the "two-in, two-out" rule. This rule is found in the U.S. Department of Labor's Code of Federal Regulations, 29 CFR 1910.134(g)(4) which pertains to interior structural firefighting. It states that employers must guarantee that "at least two employees enter the immediately dangerous to life and health (IDLH) atmosphere and remain in visual or voice contact with one another at all times" and "at least two employees are located outside the IDLH atmosphere" (U.S. Department of Labor [DOL], 2011, June).

Wilson (2009) states that when less than four firefighters arrive on the fireground, critical decisions have to be made. He feels that the initial arriving company has to make a decision to either attack the fire without adequate staffing, increasing firefighter risk, or delay fire attack, causing further fire damage (Wilson, 2009). He feels that this has contributed to costly time-lost injuries and dozens of line-of-duty deaths (LODD) each year.

However, the International City/County Management Association (ICMA) warns that "the standards produced are recommended by the NFPA for use, while important … are not enforceable by law" (ICMA, 2011, p.31). They continue by stating that it is the role of the individual community to adopt those NFPA recommendations "based on its financial assets." Before general standards can be adopted, all facets of the issue need to be tested given the specific community situation (p. 31).

Communities may find that having cross-trained firefighters makes sense. Roberts (2010) feels that firefighters are accustomed to high-stress situations. This may provide an opportunity

to train them with additional life-saving skills, making them well-suited for EMS operations (Roberts, 2010). However, the additional skills may result in firefighters being called upon to work in life threatening situations on less sleep. Disrupted sleep patterns cause occupational stress and adverse consequences (Elliot & Kuehl, 2007). Research done on firefighter fatigue shows that their night work is "episodic and unpredictable" (p. 51). This results in fragmented sleep and overall fatigue. New laws have been implemented due to this impact on safety. In New Jersey, "Maggie's Law" allows criminal prosecution if a fatigued driver causes a fatal accident. This may also present a liability risk for fire departments if an employee is allowed to operate an apparatus while fatigued (p. 71).

Chief Woodson (personal communication, January 2013) agrees that fatigue is an issue. He has had complaints from his dual-role firefighters that they may be too tired to continue to make calls and non-emergency transfers. This a real concern for volunteer staff as well. Fatigue may be looked at different. Being called "burn-out" from too many EMS calls and extra training (J. Metheny, personal communication, 2013). Another aspect of training that may be negatively impacted by EMS calls is when crews are out on calls, missing needed fire training. This is a concern of Chief Woodson (personal communication, 2013).

Fire agencies that use dual-role firefighters have to weigh the risks and benefits of a fire-based EMS system. The Arvada Fire Protection District recently completed that process. The staff presented a recommendation to the Board of Directors to create a fire-based medical transport system (Arvada Fire Protection District, 2011). The staff reports that fire-based EMS will increase resources available in the District to respond to other types of calls (p. 3). Also, fire-based EMS is also notable for eliminating duplication (Ludwig, 2010). Emergency medicine

literature indicates that transferring patient care from one provider to another is the most likely time for mistakes to be made (CFSI, 2007, p. 10).

Compton (2009, June) believes that fire-based EMS is critical and popular and that many lives are saved by firefighters. Steve Austin, the co-chair of Fire Service-Based EMS Advocates, believes that good fire protection and emergency services are a quality-of-life issue" (Roberts, 2010). "If fire departments step up to provide medical services, it is going to improve the quality-of-life in that community."

Communities expect that EMS will be available around the clock with high quality response (National EMS Advisory Council [NEMSAC], 2012, p. 23). Unfortunately, policy makers often do not have this same opinion. This creates a failure to recognize EMS as vital and creates underfunding. The IAFF agrees and states that many studies have shown that fire-based EMS is superior to other provider types (IAFF, 2009, p.7). They contend that "considering cost, access, timely response, and quality of patient care, the fire service is the optimal choice for providing prehospital emergency care services" (p. 7). Ludwig (2010) feels that when agencies combine services, efficiency will be improved and money will be saved (p. 36).

Even though money may be saved in dual-role systems, the provision of medical services has its own expenses. The cost of delivering transport services may be a potential negative to the implementation of such a program (Dean & Messoline, 2011). Cross trained firefighters offer a high degree of skill, but they "are expensive to employ and train." Equipment is also expensive, both to purchase and maintain. In *Management of EMS*, Dyar and Evans (2010) explain that direct costs are those that are "assigned to a particular component of the operation" (p. 233).

Some of those costs include, but are not limited to, apparatus, EMS specific equipment, disposable supplies, transport apparatus fuel, medical director costs, and billing services (p. 245).

Deardorff (2012) states that one of the biggest questions of fire-based EMS systems is cost, but those costs are marginal (p. 29). The Arvada (2011) staff report identifies that costs of the system are covered by being able to bill for the service (p. 18). They also feel that billing for EMS services is a way to increase the number of firefighters without increasing the tax burden of the fire district (p. 9). Dennis Compton feels that firefighters providing EMS is "simply using existing resources in a much more cost-effective way" (Roberts, 2010). Many departments may be looking for a way to increase revenue during a down economy. One way to do this is to look at billing for EMS services (Ludwig, 2009).

Dean and Messoline (2011) believe that fire-based transport EMS can generate good revenue for agencies. Also, the higher propriety in your service area, the more revenue will be realized. However, concerns regarding revenues surround the lack of health insurance coverage of patients. People losing jobs in a declining economy relates to fewer patients being covered by insurance and more by Medicare or other government programs (Ludwig, 2009). Add this to an aging population and fears of Medicare instability and revenue streams for fire-based EMS is a concern.

For many agencies, stable ambulance revenue depends on non-emergency transportation. Emergency ambulance service has a high level of associated costs as well as a higher percentage of uncollectable fees (ICMA, 2011). Success in providing an EMS transport service relies on reimbursement rates and effective collection services (p. 40). The National EMS Advisory Council (NEMSAC) feels that financing EMS is challenging and the system is usually left

underfunded (NEMSAC, 2012). Ambulances are critical to health services in the community and are often the "health care safety net" (p. 1).

NEMSAC believes that EMS costs in the United States currently exceed the available resources (p. 20) and that EMS is historically underfunded. They state that stakeholder communities need to recognize the necessity of EMS in the medical system and provide adequate financial support for the services (p. 22). Unfortunately, many communities do not have the funding to provide this support, so health care costs rise or services decline. This reduction in funding may affect timeliness and quality of service, which negatively impacts patient outcomes (p. 23). However, since EMS is a "healthcare safety net," response continues to happen regardless of the patient's ability to reimburse the service (NEMSAC, 2012, p. 23).

The National Center for Policy Analysis (NCPA) believes that the cost of providing EMS has been driven up as the scope of what a local government provides has increased (NCPA, 2010). However, they feel that reducing the services that EMS provides limits national preparedness and decreases the ability to respond to all incidents. Funding needs stability and to be sheltered from fragmentation in order to limit municipal insolvency. Bob Palmer, Fire Chief at Mid-Columbia Fire and Rescue in The Dalles, OR feels that fire-based EMS is a benefit, so long as there are financial resources sufficient to meet increasing service level demands (personal communication, January 2013).

Another way that fire-based EMS may be fiscally sound is the use of the 207(k) exemption of the Fair Labor Standards Act. This section states that firefighters are allowed to work up to 216 hours in a 28 day period before being paid overtime (DOL, 2011, May). In contrast, non-firefighters must be paid overtime when the work in excess of 40 hours per week

(IAFC, 2009). In the IAFC's (2009) opinion, this makes the fire service the "most efficient and effective model for rapid delivery of all emergency medical services" (p. 2).

The Arvada fire staff agrees and believes it is not only a financially feasible option, but one that will have great benefits for the community and fire district (Arvada, 2011, p. 3). Chief Pegram (personal communications, January 2013) states that 33% of his department's budget comes from EMS-based revenues, funding firefighters that would not be employed at his department without the added proceeds. Cascade Locks also sees this benefit, by having EMS reimbursements fund their paid firefighter positions that would otherwise not be available (J. Metheny, personal communications, January 2013).

The literature review has influenced this research project by identifying arguments for and against fire-based EMS. These arguments brought up specific areas that this research will explore more in depth. It has also identified areas of concern that were not previously considered. The review discovered that fire-based EMS is a system that is common in the United States.

The number of fire service related organizations that are involved in EMS activities is large. These include the IAFC, IAFF, the National Volunteer Fire Council (NVFC) and others (Janing & Sachs, 2006, p. 919). The literature review identified that national guidelines establish staffing levels and response standards dictating minimum levels of fire service in communities (NFPA, 2010). NIST (2010a) research has justified these staffing requirements by completing numerous field experiments.

It was also shown that the addition of EMS services to fire agencies has revealed efficiencies and the ability to utilize already positioned and ready firefighters to deliver quick

medical care (IAFF, 2009). However, this additional task added to a firefighter's response regiment creates the possibility to increase fatigue in responders. Fatigued firefighters have presented with higher stress levels and create potential liability issues for local governments (Elliott & Kuehl, 2007).

Lastly, the literature review identified that rising costs of medical supplies, equipment, training, and personnel are a concern for fire-based EMS agencies (Dyar & Evans, 2010). However, these costs are commonly reimbursed by the use of a fee-for-service billing. Ambulance collections are an important topic of national policy and have drawn the attention of many agencies (NCPA, 2010). Fire departments have found that the revenues they can generate on EMS provides relief for decreasing tax revenue (Ludwig, 2009). Agencies have found that the increased revenues off-sets the costs for additional firefighters, increasing the amount of protection their jurisdiction receives (Arvada, 2011). Fire-based EMS is a topic of critical national importance (USFA, 2012) that is evident in many sources of literature and the federal government (Janing & Sachs, 2006).

## Procedures

The first part of this research project was an extensive literature review. Initially, an exploration of past Executive Fire Officer (EFO) Applied Research Projects and other sources was conducted in July 2012 at the Learning Resource Center (LRC) of the National Fire Academy in Emmitsburg, MD. Also, an evaluation of our fire department library and searching current periodicals was completed. Following that investigation, a thorough internet-based examination was conducted using popular search engines such as Google® and Bing®.

Literary sources were found by using the industry-specific terms, including: fire-based EMS, fire-based EMS problems, benefits of fire-based EMS, EMS cost recovery, ambulances detract from firefighting, risks of EMS, fire department staffing, ICMA fire EMS, ambulance takes away from fire response, NFPA 1710, effects of EMS on fire service, operational costs of fire-based EMS, funding fire and EMS operations, and managing fire and EMS services. These searches resulted in hundreds of results relating to fire and EMS operations and finances.

Only documents with a publication date within ten years were reviewed, primarily focusing on literature written in the past 5 years. The purpose of the literature search was to find relevant past research and background information to assist in answering the research questions of (a) what are the base costs of providing emergency services in Hood River, without providing transport EMS, (b) what are the incremental operational risks and benefits of providing fire-based EMS transport in Hood River, and (c) what are the incremental financial requirements and revenues of providing fire-based EMS transport in Hood River?

The next procedure used in this research was to conduct informal interviews with a few industry professionals that currently operate fire-based EMS transport agencies. The personal communications took place in January 2013. Initial questions asked are shown in the Appendix of this report. The interviews were used to answer the research questions (a) what are the incremental operational risks and benefits of providing fire-based EMS transport in Hood River, and (b) what are the incremental financial requirements and revenues of providing fire-based EMS transport in Hood River?

Individuals chosen to interview included Steve Pegram, Fire Chief of Goshen Township (OH) Fire & EMS; Jesse Metheny, Captain of Cascade Locks (OR) Fire & EMS; Dan Woodson,

Fire Chief of Lebanon (OR) Fire District; and Bob Palmer, Fire Chief of Mid-Columbia Fire and Rescue in The Dalles, OR. Each of these individuals operate a fire and EMS agency approximately the same size as Hood River Fire & EMS or within a close vicinity to the City of Hood River. The results of the informal communications resulted in information regarding currently operating fire-based Ems transport systems and were used to help guide the direction of the research.

The final part of the research was to conduct a review of raw data collected from sources within the City of Hood River. First, reports from Hood River Fire & EMS's reporting system, *Emergency Reporting*¸ were printed off relating to call volume, incident details, response zone details, and patient age characteristics. The reporting period utilized for this research project was four years, from January 2009 through December 2012. Next, city budget documents were utilized to identify costs of firefighting and EMS operations, personnel costs in the fire year period also, from July 1, 2008 through June 30, 2012.

Lastly, reports from the City's ambulance billing agency, Springfield Fire and Life Safety, were used to identify ambulance revenues. Years looked at in this review were also July 1, 2008 through June 30, 2012. The results of the data review were used to answer research questions (a) what are the base costs of providing emergency services in Hood River, without providing transport EMS, (b) what are the incremental operational risks and benefits of providing fire-based EMS transport in Hood River, and (c) what are the incremental financial requirements and revenues of providing fire-based EMS transport in Hood River?

Limitations of this research project include the low number of personal interviews. Additional interviewees would establish a more diverse opinion about fire-based EMS transport

services. Also, the date of data collections between the Emergency Reporting system and the budget documents does not match directly. Call volume reports are generated on a calendar year basis while budget reports are on a fiscal calendar.

## Results

*What are the base costs of providing emergency services in Hood River, without providing transport EMS?*

Budget documents from the City of Hood River provided information to understand what the base costs of fire protection are at Hood River Fire & EMS. Four distinct budgetary sections are included in the general fund: personnel costs, materials and services, capital improvements, and vehicle replacement. The results of this review are depicted in Table 1.

Table 1

Costs of fire protection services per fiscal year.

| FY | 2008/2009 | 2009/2010 | 2010/2011 | 2011/2012 |
|---|---|---|---|---|
| Personnel | $1,384,840 | $1,286,600 | $1,317,045 | $1,498,400 |
| Materials and Services | $255,796 | $170,338 | $244,750 | $223,812 |
| Capital | $0 | $0 | $0 | $0 |
| Vehicle Replacement | $211,728 | $211,728 | $211,728 | $211,728 |
| Total Fire Cost | $1,852,364 | $1,668,666 | $1,773,523 | $1,933,940 |

*What are the incremental operational risks and benefits of providing fire-based EMS transport in Hood River?*

Interviews with fire service professionals that lead organizations involved in fire-base EMS transport services identified multiple risks and benefits of providing EMS services. Fire Chief Steve Pegram of the Goshen (OH) Fire & EMS Department (personal communication,

January 2013) feels that the community knows and loves his department better because of fire-base EMS systems. He says people that receive services like taking grandmother to the hospital or helping daughter at a vehicle crash are very appreciative of the service they receive. He does not believe that they get that same personal interaction on most fire details. Fire Chief Bob Palmer of Mid-Columbia Fire and Rescue in The Dalles, OR (personal communication, January 2013) adds that having cross trained firefighters makes them more adaptable and better trained which leads to improved quality of life for the community.

Chief Dan Woodson of Lebanon (OR) Fire District feels that fire-based EMS allows for more staffing due to increased personnel covering ambulances (personal communication, January 2013). He believes it is a better use of the personnel, resulting in better trained, multi-use personnel. That training translates to attracting more volunteer firefighters in Cascade Locks (OR) Fire & EMS. Captain Jesse Metheny sees an advantage of offering fire-based EMS by capturing additional volunteer staffing that otherwise would not be interested (personal communication, January 2013).

However, the benefits of having fire-based EMS transport has some additional risks. Woodson and Palmer both agree that firefighter fatigue is a concern and has been a source of complaints (personal communications, January 2013). Firefighters are also pulled from training to answer medical calls, often times leaving them delinquent on important fire training topics (D. Woodson, personal communication, January 2013). Metheny warns that the extra training that EMT's are required to attend may lead to burn-out in volunteer firefighters that have a limited amount of time to give (personal communication, January 2013). He adds that fire-based EMS also brings additional administrative duties, creating more work load for managers.

Examining the call volume and response time-of-day data reveals important information regarding the risks of fire-based EMS. Hood River Fire & EMS answered an average 1,436 calls per year over the four years from 2009 through 2012. Of those calls, 79% of them were EMS related. One important statistic to notice is that 46% of the medical calls were located outside the City of Hood River, in neighboring jurisdictions that do not have transport EMS capabilities.

When considering fatigue, call volumes per hour of the day were reviewed. Between the hours of midnight and 6:00 AM, approximately 144 calls are answered every year in Hood River. This equates to 92 local calls for fire and EMS incidents and 52 calls to neighboring jurisdictions.

*What are the incremental financial requirements and revenues of providing fire-based EMS transport in Hood River?*

Interviews identified a few common statements concerning finances of fire-based EMS transport services. Pegram reported that EMS revenues do not cover all EMS related expenses (personal communication, January 2013). Palmer is also concerned about the added impact to the apparatus replacement costs (personal communication, Janaury 2013). In his department, he feels that EMS revenues do not cover all of the costs either. However, Metheny states that as long as a certain call volume comes in, ambulance revenues cover the added costs of the EMS program (personal communication, January 2013).

Positive financial impacts exist also. Palmer believes that fire-based EMS is a natural fit for the community and that it is more cost-effective than other options (personal communication, January 2013). Pegram estimates that one-third of their budget comes from EMS revenues

(personal communication, January 2013). That revenue is how they afford paid staffing. Without it he believes they would be an all-volunteer agency with decreased fire protection capabilities. He also states that most of the fire departments in southwest Ohio rely on EMS funding to support their firefighting forces. Woodson agrees that the cost to taxpayers is offset by ambulance revenue (personal communication, January 2013). The revenue lessens the burden on the tax payers and increases funds available to provide fire protection.

A review of the revenue budget for the City of Hood River reveals three EMS related resources that help offset EMS operating costs. These are ambulance receipts, FireMed receipts, and Providence Hood River Memorial Hospital (PHRMH) Transfer Program revenue. FireMed is an ambulance subscription program that local residents can purchase to help them offset costs if they happen to use the service. The PHRMH program offsets the costs to provide three resident interns who are in Paramedic school, work an assigned fire department shift, and staff inter-facility transfers. Table 2 outlines the revenues over the four fiscal years 2008 through 2012.

Table 2

EMS-related revenues per fiscal year.

| FY | 2008/2009 | 2009/2010 | 2010/2011 | 2011/2012 |
|---|---|---|---|---|
| Ambulance Receipts | $725,053 | $641,131 | $526,870 | $699,477 |
| FireMed Receipts | $26,220 | $29,945 | $36,763 | $25,000 |
| PHRMH Program | $0 | $0 | $40,000 | $40,000 |
| Total EMS Revenue | $751,273 | $671,076 | $603,633 | $764,477 |

The budget documents of the City also provide a view of EMS-related expenses. These costs mimic the fire protection services budget with personnel, materials and services, capital outlay, and vehicle replacement requirements. Table 3 reports the results of that budget review.

Table 3

Costs of EMS related services per fiscal year.

| FY | 2008/2009 | 2009/2010 | 2010/2011 | 2011/2012 |
|---|---|---|---|---|
| Personnel | $392,658 | $275,870 | $200,957 | $301,855 |
| Materials and Services | $142,701 | $113,445 | $143,413 | $177,494 |
| Capital | $12,054 | $0 | $0 | $24,960 |
| Vehicle Replacement | $77,490 | $77,490 | $77,490 | $77,490 |
| Total EMS Cost | $624,903 | $466,805 | $421,860 | $581,799 |

## Discussion

The literature review and original research aided in determining that fire-based ambulance transport services enhance the provision of fire protection services. It is this researcher's opinion that fire-based EMS transport services increase the level of fire protection afforded to the citizens of Hood River, OR.

Fire & EMS services are a much relied upon amenity in the community. Citizens have come to expect high levels of professionalism and care from firefighters and paramedics. EMS is seen as a popular and critical service that communities rely upon (Compton, 2006). In a small survey of residents of Hood River, Wells (2010) found that EMS should be highly important and a top priority of the fire department. Fire departments are the largest provider of EMS in the United States (FICEMS, 2011).

This researcher believes that in order to determine financial and operational stability of EMS in the fire department, you must first understand the base fire protection needs and costs. According to the NIST (2010b) research, 4-person crews achieved the national standard for response as presented in NFPA 1710. This standard contains minimum requirements of deployment to emergency situations for substantially career fire departments (NFPA, 2010).

However, these are standards, and must be balanced with financial capabilities of a community (ICMA, 2011).

It is this researcher's opinion that 4-person engine companies provide the service that the citizens of Hood River need and the safety firefighters deserve. NIST (2010a) research shows a dramatic decrease in effectiveness of 2- or 3-person engine companies. When fewer than four trained firefighters arrive on scene, critical decisions must be made (Wilson, 2009). The US Department of Labor requires that a minimum of two firefighters enter IDLH atmospheres together, while at least two firefighters remain out of the IDLH atmosphere (DOL, 2011, June).

The budget review showed that the cost of fire service provision, with four paid staff on duty, in Hood River averaged $1,807, 123 per year over the last four fiscal years (see Table 1). This number was derived by subtracting EMS costs from the overall audited budget numbers, per budget documents of the City of Hood River. This is the base cost of providing almost the same level of fire protection that exists in the department today. Since cross-trained firefighters add fire protection capabilities to the fire department, removal of staff that is dedicated to EMS will affect fire protection services (Pegram, personal communication, January, 2013).

However, a liability benefit may be realized by decreasing the possibility of sleep deprived responders (Elliot & Kuehl, 2007). Chief Woodson has had firefighters voice concern over being too tired to continue answering emergencies because of the added call volume from EMS (personal communication, January 2013). Volunteers may also feel the effects of burn-out from answering so many emergency calls (Metheny, personal communication, January, 2013). Fire agencies have to weigh the risks and benefits of fire-based EMS for their own jurisdiction.

Call volume data for Hood River Fire & EMS indicates that an average of 52 EMS transport incidents occur annually outside of the City of Hood River, between midnight and 6:00 AM. Based on the average annual call volume being 1,436, this represents less than 4% of the calls. This researcher's opinion is that the benefit gained by highly qualified, cross-trained firefighters out-weighs the risk of sleep deprivation liability.

The operational benefits of having increased staffing levels and higher trained firefighters help the community (Ludwig, 2010). The IAFF (2009) contends that when costs, quality of patient care, and other aspects of emergency are considered, the fire service is the optimal choice for providing EMS. Quality of life is an important aspect of a community. Steve Austin believes that good fire protection and emergency services are part of the equation (Roberts, 2010). Communities rely on EMS to be available 24 hour per day with high quality care (NEMSAC, 2012). This researcher and the IAFF (2009) believe that cross-trained firefighters provide that level of service in the community since they are already in the role of providing quick response to life-threatening situations.

When addressing the operational benefits of fire-based EMS, one must consider the financial implications associated with the marginal provision of additional services. The costs of providing EMS transport services may be overwhelming (Dean & Messoline, 2011). Medical equipment, capital outlay for EMS vehicles, and cross-trained firefighters are expensive (Dyar & Evans, 2010). Deardorff (2012) believes that one of the biggest questions surrounding fire-based EMS is the cost of the service.

Upon reviewing the budget documents of the City of Hood River, the marginal costs of providing EMS were found (see Table 3). These costs include personnel costs related to EMS, all

materials and services associated with EMS, capital expenses, vehicle replacement estimates. Average EMS costs over the four fiscal year period were $523,841. Assumptions that were included in gathering this data include the minimum staffing needed for fire operations. Hood River Fire's current daily staffing is five per shift. Since only four are needed to meet national standards, one firefighter/paramedic and one intern per shift were allocated to EMS functions, leaving four firefighters allocated to minimum fire staffing. Also, ambulance vehicle replacement is not an actual cost, but a liability the City has to budget for. The annual allocation of funds to vehicle replacement is in 2012 dollars, not adjusted annually. It is this researchers opinion that the numbers used in this research are accurate and reflect the real costs of firefighting and EMS work.

To offset the costs of fire-based EMS, Hood River Fire & EMS seeks EMS reimbursement and other forms of funding. Seeking out sources of funding sufficient to meet increasing service level demands is important to Chief Palmer in The Dalles, OR (personal communications, January 2013). Steve Pegram at Goshen (OH) Fire & EMS believes that 33% of his overall budget is generated by EMS functions (personal communication, January 2013). Fire-based EMS transport services can generate good revenue for agencies (Dean & Messoline, 2011).

Reviewing the resources budget of the City of Hood River for the for fiscal years from 2008 to 2012 reveals a large amount of revenue generation from EMS (see Table 2). Average EMS related revenue was $697, 615 per year. Included in this revenue is ambulance transport receipts, FireMed program receipts, and PHRMH transfer program receipts; all of which are revenues only realized with transport EMS programs. A fee-for-service system is in place in Hood River, resulting in ambulance receipts. The Fire Med program is a subscription ambulance

service program to help offset the costs of ambulance transportation. PHRMH sponsors the department to provide internship positions for paramedic students, in return for doing inter-facility transfers for them. This researcher believes that fire-based EMS transport services generate good revenue for the City of Hood River.

Table 4

Cost vs. Revenue of fire protection and EMS services.

| | 4-yr Average |
|---|---|
| EMS Program Costs | ($523,841) |
| Fire Protection Costs | ($1,807,123) |
| Total Budget Expense | ($2,330,964) |
| EMS Program Revenue | $697,615 |
| Total Tax Burden | ($1,633,349) |
| EMS Subsidy or (Loss) | $173,774 |

Comparing the average costs of fire protection and EMS provision with the EMS revenues identifies a positive source of revenue for the City (Table 4). Total budget expense of operating the fire department and EMS transport system, including vehicle replacement liability, is subsidized by the EMS revenue by $173,774. This is consistent with what the Arvada Fire Protection District (2011) found in their study. Their staff report states that fire-based EMS increases the availability of emergency services resources in the community. This researcher agrees with that statement and believes that fire-based EMS transport systems are providing added revenue to the City of Hood River to provide adequate fire and emergency protection.

The literature review, interviews and original research suggest that the fire-based EMS transport system at Hood River Fire & EMS enhances fire protection services funded by tax revenues. It is this researcher's opinion that, operationally and fiscally, fire-based EMS is a sound program that provides excellent service to the community.

## Recommendations

After a thorough literature review and research, this researcher has developed recommendations that will solve the problem statement and fulfill the purpose of this research. Hood River Fire & EMS's mission to prevent, prepare, and protect will be enhanced by continuing the delivery of fire-based EMS transport services.

Based on this research, Hood River Fire & EMS should

1. Continue providing fire-based EMS transport services at current operational levels.
2. Continue the fee-for-service reimbursement process, FireMed, and the PHRMH transfer program to ensure revenues carry on offsetting tax costs of fire protection.
3. Seek additional revenue sources and/or partnerships to enhance the revenues of fire-based EMS transport services. As revenues are a major concern for the continuance of the program, this recommendation should be carried out with an open opportunity to partner with neighboring fire agencies on provision of services.
4. Closely monitor the costs of fire-based EMS, as well as the operational risks, such as burnout and fatigue, to ensure responders are safe and providing high quality EMS care.

Recommendations to future researchers on this topic include various ways of funding on the national scale. Community Care Organizations are beginning to develop, possibly affecting

the revenues of fire-based EMS transport agencies. Also, research should be conducted on the age of patients and the impact, both operationally and financially, that an aging community utilizing federal health care programs may have on fire-based EMS systems. Finally, a detailed, line item, program budget review could be conducted to determine specific costs of fire-based EMS and how to make the program more efficient, thus lessening the tax burden even further.

Fire-based EMS transport systems are an important part of the community public safety network. Proficient quality of care equals increased quality of life for community members. The provision of life saving emergency medical services has been handled efficiently and effectively by firefighters in Hood River, OR for over 60 years. The community relies on this critical feature and it is only logical that fire departments provide this enhanced service to them.

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# Appendix

## Initial Interview Questions

1. Have you completed an operational analysis of the impacts that fire-based EMS, positive or negative, have on firefighting services?
2. Have you completed an economic analysis of the impacts of fire-based EMS, positive or negative, on your tax-based firefighting services?
3. What positive operational impacts do you attribute to fire-based EMS?
4. What negative operational impacts do you attribute to providing fire-based EMS?
5. What positive financial impacts do you attribute to providing fire-based EMS?
6. What negative financial impacts do you attribute to providing fire-based EMS?
7. Do you have any other input on fire-based EMS systems and their impact on the fire service?