EVALUATING THE RELATIONSHIP BETWEEN UNNECESSARY UTILIZATION
OF GRANDVIEW FIRE DEPARTMENT RESOURCES AND ITS RESULTING
IMPACT ON COMMUNITY RISK.

Strategic Community Risk Reduction

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Appendices C through E Not Included. Please visit the Learning Resource Center on the Web at http://www.lrc.dhs.gov/ to learn how to obtain this report in its entirety through Interlibrary Loan.
Certification Statement

I hereby certify that this project 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 writing of another.

Signed________________________

James B. Toone
ABSTRACT

This applied research project was written to evaluate the relationship between the unnecessary utilization of Grandview Fire Department resources and its associated level of community risk.

Research performed by the author, which included literary review, questionnaires, interviews, incident data research, round table discussions, and other methods determined that there was minimal risk to the community of Grandview, Missouri from its fire department resources being utilized on unnecessary alarms.

Risk was evaluated on several facets which included the risk of having valuable resources and response capability unavailable for a necessary alarm because of an unnecessary one. Secondly, evaluated the aspect of risk resulting from an accident involving Grandview Fire Department apparatus responding to an unnecessary alarm. Next, the associated financial risk of running unnecessary alarms was evaluated. Finally, the author evaluated the risk related to intangible variables such as employee morale and how poor morale resulting from unnecessary resource utilization affected community risk.
The author found that the risk resulting from unavailable resources was very minimal, in that on the average day, the Grandview Fire Department was unavailable because it was on an unnecessary alarm for 35 seconds. From the aspect of GFD units being involved in an accident responding to an unnecessary alarm, it was also found that there was very little risk to the community. The Grandview Fire Department has operated for at least ten years without a collision responding to an alarm. The financial risk was also found to be minimal due to the fact that even if the organization managed to eliminate all unnecessary alarms, the resource allotment or staffing in Grandview would not change. Finally, the risk associated with running unnecessary alarms and its resulting effect on employee or responder morale was found to be significant in that the author exhibited that poor morale could affect service delivery to both those who create an unnecessary alarm, but even to other members of the community for request services for a legitimate reason.

The author recommended that the City of Grandview address this issue by enhanced community education, tiered EMS response, re-visiting its fire alarm ordinance, consider altering its unit response matrix, and finally, by establishing a recognized emergency medical dispatch system to better filter responses.
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INTRODUCTION

This Applied Research Project is entitled Evaluating the Relationship Between Unnecessary Utilization of Grandview Fire Department Resources and its Resulting Impact on Community Risk.

The problem was that the Grandview Fire Department had seen an increase in unnecessary responses to medical emergencies, fires, and other calls for service. The Grandview Fire Department needed to assess the level of community risk resulting from resources which were unavailable because they were responding to these unnecessary alarms.

The purpose of this evaluative research would be to determine the actual risk created to the community by the unavailability of Grandview Fire Department resources, safety risk, financial and other risks caused by alarms that have been found to be unnecessary by testing them against a method for determining whether a legitimate need for services existed.

The research approach for this applied research project was to use evaluative research to approach the problem from a Community Risk Reduction aspect by
evaluating the impact of unnecessary alarm response to the level of community risk for the citizens of the City of Grandview. The author created a litmus test to determine what alarms were truly unnecessary. This test was used later to determine the impact to the level of community risk which resulted from running such alarms, and to determine the actual risk created from unavailability of resources. Finally, the author set forth recommendations on the above, plus discussed what other similar fire departments had done to address this problem.

The research method employed raw alarm data for 10 percent of the annual alarms for the Grandview Fire Department and by reviewing reports and interviewing responders determined the percentage of all alarms that were unnecessary as compared to a matrix developed by the author. Next, the actual time spent on these alarms was evaluated to determine how often the community at large was at risk of the fire department being unable to respond or at risk for a limited response due to unavailable resources. Risk was measured on an actual basis from different perspectives, including unavailability of resources, financial issues, response hazard issues, and by personnel morale issues. The author utilized questionnaires to evaluate if this was a common problem among similar fire departments and what they did to address the issue. Finally, the author utilized data to set forth recommendations to reduce the risk to the citizens of the City of Grandview.
The author set forth to obtain answers to the following research questions:

How many alarms that the Grandview Fire Department responded to were actually unnecessary after being tested against a litmus test to judge them as such?

What was the actual loss in resource availability in terms of equipment, personnel, and apparatus to the citizens of Grandview while those resources were being utilized on alarms found to be unnecessary?

What level of risk to the community was created while Grandview Fire Department resources were on unnecessary alarms?

What had other fire departments, who provided similar services in an urban / suburban environment done to reduce the risk created to their communities related to unnecessary utilization of department resources?

What recommendations should be made to address the problem of risk to the citizens of Grandview, Missouri secondary to providing resources which are unnecessary?
BACKGROUND AND SIGNIFICANCE

The Grandview Fire Department ran 2,983 alarms in 2006. (Grandview Fire Department 2007) Seventy-two percent of the requests for fire department services in Grandview were for emergency medical services, while the remainder of alarms were for fire suppression and other services. (Grandview Fire Department 2007) In Grandview, Missouri the percentage of calls that were for EMS response was greater than the national average. In the FEMA report, Fire Department Overall Run Profile from the Topical Fire Report Series, it was shown that 55.2 percent of the alarms nationwide were for EMS / rescue (FEMA 2007), while EMS comprised 72 percent in Grandview. The number of alarms for the Grandview Fire Department responded to increased year to year by an average of 5.9 percent annually over the past three years (Grandview Fire Department 2007) with a population growth of negative 2.0 percent estimated over the last six years. (City-Data.com 2007) The bottom line was that the Grandview Fire Department saw a 15.9 percent increase in requests for service (Grandview Fire Department 2007) while the city experienced a loss in population of 2 percent (City-Data.com, 2007).

This Applied Research Project looked at the relationship between unnecessary utilization of Grandview Fire Department resources and its resulting impact on
community risk. Some personnel within the Grandview Fire Department had often complained about the number of unnecessary alarms in which they had responded to. This had been observed casually and the complaint had been justified by the risk to the rest of the community because the fire service was occupied on an unnecessary alarm and wouldn't be able to respond for an alarm where life or limb was in the balance. Further, some in the Grandview Fire Department often equated this risk to the response in heavy emergency apparatus where an accident could occur, causing harm to a member of the public or the department.

The City of Grandview remained one of a minority of cities in the area who did not utilize Emergency Medical Dispatch, or EMD when it received and dispatched 911 calls for EMS services. This also had created some level of unreliability for responding units to make response mode decisions based on very limited information. (Thacker 2008)

The author felt that because the Grandview Fire Department had an increasing alarm load (Grandview Fire Department 2007) which further was disproportionate to its recent reduction in population, a general perception that a significant percentage of its alarms were unnecessary, and that a significant risk to the community was the result of the problem, that there was adequate
justification to study the problem from an organizational perspective. This study was focused on past, present, and future impact on organizational effectiveness to the community. Further, since the author concentrated on the level of community risk associated with running unnecessary alarms, a definite linkage could be established between this Applied Research Project and the Strategic Community Risk Reduction course for the Executive Fire Officer Program.
LITERATURE REVIEW

As this applied research project developed over time, it became abundantly clear that the two general areas of greatest unnecessary fire department alarm responses related to either unnecessary utilization of advanced life support ambulance transport and response of personnel and equipment to false fire alarms, which were caused by situations which shouldn't have been allowed to trigger an alarm such as lack of maintenance and poor installation. This information was gathered from a review of 300 alarms in which the Grandview Fire Department responded to. Twenty-three percent of GFDs alarms were found to be unnecessary be evaluating them against a standard developed for unnecessary alarms. (Grandview Fire Department 2007)

“We live in a time where the population is becoming older in general”, Melissa Harris, of the Baltimore Sun stated in her article Non Emergencies Tie Up Maryland Ambulances that “As the population ages, fire departments across the region are faced with a growing demand for ambulance services from long-term care facilities.” (Harris 2007). That fact along with the fact that our culture seems to had developed some propensity to utilize emergency government services inappropriately and had become dependent on such at an ever increasing rate lent itself to a perception that fire department and ambulance
services had been abused. Recently, WSLS 10 Television in Roanoke, Virginia aired a story entitled Ambulance Abuse, where the staff writers visited the subject of unnecessary ambulance calls and pointed out that “With the volume of calls going up by as much as five percent a year, calls like those can be frustrating”. (Staff 2007). The St. Barnabas Hospital, Department of Emergency Medicine conducted a retrospective study to determine if ambulance services had been over-utilized or under-utilized in the South Bronx. In that particular study, it was stated that “The wide availability of services has led to claims of overuse and misuse of the transport system. Recently, the rising cost of healthcare has demanded a need to reduce waste.” (Edward Cho, et al. 2005).

This problem didn’t appear to be limited to Grandview, Missouri. The author found several sources of information which made it clear that England and other European countries even had problems with unnecessary utilization of ambulances. In Japan, a study was conducted by Kawakami Chihiro, et al. which found that “unnecessary ambulance use is increased approximately 10% to 20% by socioeconomic factors”. (Kawakami 2007). Kawakami listed these socioeconomic factors as ranging from household income to possession of a car and everything in between. (Kawakami 2007).
A multi-site survey of one suburban and four urban emergency departments in New York State where patients arrived by ambulance was conducted by A. J. Billitter et al. Their study found that 11.3 percent of ambulance transports were unnecessary. Further, they found that typically those who misused ambulance services were under the age of 40, had a household income of less than $20,000, and utilized Medicaid coverage to pay their ambulance bill. The most common reason for using unnecessary services was lack of transportation at a rate of 38.5 percent, but 85 percent of the total polled stated that they would have been willing to use another mode of transportation if it was available. (Billittier 1996).

Further examples of unnecessary ambulance utilization were found. For example, Roanoke, Virginia found that the number of calls for non-life-threatening injuries had increased over the last few years. Those calls increased by 750 alarms per year, or 13 percent of their total alarms in a period from 2004 to 2006. (Johnson 2007).

It had been common to find many communities, such as Grandview, Missouri to have one level or tier of medical transportation. Usually it was an advance life support ambulance. If other modes of transportation existed, they either expected payment at the time of service such as a taxi cab, or some kind of
guarantee for payment such as other forms of medical transportation. In the Billittier survey, it was noted that 30 percent of the patients indicated that they would not pay for the ambulance service if billed and 50 percent believed the cost of their ambulance transports was less than 100 dollars. (Billittier 1996). The rate for ambulance service in Grandview Missouri as of December, 2007 was $750.00 plus $9.00 per loaded mile with a $150.00 reduction for Grandview residents and an additional $150.00 reduction for those who fall below the poverty level. (Loar 2008).

Some ambulance services had tried at one time or another to provide those with medically unnecessary complaints with taxi-cab vouchers, which were pre-paid by the government entity in the belief that such voucher was less expensive than providing an unnecessary ambulance trip. In San Antonio, Texas patients were given taxi cab vouchers after both they had been examined by a Paramedic and a medical control physician had approved the voucher for conditions where an ambulance was not necessary. (Silva 2007). “The program is expected to save the city 2,400 unit hours of EMS service, but cost the city $78,000 for taxis”. (Silva 2007).

The City of Grandview evaluated the use of taxi-cab vouchers for those who obviously did not require ambulance transportation. Research was done and the City elected not to utilize this option. In a personal interview with Assistant Chief
Ralph Loar, who was the EMS coordinator for the Grandview Fire Department, he was quoted as stating:

There is the issue of liability both to the City and to the Medical Director. The next issue is that of what budget does the funding for the vouchers come from? If the funding comes from the fire department budget, then we’re reducing services for those who truly need the fire department’s EMS services by taking funds away from that program for those who really don’t need the service to begin with. We’re talking about replacing ambulance services, which are already financially encumbered, in that we’re already paying for personnel and equipment with a new service with a new cost. This is building a bridge for access to the most expensive method to obtain health care for unnecessary conditions. (Loar 2008).

The City of Grandview also considered the utilization of a basic life support ambulance, or an ambulance with an EMT-Basic delivering patient care instead of a Paramedic. Two issues repeatedly came up in these considerations. First, a recent change in staffing levels reduced the number of mutual aid requests
from the City of Grandview from 138 in 2005 down to 17 in 2007. (Thacker 2008). This resulted in a reduced number of residents who had to wait for a mutual aid ambulance. Secondly, it was found that there were concerns about continuity of care and that it was important to the organization to provide one, advanced level of patient care. (Thacker 2008).

The second area which the researcher found to be important was the number of false alarms where there was no legitimate reason for the alarm to be sounded. This, too was found to be a common problem in the United States fire service as a whole.

According to Grandview Fire Department data, it was found that 13 percent of all unnecessary alarms were false fire alarms with out a legitimate reason to sound. Usually these were due to a lack of equipment maintenance or because of a process that set the alarms off such as cleaning or painting. (Grandview Fire Department 2007). Further, it was found that when all alarms run in 2005, 2006, and 2007 that the Grandview Fire Department were studied, it responded to 801 automatic alarms, or nine percent of its total alarm volume. (Grandview Fire Department 2007). Out of those 801 automatic alarms, one was found to be a working fire and it was a fatality fire in a residence with a single occupant, which was a successful suicide attempt. (Grandview Fire Department 2007).
One-tenth of one percent of GFD automatic alarms where it responded to for three consecutive years resulted from a working fire. (Grandview Fire Department 2007).

Unnecessary false fire alarms were not found to be an isolated case for Grandview, Missouri either. In Las Vegas, the fire department had written a new policy in which they didn’t respond to automatic fire alarms unless the alarm was substantiated by other supporting information such as the alarm center receiving reports of smoke or fire. Exceptions were made for schools, governmental buildings, and hospitals. This policy was justified by statistics, which stated that out of 3600 automatic alarms, LVFR found about 3400 had no supporting information about the presence of a fire. Of those 3400 alarms, zero resulted from a working fire. (Gammon 2006). Further, the NFPA states that at least 20 firefighters were killed responding to alarms, some of which were false alarms. (Gammon 2006).

Charles County Maryland had gone so far as to organize a False Alarm Reduction Unit, which had the mission of reducing false alarms through education and enforcement. Between 1999 and 2007, Charles County fire and police responded to between 19 and 27 alarms per day or between 6800 and 9800 false alarms per year. (Charles County 2007)
The National Fire Protection Association (NFPA) had chimed in on the subject as well. The NFPA stated that between 1983 and 2003 medical calls and false alarms had doubled in number. Medical calls comprised 61 percent of fire department calls and false alarms comprised 10 percent in 2003. On top of that, calls for working fires had dropped by six percent within the same time frame. (NFPA 2005) The National Fire Protection Association also found that 36 percent of false alarms were due to system malfunctions, mechanical failure, or from improper installation or maintenance. (NFPA 2005)

The False Alarm Reduction Association, or FARA had issued several documents and white papers on the problem of false alarms. They had also embarked on a joint effort with the National Burglar & Fire Alarm Association to create a Model Fire Alarm Ordinance which was found online and was easily accessible. The model ordinance required registration, system certification, inspection, testing, proper maintenance, response policies, as well as remedies and penalties. Further, the model ordinance applied applicable fees to compensate for costs associated with false alarms, nuisance alarms, as well as administrative fees. Finally, the ordinance applied large fees, as much as 500 dollars in some cases where the false alarm originated because the alarm company failed to report a service or repair, or an employee of the alarm company set off a false alarm while working on the system. (False Alarm Reduction Association 2001)
The City of Grandview was found to have a similar ordinance. This ordinance, established in 1995, required the home owner or business owner in the City of Grandview to register their alarms and obtain a permit and pay a one-time 10 dollar permit fee. Further, the ordinance allowed five false alarms prior to applying fines. The fines started at the 6th alarm in each calendar year at 25 dollars and increased to 75 dollars for the 12th and subsequent alarms. At the end of the calendar year, the number of false alarms reverted back to zero. (Grandview 1995). In 2002, the City of Grandview adopted a new ordinance, which was created to further reduce the number of false alarms. This new ordinance actually terminated police response to alarms that failed to register with the city. The only problem was that there was no software link between the police department records division, who handled the alarm permits and the fire department dispatch component. So an alarm for police service might have been accompanied by an indicator on the dispatcher’s screen for non-response would not show the same if the alarm was for a fire or medical assistance. The system worked for the police department as it resulted in a reduction of 150-200 alarm responses prior to 2002 to about 80-120 after the improvement in the ordinance. (Leach 2008)

The author spent a large amount of time trying to research cases where there had been injury, death, or damage to a citizen or the community due to the
running of unnecessary alarms. This task proved to be very difficult indeed. When the author evaluated the actual risk created to the community due to running unnecessary alarms, risk was associated to several facets. There was the risk to a particular citizen or group of citizens because resources were unavailable, which if present should have produced some case history and none were found. The risk created where an accident was caused or potentially caused by an unnecessary alarm was considered next. There was risk associated with a financial loss to the community by having fire department resources actually performing response for unnecessary alarms. Finally, there were the intangibles such as morale of employees, which could have indirectly affected service delivery to the community in a negative way.

When the author considered response and the potential unavailability of resources, it was clear that the public duty doctrine, which had been sustained as the basis for many state laws in the United States, and in particular in Missouri states that the government, specifically fire and police services do not owe duty to protect any individual, but do owe a duty to protect the community as a whole. (Stevens 2000). A clear distinction was made between community risk created by unnecessary alarms and the city’s liability exposure for failure to respond, or failure to respond in a timely manner to provide services to an individual's emergency.
The next facet of risk which the author evaluated was the risk to the community of an accident or potential accident involving fire department apparatus responding to a false alarm. In Missouri, there are three exceptions to sovereign immunity, they include negligent acts or omissions while operating a motor vehicle within the course of their employment. (Missouri 2007). Missouri law, as well as many other states provided an opening for legal action when an employee of a political subdivision of the state was operating a vehicle in the course of his or her employment and through negligence caused an accident and resulting damages or injury. (Missouri 2007).

Unlike the risk facet of having unavailable resources, where the author had extreme difficulty finding supportive research, there were many cases of fire apparatus crashing while responding to a false alarm. A New York City Fire Department fire apparatus was struck by a United States Postal Service Truck and then subsequently by a taxi-cab on January 17, 2008. The end result was the death of the USPS driver and five firefighters injured. The FDNY apparatus had been responding to a false alarm. (Firehouse 2008).

On April 15, 2000 a Chicago Fire Department vehicle was struck broadside by a landscape truck as it proceeded through a 4-way stop on the way to an automatic alarm, which was found to be false. A Chicago Fire Department Lieutenant, who
was killed and another firefighter, who was injured were both ejected from the
apparatus. (Firehouse 2000) The 2006 United States Fire Administration
Report, Firefighter Fatalities In the United States found that 15 firefighters died in
2006 while responding to or returning from alarms. This number represented
almost half as many as those who died operating at the scene of an emergency.
(United States Fire Administration 2007). This was evidence that responding to
and returning from alarms is one of the most hazardous activities that firefighters
performed.

The Grandview Fire Department was found to have zero crashes while
responding to an alarm from 1997 to the current date. (Thacker 2008). This
finding was a result of good luck, responsible response policies to automatic
alarms, well trained apparatus operators, or a combination of all of these factors.
That being the case, just one accident with significant injury or death to
firefighters or the public would have a very significant impact to the community.

The author also investigated intangible factors such as morale as an associated
but indirect risk to the citizens of the City of Grandview which resulted from
running unnecessary alarms. This question of how the subject affected
employee morale could only be accomplished through a personal interview with
employees working on the front lines. An interview was conducted with three
personnel from the Grandview Fire Department who were selected based on varying length of service, rank, experience, and medical licensure.

Alan Dugan, Fire Captain / EMT had been with the Grandview Fire Department for 19 years, Kevin Brim, Firefighter / Paramedic had been with the department for four years, but previously had worked for seven years in a very busy urban setting as a paramedic, and Brandon Thompson, Firefighter / EMT who had been with the department for two years were interviewed together in a classroom setting. They were asked three simple questions. First, did they think running unnecessary alarms had affected employee morale. The answers ranged from “running calls at the jail, or our cover your butt calls; or the nursing home, where we’re called because someone’s catheter came out, where the nurse could have very well taken care of the problem does affect morale” (Dugan A. 2008) to “we’re trained to fight structure fires, rescue people and extricate people out of cars, then we run these monotonous calls one after another after another, I think we bring ourselves down sometimes”. (Dugan A. 2008) The newer employee stated that “I think people generalize calls and that there is some attitude at times; morale affects attitude and vice versa”. (Dugan A. 2008).

Next, the panel was asked if the morale issues caused quality of service to be compromised for the customer who called for the unnecessary service. Answers
included “we just get them to the hospital and pass on the information that this is another b.s. <sic> case” (Dugan A. 2008) and “Yes it does. I am a professional, so I’ll act that way, but it does affect my bedside manner”. (Dugan A. 2008)

Finally the panel was asked if their quality of services to subsequent customers in the same shift was affected after running unnecessary alarms. The responses included “no, I see cases on a person to person basis” (Dugan A. 2008) to “I would like to think no, never, but I can’t say that after running several unnecessary alarms that I could say it wasn’t affected” (Dugan A. 2008) to “No, but I could see how it could happen”. (Dugan A. 2008)
PROCEEDURES

This applied research project was conducted utilizing evaluative research to determine the level of community risk that was created because the Grandview Fire Department was responding to unnecessary alarms. The risk was looked at from several different viewpoints. First, risk to the public from not having resources available to respond to their call for help because resources were tied up on unnecessary alarms. Next, risk created to the public from the actual response of heavy fire and EMS apparatus to unnecessary alarms, which could be involved in a motor vehicle crash. The degree to which running these unnecessary alarms financially affected the community was also considered. Finally, indirect related risk from morale issues and how possible poor morale would affect quality of service to the public.

The literature review section of the applied research paper was intended to cover all aspects of risk to the community by being sufficiently comprehensive and so that the reader could replicate the author’s research. Several sources were utilized to show the current state of circumstances at the Grandview Fire Department as it related to the level of community risk from the response to unnecessary alarms. The Emergency Management Based Reporting System was utilized to gather data on alarm statistics as they related to the number of,
and types of alarms which were run in Grandview. (Grandview Fire Department
2007)

The author also used EMBRS data to determine the number, make-up, and
percentage of alarms which were unnecessary as judged against a matrix used
as a litmus test to determine whether or not an alarm was necessary. The level
of necessity was based on the author's interpretation of them being unnecessary
from a very conservative basis. The criteria for an unnecessary alarm was
determined as follows (located in Appendix A):

Unnecessary alarms included those that were found to result from

False calls regardless of intent;

Generalized Illness with no outwardly visible symptoms, vital signs normal for the
patient, and normal level of consciousness. This patient is able to walk to the
ambulance and absence of emesis, severe cough, diarrhea, or other debilitating
symptom;

Soft tissue injury which did not have any reasonable potential for acute
complications such as significant blood loss, fat embolus, fracture, dislocation, or
complicating condition;
Alarms which involved the police department where the patient admits to EMS that they had attempting to avoid capture or continued incarceration by faking an injury or illness;

Patients who admit to, or the Paramedic has very strong suspicion of calling an ambulance to either find a better environment (heat or cold), or getting closer to a desired destination such as their home. Additionally, these patients had no outwardly significant signs or symptoms and vital signs are normal for the patient;

Patients who the Paramedic was reasonably sure that would not have needed an ambulance if they would had addressed an acute or chronic condition early on, which normally would not have created the need for an ambulance, but now did (i.e. - missed urinary tract infection that has developed into a more serious condition);

Patients who experienced difficulty because they had been non-compliant with medication by choice or lack of financial means. The Paramedic must have been reasonably sure that said non-compliance created the problem prompting the ambulance call;

Patients who had been involved in motor vehicle crashes, where damage to the vehicle they were riding in had damage that was estimated to be very minor, cosmetic damage which the Paramedic was reasonably sure that injury would have been extremely rare and the patient had normal level of consciousness and
had no outwardly visible injury or when complaints of injury were inconsistent with the expected injury pattern for this mechanism of injury;

Alarms where there was obviously no injury or illness and the patient confirmed that;

Calls for false fire alarms which were not created by steam, smoke, light, heat, or other element which would normally trigger an alarm system. Specifically, alarms created by improper installation, or lack of maintenance of fire alarm systems were included;

False alarms where the occupant could have called 911 or the alarm company and cancelled the alarm but failed to do so resulting in the alarm not being cancelled prior to our arrival. Cases where there was no attempt to cancel the fire department on an obvious false alarm were included;

Calls to investigate a smoke alarm sounding where the fire department found only a “chirping” detector and a caller who was not educated in the use of such alarms and that a chirp means to change the batteries. This did not include those calls to help citizens who need legitimate assistance installing or changing the battery in a smoke alarm;
Alarms that were created by the lack of equipment maintenance as their sole cause;

Alarms where the fire department was called to investigate a situation resulting from a conflict between citizens or neighbors where it was obvious that the complaining party was attempting to get the alleged offender in trouble with the fire department where there was no fire code violation, or crime committed and there was absolutely no hazard.

The Grandview Fire Department EMBRS data was used to determine what percentage of alarms were found to be unnecessary as judged against the unnecessary alarm matrix. To conduct this research, approximately 10 percent, or 300 random alarms were selected and evaluated by reading the report and if necessary, by interviewing the incident commander. (Grandview Fire Department 2007) These alarms, which were found to be unnecessary are located in Appendix B.

From the data that was extrapolated from comparing the unnecessary alarm matrix and ten percent of Grandview Fire Department alarms, the actual risk to the public related to unavailability of resources was determined mathematically and is also included in Appendix B. (Grandview Fire Department 2007)
Two questionnaires were conducted to answer research questions. The first questionnaire was sent to employees to determine what the current perception was about whether or not running unnecessary alarms was a problem and secondly, how significant a problem existed. This particular research was done because the author casually noticed that current employees had been very outspoken about the risk that existed from running these alarms. This questionnaire was located in Appendix C of this paper. This questionnaire asked what percentage of the last 10 alarms that they had run were unnecessary. Next, they were asked if they felt that the number of unnecessary alarms in Grandview caused a significant level of risk to the community because resources were being utilized in an un-needed manner reducing its availability for a potential emergency.

Next, the employees were asked if we created a litmus test to determine the number of absolutely and factually unnecessary alarms Grandview Fire Department responded to, how many alarms, by percentage, did they feel that would be found unnecessary. Finally, the employees were also asked if when the department mutual aid or an out of district assignment which created a delayed response to an incident because units were busy with another alarm, how often did they think that this was a result of the first alarm being unnecessary.
The author sent this questionnaire to 36 employees and received 21 surveys back, which equated to a 58.3 percent response rate.

A second questionnaire was sent out to organizations throughout the country with similar makeup, in that they were fire departments based in communities generally between 20,000 and 150,000 residents in an urban or suburban setting.

Initially, this questionnaire was sent to 86 departments with a return of 4 respondents. This equated to a response rate of 4.6 percent. With this low response rate, the author sent a link to the questionnaire to the National Society of Executive Fire Officers who forwarded the link to all of it’s members. While it was unknown how many recipients received the questionnaire, the author did receive an additional ten responses for a total of 14 responses to the questionnaire.

The questionnaire included ten questions. The first question asked what services their organization provided? The choices were fire suppression, EMS (transport), EMS (non-transport), hazardous materials response, and specialized services. The rationale or this question was that since it was becoming obvious that EMS had a large number of unnecessary responses, and that departments who didn’t run EMS would theoretically have a lower rate of responding to unnecessary alarms.
The next question which was asked was if they felt that their emergency services organization had a significant problem with the utilization of resources on unnecessary alarms, which created a significant level of community risk because those resources were unavailable. The choices for answers were simply yes or on. The rationale for this question was for the author to get a feeling for how many organizations viewed this subject as a significant problem so that it might be addressed within the recommendations of this applied research project.

Next, the respondents were asked what they would estimate the percentage of alarms that were run would be considered absolutely unnecessary. For this question, they were given a text box to respond in percentage. The rationale for this question was for the author to get a better feeling for the depth of the problem or the lack thereof.

Next, the respondents were asked what they thought was the leading cause of unnecessary alarms. The choices were lack of education and community awareness, lack of resources such as transportation and financial, under-maintained fire alarm systems, or other socioeconomic factors. The rationale for this question was to attempt to hone in on the root causes of citizens calling for unnecessary response so that recommendations might curtail this problem.

The respondents were asked what their organization had done to stabilize or reduce the number of unnecessary alarms in their community. They were also
given an open text box to answer the question as they wished. The rationale for this question was directed at answering the research question about what other similar organizations had done to address the problem.

The respondents were asked if they had utilized taxi-cab vouchers or an alternative means of transportation to medical facilities for alarms where transportation via ambulance was unnecessary. They were given only yes and no options for this question. The rationale for this question was based on answering the research question about what other similar organizations had done to address the problem. This question was followed up by a question that if the respondent answered yes to the prior question, they were to explain how the outcomes of the program resulted and whether or not the organization or community benefited. All stated no, so everyone skipped the follow up question. The rationale was that it might drive recommendations which were asked for in a research question and for the recommendations section of this applied research project.

Next, respondents were asked if they had enforced fines on repeated false alarm calls for automatic fire alarms. They were simply given a yes or no option. The rationale for this question was once again to see what other departments had done to address the problem and to seek recommendations for this project.
The respondents were asked to describe the current political and legal environments where they worked as it related to addressing the problem of unnecessary response and system abuse. The potential answers were that their environment was politically and legally restrictive; legally restrictive but politically permissive; politically restrictive, but legally permissive; or both politically and legally permissive for operational changes related to how they responded to these alarms. The rationale for this question was to evaluate how easily those organizations could change their policies for response to these unnecessary alarms.

Finally, the respondents were asked if they felt that the problem of running unnecessary alarms would get better or worse in the next ten years. The answers were get much better; get a little better; remain unchanged; get a little worse; or get much worse. The rationale for this question was to gain a feeling for the depth of the issue and it’s future role in fire department operations.

An interview was conducted with three personnel from the Grandview Fire Department who were selected based on varying length of service, rank, experience, and medical licensure. Those personnel were asked three questions. First, they were asked if they felt that running unnecessary alarms created a morale problem at the Grandview Fire Department. Second they were asked, if there was a morale problem resulting from running these alarms, did it affect the service delivery to the customer causing the unnecessary alarm, and
lastly, did it affect the service delivery to subsequent customers needing our services in the same shift. The rationale was designed to address some of the intangible risk to the community from morale problems directly associated with the running of unnecessary alarms.

A personal interview was conducted with Ralph Loar III, Asst. Chief of the Grandview Fire Department about factors affecting the organization from an EMS perspective, specifically related to the possible use of taxi cab vouchers or other means of transportation and the costs associated with an ambulance bill. The rationale was to determine the depth of the problem and to answer the research question about recommendations for the Grandview Fire Department. Chief Loar was asked to elaborate about the research he had conducted on utilizing taxi-cab vouchers as an alternative mode of transportation for those EMS patients not needing ambulance transport. Chief Loar was also asked what the current rates for ambulance transport was and what the current collection rate for ambulance bills was for the City of Grandview. (Loar 2008)

A personal interview was conducted with Chuck Thacker, Fire Chief about the use of a two tiered ambulance transport system, specifically the utilization of basic life support ambulances. This interview was designed to gain information about possible recommendations for the Grandview Fire Department. Chief
Thacker was asked if the city had discussed the use of a basic life support ambulance and was also asked if the Grandview Fire Department had experienced an apparatus collision responding to any alarm since 1998, or for the last 10 years. (Thacker 2008) Finally, Chief Thacker was asked about his opinion of the financial aspect of community risk associated with the running of unnecessary alarms and how the staffing, resources, and financial commitment might have changed if unnecessary alarms were reduced. (Thacker 2008)

A personal interview was conducted with Linda Leach, who served as the records supervisor with the Grandview Police Department who handles alarm registrations, permits, and fines associated with residences and businesses in Grandview. Ms. Leach was asked what the current ordinance for alarms included related to registration fees, permit fees, and fines for repeated false alarms. Ms. Leach was also asked about changes in the ordinance from 1995 to the present. Lastly, Ms. Leach was asked about response policies for alarms that were not registered and their associated fines. Finally, Ms. Leach was asked about how their ordinance affected the fire department and it’s response policy to alarms that were non-compliant with the ordinance. (Leach 2008)

Extensive literature was reviewed and cited to find answers to the research questions for this applied research project. The author searched to define the
extent of the problem of running unnecessary alarms around the country and the world. Next the author looked to find specific cases where damage or injury was done to a person or property because emergency responders couldn’t respond to a true emergency while they were busy with an unnecessary alarm. After much work, the author was unable to find any specific cases where this had occurred and where the story had made it to a publication or an otherwise citable source.

The author did look for and locate several sources where motor vehicle crashes occurred while responders were responding to a false alarm or an unnecessary call. Specific examples included one in New York City (Firehouse 2008) and one in Chicago (Firehouse 2000), where firefighters and civilians were seriously injured killed. Further, the USFA report on firefighter fatalities in the United States was cited for the number of firefighters who died as a result of responding to or returning from alarms. (United States Fire Administration 2007) Unfortunately, this source is not specific enough when describing these deaths and they are not broken down further to see how many had died as a result of responding to or from an unnecessary or false alarm. (United States Fire Administration 2007)

The author also searched for and found sources describing what other organizations had done to address the problem of running excessive
unnecessary alarms. Specifically an article about San Antonio, Texas who utilized the taxi-cab voucher system. (Silva 2007). An article about the use of call screening techniques in Dallas, Texas was also utilized for this project. (Leilani Starks 1983).

When the author conducted research on the subject of false fire alarms as being a source for unnecessary alarms, he found that this issue had been addressed by several sources. The Fire Alarm Reduction Association had done much work on reducing alarms and designing model ordinances (False Alarm Reduction Association 2001). Further, government agencies had also done work to reduce the amount of wasted resources used on false alarms such as the Charles County, Maryland government’s False Alarm Reduction Unit, who tracked the number false alarms ran in their county. (Charles County 2007). Finally, the City of Las Vegas Fire and Rescue department was found to have conducted research, which created an ordinance requiring the fire department not to respond to false alarms if there was no substantiating information supporting the alarm. (Gammon 2006) (Szymanski 2006).

There were some limitations that the author noted in this applied research project. Limitations were as follows:
There was very little information found about specific cases where a member of the community was damaged or injured because fire department resources couldn’t respond to their emergency because those resources were on an unnecessary alarm.

The questionnaire which was sent to outside fire departments was designed to be sent to urban/suburban fire departments, similar to the Grandview Fire Department in size and makeup. There was an attempt to do so, but when the author handed the questionnaire over to the National Society of Executive Fire Officers, there was no way to insure that respondents were from similarly situated organizations.
RESULTS

Community risk was viewed from several angles for this project. First, risk to the public from not having resources available to respond to their call for help because resources were tied up on unnecessary alarms. Next, risk created to the public from the actual response of heavy fire and EMS apparatus to unnecessary alarms, which could be involved in a motor vehicle crash. The degree to which running these unnecessary alarms financially affected the community was also considered. Finally, indirect related risk from morale issues and how possible poor morale would affect quality of service to the public.

The questionnaire, Unnecessary Utilization of GFD Resources, which was sent to Grandview Fire Department employees to determine the current perception of the community risk created by false alarms created results which are listed below.

Question #1

Think about the last ten alarms that you responded to. Feel free to utilize EMBRS or Image Trend Data. How many of those alarms do you feel were unnecessary as it relates to what the reasonable person would do in the same situation?
<table>
<thead>
<tr>
<th>Percentage of Alarms</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-19%</td>
<td>9.6%</td>
</tr>
<tr>
<td>20-29%</td>
<td>19%</td>
</tr>
<tr>
<td>30-39%</td>
<td>9.5%</td>
</tr>
<tr>
<td>40-49%</td>
<td>23.8%</td>
</tr>
<tr>
<td>50-59%</td>
<td>14.3%</td>
</tr>
<tr>
<td>60-69%</td>
<td>9.5%</td>
</tr>
<tr>
<td>70-79%</td>
<td>9.5%</td>
</tr>
<tr>
<td>80-89%</td>
<td>4.8%</td>
</tr>
<tr>
<td>90-100</td>
<td>0%</td>
</tr>
</tbody>
</table>

The most common answer was 40-49% of alarms were unnecessary in the opinion of the responders at a rate of 23.8 percent.

Question #2

Do you feel that the number of unnecessary alarms in Grandview cause a significant level of risk to the community because resources are being utilized in an un-needed manner reducing their availability for a potential emergency?

<table>
<thead>
<tr>
<th>Yes</th>
<th>66.7%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>33.3%</td>
</tr>
</tbody>
</table>
Sixty-six point seven percent or the respondents felt that those unnecessary alarms created a significant level of risk to the community.

Question #3
What would you say that the level of risk to the citizens of Grandview, because of resources being busy on unnecessary alarms and not available for a potential emergency?

<table>
<thead>
<tr>
<th>Level of Risk</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0 %</td>
</tr>
<tr>
<td>A Little Risk</td>
<td>57.1%</td>
</tr>
<tr>
<td>A Lot of Risk</td>
<td>33.3%</td>
</tr>
<tr>
<td>Completely Unreasonable Amount</td>
<td>9.5%</td>
</tr>
</tbody>
</table>

Over half described the community as facing a little risk from GFD running unnecessary alarms, while roughly one-third described the community as facing a lot of risk.
Question #4

If we created a litmus test to determine the number of absolutely and factually unnecessary alarms Grandview Fire Department responds to are, how many alarms do you feel that we would find are unnecessary?

<table>
<thead>
<tr>
<th>Percentage of Unnecessary Alarms</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5%</td>
<td>4.8%</td>
</tr>
<tr>
<td>6-10%</td>
<td>14.3%</td>
</tr>
<tr>
<td>11-20%</td>
<td>9.5%</td>
</tr>
<tr>
<td>21-30%</td>
<td>23.8%</td>
</tr>
<tr>
<td>31-40%</td>
<td>9.5%</td>
</tr>
<tr>
<td>41-50%</td>
<td>9.5%</td>
</tr>
<tr>
<td>51-60%</td>
<td>14.3%</td>
</tr>
<tr>
<td>61-70%</td>
<td>4.8%</td>
</tr>
<tr>
<td>71-80%</td>
<td>9.5%</td>
</tr>
<tr>
<td>81-90%</td>
<td>0%</td>
</tr>
<tr>
<td>91-100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

The largest percentage with 23.8 percent of the respondents felt as if 21-30 percent of GFD alarms would be found to be unnecessary as judged against a litmus test. It was interesting to note that the results of that litmus test against
300 GFD alarms found that 23.7% of the actual alarms were judged to be unnecessary.

Question #5

When we have to utilize mutual aid or use out of district apparatus (P2 in T3 District for example), which creates a delayed response to an alarm because we are busy with another alarm, how often do you feel that this is a result of the first alarm being unnecessary?

<table>
<thead>
<tr>
<th>Percentage of Alarms</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25%</td>
<td>38.1%</td>
</tr>
<tr>
<td>26-50%</td>
<td>38.1%</td>
</tr>
<tr>
<td>51-75%</td>
<td>23.8%</td>
</tr>
<tr>
<td>76-100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Seventy-six percent of the respondents stated that they thought up to 50 percent of our alarms when mutual aid or an out of district apparatus, which caused a delay in service was associated with an unnecessary alarm.
The second questionnaire which was conducted, Evaluating The Level of Community Risk Secondary To Responding To Unnecessary Alarms, was sent out to outside fire departments as described in the procedures section. The results of this questionnaire are as follows:

Question #1
What Services Does Your Organization Provide to the Community?

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Suppression</td>
<td>100%</td>
</tr>
<tr>
<td>EMS (Transport)</td>
<td>50%</td>
</tr>
<tr>
<td>EMS (Non-Transport)</td>
<td>50%</td>
</tr>
<tr>
<td>Hazardous Materials</td>
<td>71.4%</td>
</tr>
<tr>
<td>Specialized Services (rescue, etc)</td>
<td>64.3%</td>
</tr>
</tbody>
</table>

All respondents provided some sort of EMS whether it was a transport service, or a non-transport service. This should have supported the results of this project in that since EMS response has a large proportion of unnecessary alarms (Grandview Fire Department 2007) that each respondent had dealt with that facet of service.
Question #2
Do you feel that your emergency services organization has a significant problem with the utilization of resources on unnecessary alarms, which creates a significant level of community risk because those resources are unavailable?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>64.3%</td>
</tr>
<tr>
<td>No</td>
<td>36.5%</td>
</tr>
</tbody>
</table>

The majority of the respondents thought that their organization had a significant problem with community risk associated with running unnecessary alarms.

Question #3
What would you estimate the percentage of your alarms that are run are considered absolutely unnecessary? (Enter whole numbers only)

The average response was that 31% of alarms were absolutely unnecessary. Responses ranged from five to 75%. The most common answers were 5% (four), 40% (two), and 65% (two).

Question #4
What is the leading cause of running these unnecessary alarms?
Respondents cited lack of education and community awareness as the top root cause for the number of unnecessary alarms at 57.1 percent although all four possible answers had a significant number of responses.

Question #5

What, if anything has your organization done to stabilize or reduce the number of unnecessary alarms in your community?

Nine departments responded to this question and five skipped it. The responses were as follows:

| False alarm fines and citations | 4 |
| Public Education | 3 |
| Single Unit Responses | 1 |
| No action taken | 1 |
It appeared that the majority of respondents had tried to educate the public about fire department and EMS services or enforce fines and citations for false alarms. This became critical in the recommendations section of this project.

Question #6

Have you tried utilizing taxi-cab vouchers or an alternative means of transportation to medical facilities for alarms where transportation via ambulance is medically unnecessary?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0%</td>
</tr>
<tr>
<td>No</td>
<td>100%</td>
</tr>
</tbody>
</table>

Question #7

This question was not applicable as it was a follow up to those who stated yes for question number six.

Question #8

Has your organization enforced fines on repeated False Alarm calls for fire alarms?
Just about half of the respondents enforced fines for false automatic fire alarms.

Question #9

How would you describe the current political / legal environment where you work as it relates to addressing the problem of unnecessary response or system abuse?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very restrictive both politically and legally you are expected to provide services to everyone regardless of legitimate need.</td>
<td>57.1%</td>
</tr>
<tr>
<td>Legally restrictive, but Politically permissive</td>
<td>7.1%</td>
</tr>
<tr>
<td>Politically restrictive, but Legally permissive.</td>
<td>14.3%</td>
</tr>
<tr>
<td>Both Legally and Politically, there is room for addressing the issue through operational changes.</td>
<td>21.4%</td>
</tr>
</tbody>
</table>
For over half of the respondents, there was shown to be a restrictive environment for changing their operational approach if it involved reducing unnecessary services.

Question #10

Do you feel that the problem of running unnecessary alarms will get better or get worse in the next ten years?

<table>
<thead>
<tr>
<th>The problem will…</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get Much Better</td>
<td>0%</td>
</tr>
<tr>
<td>Get a Little Better</td>
<td>7.1%</td>
</tr>
<tr>
<td>Remain Unchanged</td>
<td>14.3%</td>
</tr>
<tr>
<td>Get a Little Worse</td>
<td>64.3%</td>
</tr>
<tr>
<td>Get a Lot Worse</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

The majority, or 64.3 percent of the respondents thought the problem of running unnecessary alarms would get a little worse. The total percentage of respondents who thought that the problem would get worse in general was 78.6 percent while 14.3 percent thought that the problem would remain unchanged and seven percent thought that the problem would actually get better.
Incident data was collected from 300, or approximately 10 percent of Grandview Fire Department’s annual incidents. (Grandview Fire Department 2007) These incidents were evaluated against a standard or litmus test for what was judged by the author to be an unnecessary alarm. These unnecessary alarms were based on rather conservative definitions. The matrix for determining if an alarm was necessary is located in appendix B of this project. The author calculated that 23.7 percent of Grandview Fire Department alarms are unnecessary. (Grandview Fire Department 2007)

It was further calculated that the Grandview Fire Department ran 8.80 alarms per day and the average alarm length was 38 minutes. (Grandview Fire Department 2007). The Grandview Fire Department runs two ALS ambulances, one pumper company, one truck company who are all advanced life support capable and an Assistant Chief who is advanced life support capable approximately 66 percent of the time. (Grandview Fire Department 2007). The Grandview Fire Department can generally handle two simultaneous alarms at the same time, but needs mutual aid to handle the third and subsequent simultaneous alarms.

It was calculated that the Grandview Fire Department ran 1.75 simultaneous alarms per day, which resulted in an average of 66.5 minutes per day where it ran two simultaneous alarms. (Grandview Fire Department 2007) Three
simultaneous alarms were found to be run at the rate of .57 per day or 2.4 minutes per day. (Grandview Fire Department 2007)

The risk created to the community specifically from units not being able to respond to an emergency because they were assigned on an unnecessary alarm was calculated based on times where the Grandview Fire Department could not respond to a potential emergency. The risk was calculated as follows:

<table>
<thead>
<tr>
<th>Average time per day when GFD is unable to respond.</th>
<th>2.46 minutes / day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplied by 23.7 percent for those alarms judged to be unnecessary.</td>
<td>34.98 seconds /day</td>
</tr>
</tbody>
</table>

The author assumed that a working structure fire, which was found to occur at the rate of 27.57 per year over the last seven years (Grandview Fire Department 2007) resulted in 8.02 minutes per day average where GFD units were completely occupied. The author assumed that working structure fires are generally necessary alarms and were not included in the calculations for time on unnecessary alarms.
It was further found that the Grandview Fire Department had not had an apparatus involved in a motor vehicle collision responding to any alarm since at least 1997. (Thacker 2008). The Grandview Fire Department had run 2551 alarms per year on the average for an approximate total of 25,000 alarms without a collision responding to an alarm. (Grandview Fire Department 2007). There were a few isolated incidents of motor vehicle collisions involving department apparatus at the scene or returning from an alarm. (Thacker 2008).

Through a panel interview conducted with three members of the Grandview Fire Department, it was determined that there was some risk to the community through poor morale resulting from running unnecessary alarms. (Dugan A. 2008) This interview revealed that there were possible morale issues created by the running of unnecessary alarms. The panel admitted to varying degrees that the service rendered to those creating an unnecessary alarm could possibly be compromised, and further stated that service delivery to subsequent customers on subsequent alarms in that particular shift could have been compromised due to poor morale because of a series of unnecessary alarms. (Dugan A. 2008)

Financially, it could be said that 23.7 percent of the Grandview Fire Department’s budget, or about 758,000 dollars of taxpayer dollars was being used to provide service to customers with unnecessary incidents. (Thacker 2008) A more accurate depiction is that the staffing levels and response policies in the City of
Grandview would not have changed if it ran 23.7 percent less alarms (Thacker 2008), so the services provided to the community would essentially have had the same cost as those associated costs would have been already encumbered due to the existing demands of the alarm load in Grandview. Reducing the load of unnecessary alarms would, in actuality, have a minimal impact on the financial aspect of community risk. (Thacker 2008)

Research Questions:

1. How many alarms that the Grandview Fire Department responded to were actually unnecessary after being tested against a litmus test to judge them as such?

The Grandview Fire Department ran 2983 alarms in 2006. A sample representing approximately 10 percent of the annual incidents determined that the Grandview Fire Department responds to unnecessary alarms 23.7 percent of the time. (Grandview Fire Department 2007)

2. What was the actual loss in resource availability in terms of equipment, personnel, and apparatus to the citizens of Grandview while those resources were being utilized on alarms found to be unnecessary?
When the risk was viewed as being created when the Grandview Fire Department could not have responded to an incident because it was occupied on three or more simultaneous alarms multiplied by the percentage of alarms which were judged to be unnecessary, there was a loss of 35 seconds per day of availability and thus risk to the community. (Grandview Fire Department 2007)

The current risk of resources not being available to run an alarm was found to be minimal. This is especially true if it is assumed that at least some of the time a unit could have possibly become available from an alarm to run an additional emergency call. (Grandview Fire Department 2007)

3. What level of risk to the community was created while Grandview Fire Department resources were on unnecessary alarms?

It was determined that the risk or the Grandview Fire Department not being able to respond to an emergency because it was busy on an unnecessary alarm was found to be minimal. The community was found to be at exposed to risk at the most averaged 35 seconds per day. (Grandview Fire Department 2007)

There was minimal risk associated with potential motor vehicle crashes while units were responding to unnecessary alarms in that through effective response policies and training, the Grandview Fire Department had an excellent record of driver safety and no accidents had occurred in the ten years (Thacker 2008)
while responding to over 25,000 alarms. (Grandview Fire Department 2007)
The significance here would have been that one accident would have serious if
not catastrophic consequences for the community, the organization, and the
victims of such accident. (Thacker 2008)

The author found that there was limited risk financially to the community because
of Grandview Fire Department units responding to unnecessary alarms. The
budget for fire and rescue services in the City of Grandview would not have
changed if it ran 23.7 percent less alarms (Thacker 2008). The services provided
to the community would essentially have had the same cost as those associated
costs would have been already encumbered due to the existing demands of the
alarm load in Grandview. (Thacker 2008)

The risk to the community due to the issue of poor responder morale was found
to be probably the most significant variable in this project. The author found
definite evidence in a round table group-based interview of possible risk of
delivering sub-standard services because of poor morale to those who caused
the unnecessary incident, but even possibly to those who the responders would
serve subsequently in a given shift after running one, or a series of unnecessary
alarms. (Dugan A. 2008)
4. What had other fire departments, who provided similar services in an urban/suburban environment done to reduce the risk created to their communities related to unnecessary utilization of department resources?

Through the use of a questionnaire, it was found that other departments had tried to utilize false alarm citations and fines, public education, and single unit responses to minimize the exposure to potential unnecessary alarms. Further, through the literature review, it was found that at least one department had used taxi-cab vouchers to limit the number of unnecessary ambulance trips. (Silva 2007) In Dallas, Texas, call screening had shown to be a positive method to reduce the number of unnecessary alarms for medical assistance. (Leilani Starks 1983) One other municipality even went so far as to eliminate response to any automatic fire alarm which was not substantiated by supporting information such as multiple calls, smoke, or fire showing. (Szymanski 2006)

5. What recommendations should be made to address the problem of risk to the citizens of Grandview, Missouri secondary to providing resources which are unnecessary?

The City of Grandview should follow the following recommendations to reduce the risk to the community from running unnecessary alarms.
First, the City of Grandview should embark on a public education campaign by where it its fire department and police department include in all of its public education endeavors information about what is an emergency and what is not an emergency. This public education campaign should be delivered to very young children as well as adults so that engrained knowledge might result in behavioral changes as it relates to calling 911 for help. This endeavor would serve to slow the potential growth of the problem.

Second, the City of Grandview should consider options for a tiered ambulance response system, given that a large majority of unnecessary alarms result from calls for emergency medical care. This would allow critical advanced life support ambulances to remain in service for potential emergencies.

Third, the City of Grandview should re-visit it’s false alarm ordinance with possible changes and increases in fees and consider model ordinance language developed by groups such as the False Alarm Reduction Association (False Alarm Reduction Association 2001). Also, the city should insure a method for allowing dispatch screens to alert fire units of a repeated false alarm so that enforcement may take place just as it currently does for the police department.
Fourth, the City of Grandview should consider reducing its unit assignments for those alarms which do not typically require both a fire apparatus and an ambulance. This should be considered with caution however because there is safety in numbers on the incident scene where a supervisor can dedicate his or her attention to the safety of the crew and the customer. Further, the department should utilize triage color coding by the first arriving unit to allow subsequent units to slow their response for added safety.

Finally, the City of Grandview should utilize some form of Emergency Medical Dispatch (EMD) to allow 911 operators to more critically determine a patient’s condition and assign fire department units based on reliable information received from the caller. This would give the department a basis for slowing responses or canceling un-needed resources.
DISCUSSION

The fact that the difference between the perception of Grandview Fire Department personnel who answered the questionnaire, the questionnaire sent to other departments, and the factual numbers from the collection of incident data (Grandview Fire Department 2007) was very limited was interesting. The most common answer from Grandview FD personnel was that 21-30 percent of alarms in Grandview were totally unnecessary. The average answer in the questionnaire sent to other organizations was that 31 percent of all their alarms could be judged as totally unnecessary. The data obtained from actual incidents in the City of Grandview revealed that 23.7 percent of the total responses were totally unnecessary. (Grandview Fire Department 2007).

Even know the author had established that a significant portion of the alarms in the City of Grandview were totally unnecessary, there still needed to be a connection or link between that fact and any risk to the community. It turned out that there was found to be very little direct risk to the community related to resources not being available. From that perspective, with 35 seconds per day on average where the Grandview Fire Department was blacked out because it was running an unnecessary alarm, and add to that the assumption that on many of those situations, a unit could have cleared the previous alarm for a life-
threatening emergency, the risk to the community in the City of Grandview currently from running unnecessary alarms is very low.

From the perspective of having an accident while responding to an unnecessary alarm, it was found that the Grandview Fire Department had a very good track record for safety while responding to alarms. The department hadn’t had an accident responding to an alarm since at least 1997, or for over ten years. (Thacker 2008) Due to effective response policies, adequate driver training, and a culture of safety, the Grandview Fire Department had been very successful in avoiding these incidents. The potential though of great property damage, injury, or death was assumed to create a much greater risk from having a collision then from resources not being available. The risk to the community in the City of Grandview resulting from an apparatus having accident while responding to an unnecessary alarm was limited but was worthy of discussion to find better methods.

Probably the largest risk to the community in the City of Grandview was found to be intangible risk from morale issues when it seemed that employees had grown tired of running alarms which they perceived as being unnecessary. (Dugan A. 2008) There was found to be risk of the service provider or employee
not providing quality services to those who had called the fire department for an
unnecessary alarm. Even more concerning was that there appeared to
be question as to whether future customers in a given shift would have suffered
less than quality services because an employee’s morale was affected by one or
more unnecessary alarms. (Dugan A. 2008) The risk to the community in the
City of Grandview was found to be significant as viewed from a non-scientific
basis when the author considered risk as a result of poor employee morale.

Generally, the risk to the City of Grandview as a community was found by the
author to be very limited in that the organization could almost always provide
safely delivered services in a timely manner without delay because it had been
busy with an unnecessary alarm.
RECOMMENDATIONS

The City of Grandview should follow the following recommendations to reduce the risk to the community from running unnecessary alarms.

First, the City of Grandview should embark on a public education campaign by where it its fire department and police department include in all of its public education endeavors information about what is an emergency and what is not an emergency. This public education campaign should be delivered to very young children as well as adults so that engrained knowledge might result in behavioral changes as it relates to calling 911 for help. This endeavor would serve to slow the potential growth of the problem.

Second, the City of Grandview should consider options for a tiered ambulance response system, given that a large majority of unnecessary alarms result from calls for emergency medical care. This would allow critical advanced life support ambulances to remain in service for potential emergencies.

Third, the City of Grandview should re-visit it’s false alarm ordinance with possible changes and increases in fees and consider model ordinance language developed by groups such as the False Alarm Reduction Association (False Alarm Reduction Association 2001). Also, the city should insure a method for
allowing dispatch screens to alert fire units of a repeated false alarm so that enforcement may take place just as it currently does for the police department.

Fourth, the City of Grandview should consider reducing its unit assignments for those alarms which do not typically require both a fire apparatus and an ambulance. This should be considered with caution however because there is safety in numbers on the incident scene where a supervisor can dedicate his or her attention to the safety of the crew and the customer. Further, the department should utilize triage color coding by the first arriving unit to allow subsequent units to slow their response for added safety.

Finally, the City of Grandview should utilize some form of Emergency Medical Dispatch (EMD) to allow 911 operators to more critically determine a patient’s condition and assign fire department units based on reliable information received from the caller. This would give the department a basis for slowing responses or canceling un-needed resources.
REFERENCES


Firehouse (2008) Five FDNY Firefighters Injured in Fire Truck Crash. Firehouse Online Volume, DOI:


NFPA (2005) NFPA Report shows most calls to US fire departments in 2003 were for medical help, false alarms. NFPA Volume, DOI:


Szymanski, T. (2006) Vegas to Alter Fire & Medical Responses. Firehouse Magazine Volume, DOI:


Appendix A

Grandview Fire Department
Unnecessary Alarm Matrix

Emergency Medical Alarms

1) False Call (Malicious or Good Intent)

2) Generalized Illness with no outwardly visible symptoms, vital signs normal for the patient, and normal level of consciousness. This patient is able to walk to the ambulance and absence of emesis, severe cough, diarrhea, or other debilitating symptom.

3) Soft tissue injury which does not have any reasonable potential for acute complications such as significant blood loss, fat embolus, fracture, dislocation, or complicating condition.

4) Alarms involving the police department where the patient admits to EMS that they were attempting to avoid capture or continued incarceration by faking an injury or illness.
5) Patients who admit to, or the Paramedic has very strong suspicion of calling an ambulance to either find a better environment (heat or cold), or getting closer to a desired destination such as their home. Additionally, these patients have no outwardly significant signs or symptoms and vital signs are normal for the patient.

6) Patients who the Paramedic is reasonably sure that would not have needed an ambulance if they would have addressed an acute or chronic condition early on, which normally would not have created the need for an ambulance, but now does. (i.e. - missed urinary tract infection that has developed into a more serious condition).

7) Patients who are experiencing difficulty because they have been non-compliant with medication by choice or lack of financial means. The Paramedic must be reasonably sure that said non-compliance created the problem prompting the ambulance call.

8) Patients who have been involved in motor vehicle crashes, where damage to the vehicle they were riding in has damage that is estimated to be very minor, cosmetic damage which the Paramedic is reasonably sure that injury would be extremely rare and the patient has normal level of consciousness and has no
outwardly visible injury or when complaints of injury are inconsistent with the expected injury pattern for this mechanism of injury.

9) Alarms where there is obviously no injury or illness and the patient confirms that.

Other Alarms

1) Calls for false fire alarms which are not created by steam, smoke, light, heat, or other element which would normally trigger an alarm system. Specifically, alarms created by improper installation, or lack of maintenance of fire alarm systems are included.

2) False alarms where the occupant could have called 911 or the alarm company and cancelled the alarm but failed to do so resulting in the alarm not being cancelled prior to our arrival. Cases where there was no attempt to cancel the fire department on an obvious false alarm are included.

3) Calls to investigate a smoke alarm sounding where the fire department finds only a “chirping” detector and a caller who was not educated in the use of such alarms and that a chirp means to change the batteries. This does not include those calls to help citizens who need legitimate assistance installing or changing the battery in a smoke alarm.
4) Alarms that are created by the lack of equipment maintenance as their sole cause.

5) Alarms where the fire department is called to investigate a situation resulting from a conflict between citizens or neighbors where it is obvious that the complaining party is attempting to get the alleged offender in trouble with the fire department where there was no fire code violation, or crime committed and there is absolutely no hazard.
Appendix B

Risk Calculator / Unnecessary Alarm Log

GFD Constants------------------ 8.80 alarms per day

1 Alarm / 163 minutes

Average Alarm Length 38 Minutes

Simultaneous (2) 1.75 / Day

20% of alarms

66.5 minutes / day

Simultaneous (3+) .57 / Day

6.4% of alarms

2.4 minutes / day

Structure Fires 27.57 per year (7 yr)

Ave 114 Min

2930 Min per year

8.02 Minutes / day

36 Alarms

07-2493 No Signs or Symptoms
07-2490 No Patient
07-2492 No Patient
07-2507 Minor Soft Tissue Injury
07-2509 Minor eye irritation
07-2522 No Signs or Symptoms

6 / 36 alarms are unnecessary or 16.6%

Period 11/01/2007 to 11/14/2007

134 Alarms

07-2539 Isolated Soft Tissue Injury
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>07-2533</td>
<td>Isolated Soft Tissue Injury</td>
</tr>
<tr>
<td>07-2536</td>
<td>Chronic Medical Condition</td>
</tr>
<tr>
<td>07-2552</td>
<td>Simple Laceration</td>
</tr>
<tr>
<td>07-2559</td>
<td>Isolated Soft Tissue Injury</td>
</tr>
<tr>
<td>07-2561</td>
<td>Noise in Vehicle</td>
</tr>
<tr>
<td>07-2576</td>
<td>Simple Laceration</td>
</tr>
<tr>
<td>07-2568</td>
<td>No Signs or Symptoms</td>
</tr>
<tr>
<td>07-2566</td>
<td>Chronic Medical Condition</td>
</tr>
<tr>
<td>07-2569</td>
<td>Generally Ill</td>
</tr>
<tr>
<td>07-2587</td>
<td>Chronic Medical Condition</td>
</tr>
<tr>
<td>07-2589</td>
<td>Fever</td>
</tr>
<tr>
<td>07-2592</td>
<td>Isolated Soft Tissue Injury</td>
</tr>
<tr>
<td>07-2603</td>
<td>Isolated Soft Tissue Injury</td>
</tr>
<tr>
<td>07-2605</td>
<td>False alarm without reason</td>
</tr>
<tr>
<td>07-2596</td>
<td>Isolated Soft Tissue Injury</td>
</tr>
<tr>
<td>07-2598</td>
<td>Minor Hemorrhage</td>
</tr>
<tr>
<td>07-2604</td>
<td>Generally Ill</td>
</tr>
<tr>
<td>07-2612</td>
<td>Chronic Medical Condition</td>
</tr>
<tr>
<td>07-2617</td>
<td>Nothing Found</td>
</tr>
<tr>
<td>07-2623</td>
<td>Non Compliant with Meds</td>
</tr>
<tr>
<td>07-2620</td>
<td>Chronic Medical Condition</td>
</tr>
<tr>
<td>07-2622</td>
<td>Lack of system maintenance</td>
</tr>
</tbody>
</table>
07-2635   No Signs or Symptoms
07-2631   Lack of system maintenance
07-2639   Chronic Medical Condition
07-2648   No Signs or Symptoms
07-2651   Isolated Soft Tissue Injury
07-2654   Chronic Medical Condition
07-2657   Simple Laceration
07-2660   No Signs or Symptoms
07-2662   Non Compliant with Meds

33 /134 were unnecessary or 24.6%


24 Alarms

07-2671   Maintenance Issue
07-2665   No Patient Found
07-2668   No Signs and Symptoms
07-2683   No Signs and Symptoms
07-2684   No Signs and Symptoms
5 / 24 Alarms were unnecessary or 21%


24 Alarms

07-2695 Ignorance of Ordinance
07-2690 No Complaint
07-2692 No Patient
07-2706 Simple Laceration
07-2711 Non Compliance---Meds
07-2709 No Signs and Symptoms
07-2710 Excessive frequent flyer—No S / S

7/25 Alarms were unnecessary or 28%

54 Alarms

07-2720 Chronic Signs and Symptoms
07-2638 False Alarm
07-2721 False Alarm
07-2725 Minor Laceration
07-2729 No Signs or Symptoms
07-2731 False Alarm
07-2744 Non-compliance --ETOH
07-2746 Minor soft tissue injury
07-2765 Chronic Signs and Symptoms
07-2755 Non Compliant--Meds
07-2759 Minor soft tissue injury
07-2763 False Alarm

12/54 Alarms were unnecessary or 22.2%


07-2771 Odor of Spray Paint
07-2774 No Signs and Symptoms
07-2776    Isolated Fever
07-2781    Return to ED after Dx
07-2787    Simple Laceration
07-2788    Odor—None found
07-2795    Simple Laceration
07-2792    2nd call to burned out car
07-2796    Non Compliance---Meds
07-2798    No Signs and Symptoms
07-2804    No Signs and Symptoms
07-2809    No Signs and Symptoms

12/45 Alarms were unnecessary or 26.6%

Total 317 Alarms

   75 Unnecessary

   23.7%

Risk Method I    2.46 minutes per day

               Multiplied by .237

Non Avail.      34.98 seconds per day average