

**DEVELOPING A PHYSICAL FITNESS PROGRAM FOR THE CITY OF
PORTAGE FIRE DEPARTMENT**

EXECUTIVE DEVELOPMENT

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ABSTRACT

The problem was the Portage Fire Department did not have an established wellness/fitness program in place for its employees. The purpose of this study was to identify the benefits of a fire department wellness/fitness program. This was a combination of a descriptive and evaluative research project. The research questions were:

1. Would a formal fitness/wellness program benefit the firefighters and citizens of Portage by assuring the most physically capable personnel respond to emergencies within the city?
2. Due to the aging workforce of the City of Portage Fire Department, would a formal physical fitness/wellness program help to keep an adequate number of firefighters ready to meet the physical demands of their jobs?
3. Could a formalized physical fitness/wellness program in the City of Portage Fire Department help reduce the number of job related injuries and therefore reduce the number of lost workdays due to injury and subsequently reduce the workmen's compensation costs to the city?
4. If a formalized physical fitness/wellness program were instituted in the City of Portage Fire Department, would this help meet state and federal occupational health and safety standards as well as NFPA guidelines?

The author utilized literature review of past Executive Fire Officer (EFO) Applied Research Papers (ARP), as well as fire service and fitness periodicals, texts, journals, and Internet resources for information pertinent to the four research questions. Additionally, interviews were conducted to obtain local baseline data on the problem.

The recommendation, based on this study, was for the Portage Fire Department administration to begin to establish a comprehensive wellness/fitness program using the standards set forth in NFPA 1500, NFPA 1582, NFPA 1583, the IAFF/IAFC Joint Labor Management Wellness Fitness Initiative, and other criteria cited in this study. In particular, the city and fire department administration should address the common benefits noted in this Applied Research Paper regarding the reduction of fire fighter injuries and increased performance through physical fitness/wellness programs.

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INTRODUCTION

The problem of line of duty deaths is a serious one. It happens in the largest cities, in the suburbs, on the farms, and in small-town America. There are approximately 1.1 million firefighters in the United States, about 300,000 of them career firefighters. No firefighter is exempt from the potential of a line of duty deaths. Certain tasks and positions within the fire service may be less hazardous, but no one totally escapes the risk, not the battalion chief, pump operator, or fire investigator. Cardiovascular disease is the primary cause of line of duty deaths (Hollins, 2000).

According to NFPA 1500, it shall be the responsibility of the fire department to research, develop, implement, and enforce an occupational safety and health program that recognizes and reduces the inherent risks involved in the operations of a fire department (NFPA, 1997, p.2-4.1).

The problem this research project addresses is that the Portage Fire Department does not have a standardized program to address firefighter physical fitness/wellness. The purpose of this research project is to determine whether the implementation of a wellness/fitness program would be beneficial to the health and well being of the Portage firefighters. This is a combination descriptive and evaluative research project. The research questions are:

1. Would a formal fitness/wellness program benefit the firefighters and citizens of Portage by assuring the most physically capable personnel respond to emergencies within the city?

2. Due to the aging workforce of the City of Portage Fire Department, would a formal physical fitness/wellness program help to keep an adequate number of firefighters ready to meet the physical demands of their jobs?
3. Could a formalized physical fitness/wellness program in the City of Portage Fire Department help reduce the number of job related injuries and therefore reduce the number of lost workdays due to injury and subsequently reduce the workmen's compensation costs to the city?
4. If a formalized physical fitness/wellness program were instituted in the City of Portage Fire Department, would this help meet state and federal occupational health and safety standards as well as National Fire Protection Association guidelines?

BACKGROUND AND SIGNIFICANCE

In July 2002, the National Fire Protection Association released a startling report regarding firefighters fatalities. Although the report, U.S. Fire Service Fatalities in Structure Fires, 1977 to 2000, says the annual number of firefighter deaths at structure fires has dropped 59% since 1977, it also shows that the annual number of structure fires in that same period has dropped 54% (NFPA, 2002b, p.1).

At the present time a comprehensive physical fitness/wellness program does not exist within the Portage Fire Department. The Portage Fire Department is a full service agency, providing fire suppression, heavy rescue, and first responder emergency medical services to a thirty-five square mile city with a population of 44,897. Staff operates out of three fire stations with a total of 32 career firefighters and 20 paid on-call firefighters.

Daily staffing requires a minimum of seven personnel with a Captain and firefighter assigned to each station, and a Battalion Chief assigned to Station 1. The NFPA recommends staffing levels of four personnel on each piece of apparatus (NFPA, 2002). The City of Portage routinely staffs apparatus with 2 personnel, as a result the stressors placed upon these crewmembers more than doubles. Additionally, PFD is an aging department with the average age of the career firefighter at 44, with over 70% of the force over the age of 40.

Portage IAFF Local 1467 has worked with city administration through contract negotiation at several points to attempt to enhance fitness within the department. In 1987, the union requested and received a mandatory non-smoking requirement for firefighters. In a later contract, a maximum body fat composition standard was approved, however, the City later withdrew it in 1993 concerned that it might be considered discriminatory. The current mindset is such that the city does not deem a physical fitness/wellness program as a benefit to the city.

Overall firefighter wellness is recognized as an important element in decreasing firefighter fatalities and injuries. According to Nugent, “Wellness contributes to reduced risk of death from heart attack, less injuries and disabilities; improved performance on the incident scene; higher morale; lower personnel and insurance costs; and a positive effect on public relations” (Nugent, 1994).

The implementation of a fire department fitness/wellness program will reduce the number of firefighter fatalities and injuries. According to the National Fire Protection Association (NFPA) Technical Committee on Standard 1583 “...believes that a health-

related fitness program will contribute significantly to reducing fire fighter fatalities and injuries” (NFPA, 2000, p.2).

Relevancy to the Executive Development Class

This Applied Research Project (ARP) relates to the professional development unit taught in the *Executive Development* course of the Executive Fire Officer Program (EFOP). This project would enable personnel to evaluate their current level of fitness/wellness and prioritize strategies for personal growth.

Relevancy to the United States Fire Administration Operational Objectives

The third USFA Operational Objective is to reduce the loss of life from fire of firefighters. Increased wellness/fitness of firefighters will improve their performance on the fireground and reduce their risk of cardiovascular disease as well as reduce the probability of suffering a heart attack from stress and overexertion.

LITERATURE REVIEW

“The relationship between the soundness of the body and the activity of the mind is subtle and complex. Much is not yet understood, but we know what the Greeks knew: that intelligence and skill can only function at the peak of their capacity when the body is healthy and strong, and that hardy spirits and tough minds usually inhabit sound body's. Physical fitness is the basis of all activities in our society; if our bodies grow soft and inactive, if we fail to encourage physical development and prowess, which will undermine our capacity for thought, for work, and for the use of those skills vital to an expanding and complex America” This quotation by former President John F. Kennedy clearly points out the importance of physical fitness (Corbin, 1988, p.13).

The former President's comments lead us to believe that fitness in general is the foundation of a nation. So, what impact does physical fitness have upon the members of the fire service?

Hazardous Occupation

The United States Fire Administration states, " firefighting is known to be one of the most physically and mentally demanding occupations today. Each year, over 50 percent of the firefighters who die in the line of duty succumb to heart failure and other stress related problems" (Pearson, 1995, p.7). This is further supported by statistics presented [e]ach year, by the International Association of Fire Fighters death and injury surveys which demonstrate that firefighting remains one of the most dangerous occupations in the United States. Research has repeatedly shown the need for high levels of fitness to perform safely in the fire service. (IAFF, 1997, p.3). According to Dr. Michael Fragen, M.D., "Firefighting is one of the most hazardous jobs in America, [I]njury rates are four to five times higher than other occupations. Providing care for these important emergency response personnel includes setting up and overseeing department fitness programs, because metabolic de-conditioning is a preventable risk factor in the life of a firefighter" (Fragen, 2002).

Ironically, "[t]he fire service spends a lot of money researching equipment and hardware, yet these technologically oriented devices are external to the primary machine that fights the fire, namely the man inside the protective clothing" (Coleman, 1984). The risks being put upon these individuals are many as "Firefighters are exposed to a disproportionately high rate of fatalities, injuries and illness. The leading cause of death is heart attack; with sprains and strains the leading cause of injury. Cancer and

cardiorespiratory disease are the leading causes of illnesses. Studies shown that high levels of physical fitness are critical requirements of fire and rescue work". (Walterhouse, 1996, p.1). In fact, the risks are so overwhelming that [s]tudies seem to suggest that firefighters have from 2 to 10 times the risk of coronary heart disease as the general population (Pearson, 1995, p.10).

We know that [f]ire fighters must be ready day or night to go from a state of relative relaxation, even a deep sleep, to performing at full speed within seconds (Goodson, 1994, p.19). As a result, [r]epeatedly, research has shown the need for high levels of aerobic fitness, muscular endurance, and muscular strength to perform safely and effectively in the fire service (Tempe Fire, 2002).

Looking at the National Fire Protection Association's U.S. Fire Department profiles we find that fires account for 10% of all fire department responses, and structure fires made up only 3 percent of fire department responses. In short, the majority of all firefighter deaths and injuries occur in 3% of our responses (Davis, 2002, p.96).

Many occupational hazard surveys have ranked firefighting, coal mining, and police work as the three most dangerous jobs in the United States, in that order. Statistically, the number of on-the-job fatalities supports this conclusion. However, if premature heart attacks could be reduced by proper health promotion programs, police work and firefighting would be about as hazardous as construction work, which ranks about 11th on most surveys (Jacobs, 1990, p.43).

The Problem

The problem of line of duty deaths is a serious one. It happens in the largest cities, in the suburbs, on the farms, and in small-town America. There are approximately

1.1 million firefighters in the United States, about 300,000 of them career firefighters. No firefighter is exempt from the potential of a line of duty death. Certain tasks and positions within the fire service may be less hazardous, but no one totally escapes the risk, not the battalion chief, pump operator, or fire investigator. Cardiovascular disease is the primary cause of line of duty deaths (Hollins, 2000).

In recent years, firefighters have suffered cardiac arrest while operating fire apparatus. One firefighter suffered a cardiac arrest while driving a pumper to a fire call. Another firefighter, who was riding in front seat of the engine, was able to stop the pumper and begin cardiopulmonary resuscitation. The driver was revived (Hennessey, 1991, p.34). In another case, a firefighter parked the pumper in front of a well-involved house fire with occupants trapped inside. He collapsed on his way to the pump panel. He was also revived, but can you imagine the confusion and stress caused to the other firefighters on the scene (Hennessey, 1991, p.34).

According to annual IAFF death and injury surveys, the leading occupational related diseases causing premature departures from the fire service are heart disease and lung disease. Aerobic exercise may improve the individual resistance to these two categories of disease (IAFF, 1997, p.52).

According to Dr. John H. Knowles, a former medical director of the Massachusetts General Hospital, "Over 99 percent of us are born healthy and suffer premature death and disability only as a result of personal misbehavior and environmental conditions ... the individual has the power indeed, the moral responsibility to maintain his own health by observance of simple, prudent rules of behavior relative to sleep, exercise, diet, weight, alcohol, and smoking" (USFA, 1990, p.1-9).

Professional Athlete Comparison

There have been comparisons of the occupation of fire fighting and that of the professional athlete. The athlete however, generally knows all the variables in their job. The firefighter does not have that luxury, [f]irefighters do not have the benefit of a groomed, level playing field, with trainers and coaches on the sidelines with oxygen, electrolyte replacement fluids, and fans or heaters to mitigate the effects of hostile weather conditions. The personal protective ensemble worn by structural firefighters today is just as effective at keeping heat in as it is at keeping heat out; so the very clothing that is designed to protect them actually increases the likelihood of heat related illness such as heat exhaustion or heat stroke. Also, the football team always confronts a numerically equal opponent. The fire department, on the other hand, arrives at the field of battle with a limited number (very limited in some jurisdictions) of personnel who often must call for help and then put forth a superhuman effort until that support arrives. But perhaps the biggest differences between pro ball players and firefighters are how they are recruited initially and how they are trained during their careers (Goodson, 1994, p.19). It certainly requires a higher level of physical fitness than any other lifelong career field. Obviously, being in top physical condition is a job requirement for professional athletes; it is a condition of continued employment. I contend that it is no less so for firefighters (Goodson, 1994, p.20). Firefighters and football players alike must be ready when called upon to put forth a maximum effort; however, the athletes know in advance, usually months in advance, when and where the contest will be held (Goodson, 1994, p.19). Supporting the professional athlete comparison, Dr. Howie Wegner says,

“Firefighters and hockey players have a lot in common. They must be properly equipped, skilled at what they do, and fit for the demands of their job.” “Being a firefighters like being an athlete. Fire fighting requires strenuous effort in difficult conditions. This calls for strength and good cardiovascular conditioning.” There is one striking similarity between hockey and fire fighting: both require going from “0 to 60” on a moment's notice. But there are differences, too. While the hockey player heads back to the bench for a breather after a minute or two, the firefighter may have to sustain the effort for an extended period of time. Hockey is very predictable-three periods, 60 minutes and it's done. A fire is anything but. In hockey if you're not ready, the worst that can happen is you lose the game. In firefighting, the losses can be much greater ... even tragic (Stewart, 2002).

Uncontrolled Variables

Not being able to control the work tasks is what makes firefighting the most physiologically challenging occupation. From the perspective of ergonomic design, what a firefighter does is simply not recommended. Firefighting is also contrary to all recommended and exercise guidelines. No exercise physiologist would advise the person to wait until 2:00 a.m., don heavy protective clothing, and work at an intensity level of 100 percent without warming up first, yet that is exactly what firefighters do (LeCuyer, 2001, p.15). And unlike many physically demanding jobs such as roofing or block masonry, in which workers adapt to a constant environment and a known level of physical requirements, firefighters face a different set of physically demanding conditions every emergency. On the fire ground performance is everything-the job is 90 percent physical. The fact that if a firefighter tried really hard but failed to get the job done is of

very little consolation to the family who has just lost a home, or worse, a loved one, to the ravages of fire (Sierra, 1997, p.5).

Stressors

Even though exercise has become less necessary as a part of normal work of many adults, the need for regular exercise is not decreased. If anything, it is increased. Though we do not have to flee from saber toothed tigers or fight wild animals for food, our bodies still respond with the fight or flight response. The businessperson's stomach "churns" before the important meeting and the anxious sports fans' heart beat increases during the close event. The body is readied for activity, but the activity never comes. As a result, many Americans lack physical fitness and suffer from hypo kinetic diseases, or diseases associated with inactivity (Corbin, 1988, p.2).

The physiological effect of the alarm on the firefighter has been researched. They showed as much as a 60 to 70 beat increase in heart action within 20 seconds after the alarms initial sounding (Barnard, 1975). This rapid heart rate can continue throughout the entire emergency and in a poorly conditioned body it's a fax may prove dangerous. The firefighters physical condition continues to be challenged after he leaves the fire station and before he actually reaches the emergency scene. It requires a high level of mental concentration and quick mental and physical reactions to safely maneuver an emergency vehicle through traffic. During the emergency-whether a large or small town department, does not increase or decrease the amount of a firefighters physical output. High physical demands placed on a firefighter, whether it is pulling a hose line up a steep

hill during a brushfire or carrying hose up several flights of stairs while wearing SCBA during a high-rise fire (Barnard, 1975).

This response to stressors has been documented in a 1983 study completed by Manning and Griggs. Their study was designed to maximize the emotional effect on heart rate while performing simulated fire fighting tasks. Three firefighters were monitored while completing typical interior and exterior fireground activities. Firefighter 1 had a heart rate increase from 100 beats per minute before the alarm sounded to a peak of 173 beats per minute within three minutes as he entered the house. His average heart rate was 163 beats per minute, or 90 percent of his maximum heart rate for the ten minutes he was inside the building. The second firefighter involved in the testing had a rate increase from 118 to 140 beats per minute before the alarm sounded. Two minutes later, his heart rate peaked at 183 beats per minute, or 95 percent of maximum heart rate as he entered the building to attack the fire. His average heart rate was 170 beats per minute, 80 percent of maximum for the 14 minutes he was inside the building. The third firefighter tested was assigned to tasks outside of the structure. He also did not breathe from an SCBA, but did where the tank during the fires. In the first fire, his heart rate rose from 104 to 158 beats per minute in one minute as he helped carry a ladder from the truck to the house. It peaked at 194 beats per minute, 92 percent of its maximum, five minutes later as he climbed the ladder. His average heart rate during this test was 174 beats per minute.

The high heart rates observed during firefighting evolutions are indications of heavy cardiovascular stress. The cardiovascular stress may be due to psychological stress

caused by the excitement and anxiety of firefighting as has been suggested in previous tests (Manning and Griggs, 1983, p.215-218).

Daily Inactivity Compounds Problem

Unfortunately, the typical job activities performed by firefighters do not provide adequate levels of activity to promote fitness (Pearson, 1995, p.14). As we know, the firefighter's day is much like the ride on a roller coaster. According to materials published by the National Fire Protection Association, "firefighting has many periods of inactivity, followed by sudden demand for physical strength and endurance" (Pearson, 1995, p.14).

One study estimated that public safety officers spend somewhere between 30 and 75 minutes a week performing critical tasks such as firefighting and arrest control. The central point is that firefighters and police officers typically spend only a small portion of their workday actually performing the heavy tasks, which naturally implies that the greatest percentage of their time is spent in low-level physical activity. In fact, looking closely at both police and fire activities, aspects of these occupations might well qualify them as being fundamentally sedentary. That's the nature of the job, and that is also part of a problem. Some busy fire companies may see a fire each day, but most do not. Once a month is frequent for many, and even a once a day response would be inadequate for the purpose of physical adaptation. If firefighters were battling flames all day long, there would be little need for physical supplementation (LeCuyer, 2001, p.12). "The levels of physical fitness required to perform these firefighting tasks efficiently and safely cannot be maintained by simply performing these tasks of the scene of fire. These fitness levels must be acquired and maintained through regular participation in a physical fitness

program....” (Gebhardt, 1990). Also boredom from inactivity while simultaneously trying to remain alert for an alarm can grow into a stress filled situation. Fatigue from boredom is also a common result of the waiting game in the fire service (Barnard, 1975, p.146).

America Burning

The National Commission on Fire Prevention and Control was organized in the early 1970's to identify our country's fire problem and search for solutions to the problem. America burning: The Report of the National Commission on Fire Prevention and Control was published in May 1973 (Davis, 2002, p.86). America burning represented the first complete study of the fire problem. The commission estimated that each year fire caused: 12,000 civilian deaths; 300,000 civilian injuries; \$11 billion in property losses; and 175 firefighter deaths. The commission developed 90 recommendations to help reduce the losses caused by fire. These included improved firefighting turnout gear, and breathing apparatus, and studying firefighter deaths and injuries to determine ways to reduce them (Davis, 2002, p.88).

So here we are, 30 years later. In that time we've made great strides in improving the fire problem. Some of these: the creation of the U.S. Fire Administration the National Fire Academy; the development of NFIRS- our national fire incident reporting system- a system in which a very low percentage of fire departments participate; the development of 77 new NFPA standards relating to all aspects of the fire service; the development of inexpensive, better operated smoke detectors for the home; the development of quick response residential sprinkler protection; a total redesign of firefighter protective clothing, equipment and SCBA; the development of PASS devices; the development of

Class A foam and compressed air foam systems (CAFS); the availability of thermal imagers; the development of state fire training programs and fire service certification systems; the development and adoption of incident management systems; the “two in, two out” concept; the development of the concept of rapid intervention teams; the development of N F P A 1500 and numerous related fire fighters' safety programs... (Davis, 2002, p.88).

One would think with all of these and other changes we have made that the fire problem would be far less costly than it was 30 years ago. In June 2001, the NFPA released the report, titled “The Total Cost of Fire in the United States” based on data collected in 1998 it was estimated at \$123,400,000,000 including 91 firefighter deaths and 87,500 firefighter injuries. Realistically, the cost in terms of firefighters lives and injuries and dollars expended on fire nationally certainly makes one wonder whether the work we have done in the last 30 years has had any effect on the fire problem of all (Davis, 2002, p.92). LeCuyer concurs with Davis stating: [m]any new safety items have been introduced over recent years, such as the incident command system, accountability systems, personal alert safety systems, and improved personal protective equipment. If the safety measures previously mentioned were effective, and there's little reason to believe that they aren't, then something other than those measures is preventing the injury rate from dropping. The unrecognized variable, I would contend, is the physical condition of the individual firefighter (LeCuyer, 2001, p.10).

Although technology has provided industries and the fire service with efficient high-quality equipment and tools, the primary work tasks of the fire service have changed little. Firefighters still drag hose into burning buildings, carry out the victims, and swing

axes. Since today's firefighters, like their predecessors, continue to work in a mode of heavy manual labor, it seems logical that they wouldn't suffer the consequences associated with a sedentary lifestyle. Ironically, they do, and to a greater degree than the general population, including other heavy labor occupations. Although the physical demands of firefighting have changed little, the off-duty lifestyle has changed dramatically, and the gap between the physical demands of home and work are far more pronounced (LeCuyer, 2001, p.7).

Despite all the advances of, some parts of this job have not changed. Fire fighters must work in extremes of climate, exposing themselves to a temperature so hot that without adequate protection, life expectancy is only a few minutes. The weight of the equipment and tools used by firefighters has been reduced; still, the weight of water and the pressure at the hose nozzle during delivery have remained the same for years. Much of the firefighters work is still done the hard way, by manual labor (USFA, 1990, p.1-1). This project discovered the poor physical conditioning has a direct effect on firefighter longevity. There's little argument about the fact that no matter how well firefighters are protected by their turnout gear, if the same firefighters are not physically fit, they are in as much danger on the fire ground as if they have run into burning buildings without a SCBA. As a whole, the fire service has spent millions of dollars over the past 20 years providing better protective equipment for firefighters, which has saved hundreds of lives and prevented numerous injuries. However, this work has scarcely put a dent in the leading cause of firefighter fatalities-heart attacks (Hennessey, 1991).

Fatality Data

In July 2002, the National Fire Protection Association released a startling report regarding firefighters fatalities. Although the report, U.S. Fire Service Fatalities in Structure Fires, 1977 to 2000, says the annual number of firefighter deaths at structure fires has dropped 59% since 1977, it also shows that the annual number of structure fires in that same period has dropped 54%. In the late 1990's, the rate of firefighter deaths in structure fires was no lower than it was in the 1970's (Davis, 2002, p.92).

On October 23, 2002, the United States Fire Administration released a comprehensive study, which examines the causes of deaths for on duty firefighters. The U.S.F.A. Firefighter Fatality Retrospective Study: 1990-2000 is an in-depth analysis as to the causes for more than 1000 on duty deaths which occurred in the United States during the last decade of the 20th century. The key findings of the study include: the leading cause of death for firefighters is heart attack at 44% (USFA, 2002, p.1). You can go back in time, year after year, and find the same data. NFPA's report shows that 57 fatalities were attributed to stress and overexertion in 1999. Fifty of those fatalities resulted from heart attacks, which annually have accounted for half of the total deaths (NFPA, 2000). Heart attacks continued to be the leading cause a fatal on duty injury to U.S. firefighters (40 deaths, or 39 percent of all firefighter deaths) last year according to report just released from N F P A. There were 102 on duty firefighter deaths in 2000 (NFPA, 2001). Stress and overexertion, usually resulting in heart attacks, continued to be the leading cause of fatal injury, as it has been in almost all the years of the study. All 40 stress related deaths resulted in heart attacks. The largest portion of deaths, 40 percent, was due to heart attacks. All the heart attack deaths in 2001 were attributed to stress and

overexertion. Heart attack is typically the leading nature of injury and usually accounts for close to half of the total deaths... (NFPA, 2002, p.3).

Additionally, [h]eart attacks account for a higher proportion of the deaths among older firefighters, as might be expected. Two out of three of the firefighters over age 50 who died in 2001 died of heart attacks. The youngest heart attack victims were two 27 year-old firefighters-one had no known existing health condition while the other was found to have a previously undetected heart defect (NFPA, 2002a, p.4).

With all of this clinical data, year after year, we still seem to not fully understand the problem. As George D. Miller, N F P A's President and CEO, said, " so much more, though, has to be learned as to why cardiovascular illness is cited so often for these deaths and how we can all work toward eliminating this as a cause" (NFPA, 2001).

A fellow EFO candidate put it succinctly by writing, [c]osts associated with firefighter injuries and deaths are too high, both physically and fiscally, when a solution exists to eliminate a potentially large portion of the problem (Bass, 1991, p.16).

NIOSH Research Data

NIOSH- The National Institute for Occupational Safety and Health, investigates line of duty deaths in the fire service. They publish those results in a publication called "Death in the line of duty". This author reviewed twenty NIOSH reports investigating cardiac related deaths. In all of those reports, NIOSH recommended these two basic fundamentals, (1) annual medical evaluations, and (2) reduction of risk factors for cardiovascular disease by offering a wellness/fitness program for firefighters (NIOSH, 2002, p.1).

Effect of PPE

At the University of Maryland, Davis and Santa Maria tested cardiovascular responses on firefighters who wore protective equipment while walking on a treadmill. Each firefighter participated in two separate six-minute walking exercises. One episode included walking with full turnout gear, with S C B A; the other while wearing a duty uniform and no turnout gear. During this test, physiological measurements, including heart rate, blood pressure, and oxygen consumption, were made. Wearing protective gear was found to increase these physiological measures by one-third compared to walking on the treadmill wearing only duty uniforms. The need for increased fitness, therefore, becomes immediately apparent. These findings indicate that before firefighters do any work at the scene of the fire, they're already one-third less efficient than if they were not wearing the 50 lbs. of equipment required to protect them. These results strongly suggest that the breathing apparatus was responsible for the largest decrease in performance (USFA, 1990, p.1-2).

Other researchers found that [f]irefighters PPE reduces work capacity by 30 percent, and the protective gloves reduce its grip strength by 40 to 60%. In general, the bulky nature of protective apparel makes and the wearer's mobility akin to that of a two year-old in a snowsuit trying to walk through a drift (LeCuyer, 2001, p.15).

Additional concerns besides weight, bulk, and grip strength indicate that [w]hile protective equipment has been designed to keep heat and fire away from the firefighter; it also limits dissipation of body heat generated during physical work, creating a secondary heat environment. This secondary heat environment typically results in reduction of body fluid in excess of 10% (USFA, 1990, p.1-5).

What is Physical Fitness

Physical fitness has a number of definitions. Generally, fitness is thought as of the ability to perform your daily job with sufficient reserve to respond to unforeseen emergencies. The major components of physical fitness have a number of sub components, but they may be divided into three general areas: aerobic, for cardiovascular fitness; muscular fitness; and body composition. The muscular dimension can be further divided into the elements of strength, muscular endurance, and power. Flexibility is frequently listed as the fourth dimension of muscular fitness (USFA, 1990, p.1-8).

The recommendation that firefighters stay active and fit is certainly not new. As Salt Lake City firefighter Lou Manning, the oldest active firefighters on the department recalled that, “ the training manual, long before [he] came on-the-job [in June of 1959] said, firefighters should participate in ball sports and weightlifting activities to improve eye hand coordination and body strength” (Hansen, 2001, p.8).

According to the Los Angeles's City Fire Department physical fitness manual, the basic duties of firefighter require “ physical performance calling for above average ability, endurance, and superior condition, including occasional demand for extraordinary strenuous activities in emergencies, under adverse environmental conditions, and over extended periods of time; requires running, walking, difficult climbing, jumping, twisting, bending, and listing over 25 lbs.; pace of work is typically set by the emergency situation” (Gratz, 1988).

Critical Component

According to Dr. K. Cooper, “ to function properly, the human body should be in a state of balance; neither too much or too little food, work, exercise, stress, or rest-a state of

well-being” (Cooper, 1982, p.11). Repeatedly, research has shown the need for high levels of aerobic fitness, muscular endurance, and muscular strength to perform safely and effectively in the fire service (IAFF, 1997, p.43). Aerobic fitness is fundamental to the health, safety and performance of all uniformed personnel. A program of regular aerobic exercise can help improve cardiovascular fitness and maintain normal body composition, weight, blood pressure, cholesterol, and blood sugar. In fact, an analysis demonstrated that inactive persons have a 90 percent higher risk of heart attack than physically active persons. Numerous studies have demonstrated the necessity of meeting high level of aerobic capacity for fire service duties. Measurements of heart rate response taken during normal firefighting tasks have been shown to be at, or near, maximal levels. In addition, the oxygen consumption rates associated with the performance of live fire, rescue and suppression tasks fall within the range of 60 to 80 percent of maximum (IAFF, 1997, p.52). The cardiovascular, respiratory, and thermoregulatory strain resulting from the performance of work at this high level of intensity is profound. Thus, optimal aerobic capacity is essential for the safety of the member and the performance of his or her job (IAFF, 1997, p.53). Fire departments with members who are medically, physically, and mentally fit will provide better service to their communities year after year while realizing reductions in disability retirement by their uniformed personnel (IAFF, 1997, p.5).

Injury Data

According to a United States Fire Administration study, strains, sprains, and muscular pain account for approximately 29% of the 88,500-firefighter injuries in 1999. Almost one fifth of all injuries were caused by overexertion or strain (USFA, 2002). This

trend is supported by [s]tatistics from the Seattle Fire Department which showed that roughly 21 to 26 percent of firefighters reported injuries each year and about 50% or more involved sprains or strains, including muscles, joint, pinched nerves, and slipped discs (Pearson, 1995, p.8). In 2000, the leading causes of the fireground injuries were overexertion and strain, which were responsible for 31.4% (NFPA, 2001). LeCuyer concurs stating; [w]hen back injuries represent the greatest percentage of overexertion injuries, and 70 to 80 percent of back injuries can be attributed to inadequate muscular strength, than one can only conclude that increasing the strength of the lower back could result in a significant decline in the rate of such injuries (LeCuyer, 2001, p.10). The [r]ising numbers of incidents and costs associated with firefighter injuries, disabilities and other related time off from the job due to possibly unfit firefighters has led fire departments to look at a fitness/wellness program (Kluck, 1995, p.2).

Can Fitness Reduce Injuries

When asked in 1894 as to why he allowed and promoted exercise on company time, John H. Patterson, founder of the National Register Co., responded, " it pays"(LeCuyer, 2001, p.4). According to Prichard and Potter, fitness Systems, a preeminent provider of fitness program services for corporate America, reports reduced health care costs of from 200 to \$600.00 for fit employees, lower absenteeism, and enhanced productivity. Other providers in organizations, such as Coors brewery, have reported similar results, with an average return of three to \$5.00 for every dollar spent. Pritchard and Potter state that the most compelling evidence for the success of such programs is revealed by the insurance industry, which presumably has the most data on

health care costs and mortality rates. Proportionally, insurance companies have more fitness/wellness programs and that any other industry (LeCuyer, 2001, p.5)!

Wellness programs have repeatedly been shown to provide long-term savings. Many large corporations, including AT&T Communications, Union Pacific Railroad, DuPont Chemical Co., and the Travelers Corporation report returns of \$1.50 to \$3.40 for every dollar invested in their wellness efforts (IAFF, 1997, p.5).

One of the pioneering experiments in the U.S. to prove that fitness programs to be cost-effective in improved productivity is the National Aeronautics and Space Administration's employee fitness program which was started in 1968 at NASA's Washington headquarters. NASA provided a thrice-weekly exercise program for 259 men aged 35 to 55. After one year in the program, the participants completed questionnaires and underwent a thorough medical examination. The findings were most impressive. One half of the regular participants reported improvement in on-the-job performance and better attitudes toward their work. Of the occasional participants, 12% reported similar performance and attitude improvement. Nearly all the regular participants said they felt better; 89% reported improved stamina, and nearly 45% reported sounder sleep. More than 60% lost weight. Many participants quit smoking or cut down, and nearly 50 percent said they were paying more attention to their diets. Most importantly, there was a "highly consistent and positive relationship" between the perceived benefits of a program and the results of the medical tests (NFPA, 1990, p.41).

In the early '80s the International City County Management Association released a document reporting budgetary savings in cities with physically fit firefighters. Although documentation to support the introduction of fitness programs for public safety

personnel has been available for approximately 30 years, the fire service and police have been relatively slow respond (LeCuyer, 2001, p.5).

Well-designed physical fitness programs had been proven to reduce the incidence and severity of on-the-job injuries, which result in lost time and unnecessary medical costs (Pearson, 1995, p.7). Other research proves that well designed and managed care service fit as programs result in improved job performance for participants, a reduced incidence and severity of on-the-job injuries, and lower costs (Pearson, 1995, p.8). Several fire departments have documented that improved fitness results and significant cost savings through reduced incidence and severity of on-the-job injuries. Of particular note are reductions in back injuries and improvement in heart disease risk factors (Pearson, 1995, p.9).

According to Captain Charles Procter of the St. Louis Fire Department, there fitness program has been particularly helpful in reducing injuries: “we instituted a fitness program several years ago because we want to improve our overall fitness levels and reduce injuries. Recently we begun and injury tracking program and it shows our firefighters are getting fewer injuries, and the ones they do get are less severe” (Bey, 1992, p.42).

Palm Beach County Fire-Rescue found [a]fter 10 years of research and development, the program reached a culmination point and has been implemented at a time when concern for the health and safety of fire and emergency personnel has been universally identified as one of the biggest challenges facing today's fire service. Since its inception, the wellness program has proven to be cost-effective in the reduction of sick leave use, medical related costs, and fitness related problems. It will ultimately result in

fewer work-related illnesses/injuries, workers' compensation costs, and long-term disabilities to firefighters (Bielecky, 1997, p.1). There was an approximate 70% decrease in the use of sick leave for combat firefighters in 1997 when compared with data from 1996. This represents an average of five additional personnel daily or 15 total personnel over the three shifts. The cost of hiring 15 new firefighters would cost approximately \$700,000.00. Overall the number of total sick leave decreased from over 64,000 hours in 1996 to less than 30,000 hours in 1997, a remarkable decrease in utilization (Bielecky, 1997, p.8).

One of the earlier studies examines the feasibility of using a physical fitness program to address health problems and injuries of firefighters within the Los Angeles County Fire Department. The 14 years study, beginning in 1970; reported heart attacks to be 2.6 times more frequent among firefighters of lower work capacity as compared with firefighters who were more physically fit. Additionally, The occurrence of back injuries among the former group was seven times greater. The program report documented a 25% decrease in workers compensation costs per hundred dollars of payroll, a 16% increase in work capacity, and a decrease in disabling injuries (LeCuyer, 2001, p.5).

Some short-term studies have reported improvements in job specific fitness routines, as measured by pre and post performance test times, in as little as 10 weeks (Obermeyer et al., 1995). Some show no reduction in the number of injuries but a decline in the severity of injuries. Other simply report their "satisfaction with beneficial results". One example that showed improvements in all fitness dimensions, with a

concomitant reduction in both occupational injuries and workers' compensation costs (LeCuyer, 2001, p.6).

The Los Angeles Fire Department found before the initiation of a physical fitness program in 1971-1972, on duty injuries had been increasing each year. By mid-1986, despite an increase of over 85,000 emergency calls, and a total force decrease of 169 firefighters, the number of injuries received on-the-job had decreased substantially (USFA, 1990, p.1-4).

The San Jose California Fire Department put their fitness program to the test by looking at data over a four year period, from 1994 to 1998, lost work days decreased 22%, and incurred cost rate went down 12%, hospitalization payments fell 27% and indemnity payments diminished by 59%. In addition, we found the disability salary payments were three and a half percent less for program participants than non-participants (Scully, 2000).

One California fire district participated in a two-year study. The purpose of this study was to examine the effects of a wellness program on occupational absenteeism among firefighters. Thirty-nine male firefighters participated in this two-year study. Results indicated that the fire district experienced 1,324.75 total hours of lost time due to work related injury in the two years prior to implementation of the program. During the two-year wellness program, only 296 hours of lost time from duty related injuries were reported. This equated to a 447 percent reduction in injury related absenteeism. In the two years of a wellness program, the department was able to realize a monetary benefit of \$68,741.00 (Stevens, 2002).

In an Oxnard California Press Release, [a]ccording to Marie Taylor-Briggs, the city's safety and wellness specialist, the wellness program cost the city approximately \$250,000.00, and she expects an even higher reduction in workers compensation. "The injury rates have come down tremendously," said Briggs. "We have 100% compliance in the participation of the program. All our firefighters are utilizing the new equipment and working out every day. They have also completed their new annual physicals and are working towards their individual personal fitness programs" (City of Oxnard, Ca, 2001).

Jane Enger, wellness coordinator for Savannah Georgia says, since that program began, the city's health-care costs have risen just 6%, compared with 14 percent for the nation. The city's 202 firefighters have bolstered their endurance level with daily aerobics, and the 525-member police force will soon follow in their footsteps (Kobell, 1994, p.7). Absenteeism and sick leave are down and employee morale is up, according to Wilbert Wingfield, benefits administrator for Charlottesville Virginia. In Birmingham, Alabama, the results showed a 10 to one return and held costs to the city over a five-year period. Birmingham officials saved 10.5 million in health care costs over five years as a result of their prevention efforts (Kobell, 1994, p.8).

"A study in the early 1990's, where, using a randomized, stratified sample. It examined sick leave in the department in Wichita, Kansas. Before the fire department implemented a mandatory fitness program, it was using sick leave at the same rate as police department. Within a year, the fire department was at half the level of the police department. The Phoenix Fire Department has witnessed similar results. In the six years since instituting a comprehensive wellness and fitness program, the severity of injuries in the department decrease 46% (Formichelli, 2001, p.36). In January 1987, the City of

Phoenix, Ariz. conducted an audit of their disability retirement program for all city employees. The annualized cost of disability pensions for the firefighters was \$100,000; for police officers, with twice as many personnel as fire department, the annualized cost was \$721,000; and, for general city employees, with five times as many personnel as the fire department, the annualized cost was \$623,000. The reduced disability pension costs for the Phoenix Fire Department reflects their 12-year commitment to effective wellness program and thorough rehabilitation for all firefighters. (IAFF, 1997, p.5).

After completing his applied research project, Daniel Drake believes the implementation of a wellness fitness program in his department will result in an approximate one million dollar cost savings, which represents a 94% overall cost reduction in workers compensation costs. Additionally, in a discussion with Orange County Fire Authority Risk-Management, there is a potential cost savings on annual workers' compensation insurance premiums with implementation of a wellness program (Drake, 2001, p.16).

In 1988, firefighters from the Hazel Crest Fire Department in Illinois began participation in a fitness program. Firefighter's are required to perform a prescribed program of exercise three times a week for 30 to 45 minutes. Once a month, the firefighters were required to attend an exercise session during which their pulse and blood pressure were checked before and during exercise. The firefighters were told how they were progressing and their exercise programs were adjusted every four weeks as conditioning improved (Berk & Crumrine, 1990).

The City of Portland Oregon found benefits of a fitness program as well. Portland's issues included increasing emergency incidents, shrinking staff and high rates

of injuries. Retired division chief David A. Norris stated, “even though we have greatly increased our staff our risk exposure to more and larger fires and two other emergency situations, both are total and lost time injuries have begun the decline”(Norris, 1993, p.32).

Regarding a program in Aurora, Colorado it was determined [o]nce the program became mandatory, with associated mandatory testing, the injury rate dropped 50% average for the last five years a significant decrease in total on-the-job injuries was also noted. Furthermore, since 1990 injuries have declined with concomitant rise in the member’s fitness score average. The more physically fit the firefighters are, the fewer the injuries (Bennett, 1997, p.30). The most direct way to understand if the program is cost-effective was to relate workers' compensation costs to the physical fitness program cost. An average of workers' compensation costs paid for the first two years of a mandatory physical fitness program 1991 and 1992 compared to last two years 1995 and 1996 demonstrated a reduction in the workers' compensation costs of nearly 300 percent or \$118,800.90. The cost of a mandatory physical fitness program was \$5,000.00 per year (Bennett, 1997, p.31).

During a six-month period in 1982, a number of career firefighters from Prince George's County Fire Department and the Fredericksburg Fire Department participated in a voluntary fitness program. The participants were tested at the beginning of the program and then retested in six months. The results of the retesting were very impressive. The Prince George's County participants showed a reduction in blood pressure in 78 percent of the participants, the resting heart rate was lowered in 69 percent of the participants, body fat was reduced in 81% of the participants, and flexibility was increased in 84% of

the participants. Overall aerobic capacity factor was increased in 93% of the participants (Howe, 1983).

Research shown in several cities, the addition of only a physical fitness program has reduced injuries. Any reduction in the rate of injuries will have a positive effect on workers compensation costs. A department with a comprehensive wellness program can expect to receive cost savings for reduced workers' compensation costs, reduced sick leave usage, and reduced health care premiums (Matejka, 1997, p.17).

It's unlikely that all firefighter injuries can be eliminated. However, a risk-management system in the application of existing technology can reduce injury levels, lost time, and medical costs. A safety and health program is also beneficial reducing injuries (NFPA, 2001, p.52).

Benefits of Fitness

The physical benefits of aerobic, strength and flexibility training have been documented for the general population, as promoted by the President's Council on Physical Fitness (Walterhouse, 1996, p.4). These benefits of wellness for uniformed personnel are many. They include: greater strength and stamina; weight reduction and or control; lower cholesterol and blood pressure levels; decreased risk of death, injury, or disability from disease; heightened job performance and enjoyment from work; improved performance in physical activities; better posture and joint functioning; reduction of anxiety, stress, tension, and depression; increased energy, general vitality and mental sharpness; enhanced self-esteem and self image; more restful and refreshing sleep; enhanced capacity recover from strenuous and exhaustive work; increased tolerance for

heat stress and more effective body cooling; and improved mobility, balance and coordination IAFF, 1997, p.3).

Increasing amounts of body fat seriously impede performance in three different ways: First, the extra mass is a metabolic burden to the body. Extra fat is no different than weights strapped on a person's back. To move this weight takes extra effort, and subsequently greatly shorten your ability to perform sustained, arduous work. Second, extra fat is an insulator and interferes with the body's cooling process. An increase in core body heat under hard working conditions leads to accelerated fatigue. Third, there is a physiological burden imposed on the circulatory system. The extra blood vessels need to have blood pumped through them to support all this extra tissue. This physiological burden will also manifest itself through the fatigue of a musculoskeletal system that must support all this excess weight (USFA, 1990, p.1-15).

The heart is a muscle, which, like any other muscle, requires physical activity to maintain its tone and function. Exercised adequately, the heart becomes more efficient, greater amounts of work to be performed at lower heart rates. A high level of aerobic fitness, combined with a low level of risk factors for cardiovascular disease, can help provide firefighters with survival insurance in their hostile working environment (USFA, 1990, p.1-10).

“When we implemented the program, we saw an immediate improvement. Over the long-term results were even more dramatic. Comparing an initial fitness assessment of our firefighters in December 1992, with a second assessment taken five months later, we found 80 percent had lost weight. Overall, there was a 90% increase in flexibility,

almost 90% increase in muscular fitness, and an 80 percent improvement in cardiovascular fitness” (Hawbaker, 1994, p.3).

For example, people who exercise properly are not likely to be over fat. People who are not over fat have fewer back injuries. People who have fewer back injuries are less likely to be disabled. People who are less likely to be disabled are less likely to incur compensation costs to an employer. Therefore, it could be concluded that a fitness program that encourages people to exercise properly is a sound economic investment for any city or town (NFPA, 1990, p.41).

You might not have even known or thought of all the implications of not exercising. But if you recently started to exercise moderately and gradually increased the intensity and duration, you’re improving all of those health related variables without even thinking about it. Your quality of life in the present and future will be that much better (Loy, 2002).

Physical Evaluations

National Fire Protection Standards clearly call for physical evaluations of all department members. NFPA 1500, states; [c]andidates shall be medically evaluated and certified by the fire department's physician. Medical evaluation shall take into account the risks and the functions associated with the individual's duties and responsibilities (NFPA, 1997, p.8-1.1). NFPA 1582, goes on stating; [t]he implementation of the medical requirements outlined in the standard shall help ensure that candidates and current members are medically capable of performing their required duties and shall help to reduce the risk of occupational injuries and illnesses (NFPA, 2000c, p.1-2.2). In addition to the annual medical evaluation, the fire department shall include a medical examination

according to the following schedule: Ages 29 and under at least every three years, Ages 30 to 39 every two years, and Ages 40 and above every year (NFPA, 2000c, p.2-4.1.3).

NFPA 1500 also references frequency of evaluations stating; [m]embers who engage in emergency operations shall be annually evaluated and certified by the fire department as meeting the physical performance requirements specified in 8-2.1 of this section. Members who do not meet the required level of physical performance shall not be permitted to engage in emergency operations (NFPA, 1997, p.8-2.4).

When the NFPA, the Bureau of Labor statistics, and the IAFF collect injury data, one of the most important pieces of information not solicited is the physical condition of the injured or deceased employee. It is been estimated 80 percent of the firefighters who die while on duty had a related medical history and, according to NFPA 1582, Medical Requirements for Firefighters, should not have been assigned to fire suppression (LeCuyer, 2001, p.10).

Case in point, [o]f the 40 heart attack victims in 2001, 10 were known to have had prior heart problems-usually prior heart attacks or bypass surgery- and medical documentation showed that another 11 had severe arteriosclerotic heart disease and three were diabetic (NFPA, 2002a, p.4).

Required Fitness Program

According to NFPA 1500; [t]he fire department shall establish and provide a physical fitness program to enable members to develop and maintain an appropriate level of fitness to safely perform their assigned functions (NFPA, 1997, p.8-3.1).

However, less than 1% of fire departments have implemented a wellness/fitness program. There's a saying in the fire service: “ if you hire good people, provide them with training

and equipment, maintain their fitness and health, then you'll have capable firefighters serving the public for it least 20 years.” Unfortunately, the nation is failing to provide those things to our heroes and as a consequence we are losing experienced firefighters to illnesses, injuries, and death (Nesbitt, 2000). A physical fitness, health and wellness program should be an objective of every fire department as a means for reducing firefighter injuries and deaths. The goal of the comprehensive IAFC/IAFF Fire Service Joint Labor-Management Wellness-Fitness Initiative is to improve the quality of life of all fire service personnel. The comprehensive approach to wellness/fitness will result in significant cost savings in reducing lost work time, workers compensation and disability (IAFC, 2000).

Risk Reduction

There are many risk factors that can predict a person's chances of developing heart problems.

1. Age-the fact remains that the risk of heart disease increases with age.

Another factor to consider with the rising age of firefighters is a diminishment of their cardiovascular fitness.

2. Gender- medical surveys show that men have a higher rate of coronary heart disease than women. Since majority of active firefighters are male, it is evident that most firefighters are risk.

3. Heredity - heart disease is known to run in families. If close family members were victims of angina or heart attack at an early age (40's), then you will be at a higher risk of developing the same problems.

4. High blood pressure- the risk of heart disease is higher in individuals who have high resting systolic blood pressure. Hypertension is associated with a higher level of coronary heart disease, congestive heart failure, and stroke. Reduction of blood pressure through treatment has been shown to be effective against cardiovascular disease.

5. Blood cholesterol levels- there is no recognized safe level of cholesterol, but as blood cholesterol levels decrease, the risk of developing arteriosclerosis decreases as well.

6. Obesity-Obesity is defined as 20% excess over a person's ideal body weight. Being overweight alone does not contribute to heart disease, but it does increase hypertension and elevate blood cholesterol levels.

7. Smoking- in 1979, the U.S. surgeon general reaffirmed the fact is cigarette smoking is dangerous to one's health. Repeatedly, the American Heart Association has stated that cigarette smoking is a leading cause of heart disease, but people still smoke. Due to the rate of cardiopulmonary disease in the fire service, caused by exposure harmful substances on the job, many fire departments have established a no-smoking policy for employees both on off duty. In some states, cardiopulmonary diseases in firefighters are considered to be job-related injuries.

There is significant research showing that if a person could stop smoking, the damage is reversible. The risk of heart attack drops by 50 percent after two years, further, after 10 years, research has shown ex smokers decrease their chances of lung damage inevitably and have about the same risk as those who never smoked.

8. Stress- there's evidence the stress and personality type our health risk factors.

Numerous experts cite the beneficial effect of exercise is a coping mechanism and release for stress (Fackelman, 1991).

9. Exercise- Most fire departments do not have a formal or mandatory physical fitness program. To begin, stamina and cardiovascular exercise are the most important.

Exercise can be done around the fire station as part of the daily work schedule.

10. Diet- everyone, including firefighters, should watch how and what and what they eat.

A wholesome, well-balanced meal provides the necessary fuel to enable the body to perform at its optimal capacity. At the fire station it can be difficult to eat nutritious meals because of routine interruptions and the fashion in which people are fed (Hennessey, 1991).

In fact, according to executive health examiners (1983) “ every controllable risk factors associated with cardiovascular disease can be mitigated through exercise”. The Journal of the American Medical Association in November 1999 reported that those who exercise moderately, compared to those who do not exercise at all, reduce their risk of early death from cancer and heart disease by 50 percent (Pearson, 1995, p.24).

Knowledge is power. Armed with the knowledge of their health status, firefighters can take steps to improve their health and, consequently, their fitness. It's the responsibility of every member, from the chief to the rookie, to work together to ensure each other's health and safety. You need to be able to count on your fellow firefighters ability to perform. Our customers need to be able to count on their firefighters to perform (Loy, 2001).

Aging Firefighter's

Although aging is inevitable, there is great variability in the aging process. Research has shown a direct relationship between physical fitness and physiological changes that occur in the body due to aging. The rate of deterioration can be slowed by

the maintenance of adequate fitness levels through regular physical activity (Pearson, 1995, p.24). While you can't stop the superficial process of graying hair or wrinkling skin, you can preserve and extend your underlying functional work capacity. You've heard the popular axiom (and it's true) "use it or lose it." The body adapts to stressors placed on it-hard work, for example-by increasing levels of physical fitness. Conversely, when daily exercise or work is reduced, the body adapts by losing fitness. The normal age associated decline in aerobic fitness, one important dimension of firefighter fitness, is about 1% per year, or 10% per decade for the sedentary population. In physically active individuals, however, the loss is about 13% over 25 years (Davis,1994).

Age is an absolute measure, but aging is a relative measure. We all can relate to the changing perspective of what old is. From my children's perspective, I've been there for a while. Performance is another issue. Can I still do the things I did 20 years ago? Unfortunately, the answer is no, but I can rationalize this fact by recognizing that I don't train and work out to the same extent as I did 20 years ago. Obviously, we can maintain and improve to a certain extent, as we get older. There's a decrease of about 8% per decade of muscle strength after the age of 45. From the aspect of body composition, after age 35, the average person gradually gains body fat into their 50s and 60s. While body composition clearly can be affected by resistance training and appropriate nutrition, the point to be made is that without these interventions, you get fatter (Loy, 2001).

In an analysis of the relationship of aging and fitness it revealed that 50 percent of the loss of performance over the 30-year age range of the subject was attributed to lifestyle factors. We concluded that body fat-not aging-was to blame for the loss of performance on these particular fitness items. Maintenance of a program of body

composition can enhance performance in the over 40-age group by as much as 30% (USFA, 1990, p.1-7).

Statistics published by the U.S. Public Health Service indicates that in older age groups (55-64) where the greatest percentage of deaths in our society occur, the death rate from cardiovascular diseases is highest among firefighters and second highest among police officers. The death rate for atherosclerotic disease in firefighters of that age group is more than double the average death rate for all occupations (NFPA, 1990, p.43).

It's apparent that we must encourage our members to perform their cardiovascular and strength exercise programs. If we don't, there will be a decline in performance. Even if they do continue their program, there will still be a decline but will likely be much more gradual in nature. Firefighters need to have the fitness to do the jobs safely and effectively (Loy, 2001).

Out of Shape Firefighter's

You don't have to spend much time visiting fire stations anywhere in North America to see firefighters, both career and volunteer, who are obviously and seriously out of shape (Goodson, 1994, p.20). Between 20 and 25% of North American firefighters are unfit to participate in their occupations. One study even ranked the average firefighter well within the range of the normal sedentary population (Lemon, 1979). In an age when we've engineered the effort of daily living tasks, we basked in our indolence. We need a remote control to find the remote! We fight for parking spaces at the mall so we don't have to walk an extra 50 feet. We allow the electrification of America to remove the effort (and the joy) of climbing stairs, instead being perfectly complacent to

allow an escalator or elevator to lift us one floor. If the Darwinian model is to manifest itself through meditation, a few more millennia and we'll be without legs (Davis, 2000).

My opinion is that those firefighters that are grossly out of shape don't do such a good job! They perform marginally at best and are even a liability at the emergency scene. They're only able to continue doing the job because they're stronger, fitter counterparts make up for their marginal performance and because it is often difficult to see the difference between acceptable performance and poor performance of the fireground. Members of the public have no way of knowing whether they are getting superior or inferior emergency service from their fire department, but those who are doing the job know the difference (Goodson, 1994, p.20)!

I challenge you to answer the following questions: Do my co-workers depend on me? Am I fit enough to handle the tasks on the fire ground or other physically demanding emergencies? Am I still an asset to my crew, or have I become a liability? And I satisfied with how I represent myself to the public (Perry, 2000)?

If there ever was an occupation where so much depended on physical prowess, it's got to be firefighting. Knowing this, you'd think that we'd put the public's safety way ahead of our own selfish agendas. You'd hope that people who couldn't hack it would be embarrassed to take a paycheck for a job they aren't cut out for. Life is not pass/fail. While 80 percent of life might be “ just showing up,” this certainly doesn't include the fire service. People call you when they're having a bad day, and they expect you to show up with the resources and abilities to manage the situation. Since there is no “ standard minimum fire,” there's risk in assuming that the mediocre person will be up to the tasks (Davis, 1999). “We've [the fire service] closed our eyes for years when we've observed

male firefighters who were physically incapable of satisfactorily performing firefighting duties ... a certain number and up riding to and from fires but are incapable of critical fire suppression or rescue tasks” (Durkin, 1983, p.78).

Fit Firefighter’s More Effective

In another project, an evaluation of the relationship between a simulated job performance task and percent of body fat and lean body mass was evaluated. Results of the investigation found a statistically significant relationship between percent of body fat and the time to perform the job task. As the firefighters percent of fat increased, the time to perform the job task also increased (Williford, 1998). Highly fit firefighters took half the time to complete a series of simulated fairground tasks than did their less fit counterparts. The implications of these findings are even more striking when you consider the importance of fitness in extreme situations, such as having suddenly to free yourself from a back draft condition, or having to rescue a victim after carrying a hose up four flights of stairs (USFA, 1990, p.1-4).

“Physical fitness is a critical component of health and performance. Without high levels of fitness, fire and rescue workers can't do their jobs either safely or well”. This brings out the point that a firefighters performance and safety are directly linked to their health and fitness levels. Research exists relating fitness levels to job performance, injury rates, and job-related illnesses, and line of duty deaths (Pearson, 1995, p.6).

Lack of Financial Support

In his 1998 Applied Research Project, Albert Sierra stated, as an example, in fiscal year 1996-97 over 80 percent of Palm Beach County Fire Rescue’s operating budget was expended on salaries and benefits of its employees. However, this

expenditure does not include any expenses for fitness programs or annual physical examinations. Another three percent of the operating budget has been spent on the purchase and maintenance of firefighting related equipment. Palm Beach County Fire Rescue has aggressively implemented a preventive maintenance program for the vehicles and equipment it purchased during the same 13-year period (Sierra, 1998, p.7).

In the fire service will often take our primary resource, personnel, for granted. We plan for preventative maintenance on our apparatus and even establish a replacement schedule for these apparatus. Depending on the apparatus, replacement may begin as early as seven years. However, when we consider the career of the primary resource, the firefighter, we talk about 20 years or more. The problem facing the fire service is how to develop an effective and accepted preventative maintenance program for firefighters (Matejka, 1997, p.1).

Labor's Perspective

Firefighter unions' work hard to improve the economic status of their members. Equally, a wellness/physical fitness program will help all members perform their duties and allow them to enjoy the fruits of their labor when they retire (IAFF, 1997, p.4).

The firefighter combat challenge, authored by Paul Davis, has been the basis of much controversy since its development in the late 1980's. The test has five evolutions which are: high-rise stair climb, hoist evolution; forcible entry evolution, one-and-a-half inch hose line advance, and victim rescue evolution. Firefighters who can complete the above listed evolutions in the recommended time possess a level fitness necessary to meet most emergency demands. After action survey of test participants, 88% of the

firefighters felt that the test battery accurately reflected the relative demands of structural firefighting (Davis, 1989, p.4-5).

At the heat of the battle, the IAFF took the following position; [t]o best protect the members of the International, the only option is to oppose these events that led to a timed, task based physical performance test for firefighters for entry, promotions and continuation of employment. We support mandatory physical fitness programs, when mutually agreed upon by management and members, to assure a fit fire service (Duffy, 1996). During this battle, the lines were drawn, and many felt that labor's position was short sighted stating; [l]abor's attitude toward testing, unfortunately, seems to be that while physical fitness is important, anything that might cause the firefighter to lose his or job has to be fought. Union locals have been able, in many cases, to negotiate agreements that it back toothless "fitness programs" that are meaningless precisely because there is either no testing or no provision for negative consequences in the event of failure (Baltic, 1996).

In 1997, a new partnership was formed. Labor and management came together in the form of the IAFF/IAFC Fire Service Joint Labor Management Wellness Fitness Initiative. The objective of the fire service joint labor-management wellness/fitness initiative is to "build and maintain fit uniformed personnel," and to create a fire service health and fitness database (IAFC, 1998).

Building on the concept of partnership's to enhance the health and safety of firefighter's, [o]n September 1, 2000, staff from the periodical Fire Chief, interviewed incoming International Association of Firefighters General President Harold Schaitberger on the topic of cardiovascular disease. The question posed was, considering that 50

percent of firefighter deaths are from cardiovascular disease, what is your opinion of mandatory physical fitness programs? Schaitberger replied, "I really believe in it, and that's difficult for Chiefs to understand. I have to admit it is a very difficult concept, in that it's mandatory yet non punitive. That means you have to participate, but the participation is based on improving oneself, measuring improvement. The goal is to create a healthier firefighter, but non punitively and without actions being taken against an individual because of some measurement. The goal is to improve their health, to make them better, healthier firefighters living better and longer lives" (Wilmoth, 2000).

National Standards

When it comes to the topic of national standards, the water becomes slightly muddy. There are a number of documents that are considered "consensus standards". While many say they do not have the "force of law", they are often considered the "community standard". The controversial NFPA Standard 1500, issued in 1987, requires fire departments to "provide and require the structured participation of all members in a program to develop and maintain a proper level of physical fitness" (Hennessey, 1991). It shall be the responsibility of the fire department to research, develop, implement, and enforce an occupational safety and health program that recognizes and reduces the inherent risks involved in the operations of the fire department (NFPA, 1997, p.2-4.1). It continues, stating; [t]he fire department shall develop physical performance requirements for candidates and members who engage in emergency operations (NFPA, 1997, p. 8-2.1).

Although NFPA standards aren't law, they can be adopted as such by the authority having jurisdiction, and they had been sighted in case law has accepted safety and health

standards in the field. Noncompliance with NFPA 1500 isn't without risk, and complete avoidance, as some fire executives have chosen, won't be a supportable defense for whatever reason (LeCuyer, 2001, p.19).

Besides the NFPA standards, we must also be mindful of occupational safety regulations. The William Steiger Act creating the Occupational Safety and Health Act was passed in 1970. The legislation's intent was to ensure that employers and employees took reasonable precautions to keep their workplace safe for workers. Always a federal law, it seems that many of us in the fire and emergency services continued to see ourselves as different. As Alan Brunacini has said, “for the past 200 years, we have been providing a service at expense of those providing the service”. But [you] may say, “we're not in an OSHA state!” Or “NFPA standards are voluntary consensus standards-why do we need to follow them?” Ask yourself this, “What would be considered reasonable to protect workers' health and safety under the general duty clause in your jurisdiction”? My guess is that a panel of your peers would deem that to be NFPA 1500 (Ross, 2002).

Michigan is a state plan state, and we follow standards handed down by the Michigan Occupational Safety and Health Administration (MIOSHA). MIOSHA Part 74. *Fire Fighting*, lists the duties of the employer in Section 408.17411, Rule 711.(1) an employer shall comply with all of the following requirements: (b) Assure that prospective fire service personnel are physically fit and have the ability to perform assigned emergency operations (MIOSHA, 2001). MIOSHA Part 451. *Respiratory Protection*, lists the requirements for respiratory protection of employees. Rule 325.60052 Rule 2. 3)(e) Medical Evaluation. Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions

in which the respirators used, and the medical status of the employee. Accordingly, this paragraph specifies minimum requirements for medical evaluation that employers must implement to determine the employees ability to use a respirator. (e)(1) General. The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested and required to use a respirator in the workplace (MIOSHA, 1999).

Another regulation, which many people find difficult to fully understand, and follow is the Americans with Disabilities Act. The ADA prohibits discrimination against the physically and mentally disabled. The ADA draws on the Rehabilitation Act of 1973, which provides protection for people with disabilities (LeCuyer, 2002, p.20).

Many employers are wary of instituting or enforcing physical standards because of fear of discrimination litigation under the Americans with Disabilities Act (ADA) or other state handicap statutes. This fear should be dispelled because the ADA and its regulations clearly recognize the important interests in fire and emergency response, thereby allowing employers considerable latitude in setting physical standards so that firefighters can perform their “essential functions”, which times may require extreme physical exertion in fighting a fire or performing rescue (Lies, 1997, p.10).

Several major OSHA citations have been issued in the last decade. One in Washington involved the Seattle Fire Department and was based on an OSHA inspection following the highly publicized Mary Pang fire, which caused the deaths of four firefighters and injured two others. Alleged violations were based on failures to comply with OSHA and national consensus standards, including NFPA 1500. “... By its

authority under the general duty clause, OSHA issues citations to employers who do not follow these practices” (Lies, 1996, p.1).

Another incident occurred in Iowa with citations involving the Sioux City Fire Department and were based on extensive citation arising out of an explosion and fire at the Terra International Water Nitric Acid Plant. Alleged infractions were based on violations of OSHA’s *Hazardous Waste Operations and Emergency Response* (HAZWOPER) standard (29 CFR 1910.120) and *Personal Protective Equipment* (PPE) standard (29 CFR 1910.134) (Marsh, 1997, p.10).

Finally, Cal-OSHA ordered the California Department of Forestry to develop and implement a physical fitness program because two firefighters were killed when they could not outrun a vegetation fire (Jacobs, 1990).

These recent citations issued to fire departments serve as a learning example to all because they (1) indicate potential violation areas for other jurisdictions, (2) will serve as a basis for possible future regulatory standards, and (3) can form a basis for related civil liability in negligence for failure to comply with OSHA regulations or the national consensus standards (Lies, 1997, p.7).

The relationship between OSHA and NFPA standards becomes obvious. Ignoring the legal implications of non-compliance with OSHA can expose departments to significant liability (LeCuyer, 2001, p.20).

There are moral and financial arguments that suggest we should be following NFPA 1500. Clearly, protecting our members, diminishing accidents, and minimizing pain and suffering are the “right” things to do. Also, by realizing these goals, we can

save the department money in lost time, injuries, medical expenses, and rehabilitation (Ross, 2002).

Personal Responsibility

“The importance of achieving and maintaining firefighter fitness cannot be overemphasized. Just like their equipment, firefighters have an obligation to keep their most precious resource-themselves-in top working order (Bey, 1992, p.44).

As professionals, it is every firefighters responsibility to ensure that he or she has a physical capacity to execute the demanding tasks required to be safe and successful at the fire scene. There's no room for excuse or compromise when the job of firefighting is to be done (O'Connor, 1994, p.38).

Firefighters owe it to themselves, their families, their fellow firefighters, and certainly to the taxpayers whom they are sworn to protect, to achieve and maintain the highest level of physical fitness possible (Goodson, 1994, p.19).

Wellness is a personal commitment that all uniformed personnel must make to survive and to sustain a career in the professional fire service (IAFF, 1997, p.3).

Fire Chief's Role

The fire service is the most revered and respected public sector employer, and the public has very high expectations. Providing high-quality personnel should always be our first hiring objective (Davis, 1999).

It's the fire chief's job to ensure that excellent customer service for the committee is delivered by healthy firefighters with their performance enhanced by an atmosphere of workplace safety, regulatory compliance, and positive attitudes (IAFF, 1997, p.4).

Closing Comments

Physical fitness is attainable by almost anyone and the benefits are very clear. The choice seems too ridiculous to discuss yet many of this nation's firefighters are not taking advantage of this very inexpensive way to increase their life span and make life more enjoyable. They're physically and therefore, mentally unfit to meet the demands of the tasks they have to perform and do the things they wanted to do (Dangler, 1990, p.14).

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PROCEDURES

The research procedures used in preparing this document focused on four main areas, a literature review, a review of City of Portage Records, interviews with the IAFF Union President, the PFD Training/Safety Captain, and a survey questionnaire of PFD personnel. This research project employed descriptive and evaluative research methodologies to determine the current fitness status of department members and to bring about an awareness of the benefits of a fitness/wellness program to city administration.

Literature Review

A literature review was initiated at the National Fire Academy's Learning Resource Center (LRC), Emmitsburg Maryland during June of 2002. The sources of information included; periodicals, texts, journals, research papers, and Internet sources. A review of EFO research abstracts was completed to identify papers that pertained directly to the four research questions posed. This process produced twenty-two relevant papers that were further reviewed for content. Additionally, data from the Portage Fire Department and documents obtained through Inter-Library Loan were utilized.

The focus of this review was to gather available information regarding the potential benefits of firefighter wellness/fitness program, including data indicating reductions in line of duty injuries and impact on workers compensation rates.

Feedback Instrument

Descriptive research was used to gather information from career suppression personnel. A feedback instrument (Appendix A) was developed to gather demographic data from members of the Portage Fire Department relevant to their personal physical fitness. The survey was in the form of seventeen questions. Questions, (1-6) requested demographic data from the staff member (age, height, weight, sleep habits, and tobacco use). The remainder of the questions (7-16) pertained to the staff members exercise regimen, with the final question (17) requesting their opinion of their perceived fitness level. This convenience survey was distributed through electronic mail to all IAFF members of the Portage Fire Department. Thirty-one feedback instruments were distributed. Of that, 23, or 74.19% of those tools were returned for interpretation (Appendix B).

Interviews

Captain James Leve, President of IAFF Local 1467, was interviewed to gather the historical perspective of fitness activities within the Portage Fire Department. Additionally, Captain Stacy French, PFD Training/Safety Officer was interviewed to provide information on injury data within the fire department.

Assumptions and Limitations

An assumption was made that the respondents to the surveys understood each question and possessed the knowledge and ability to answer them accurately. Another

assumption is that the respondents answered all questions fairly and accurately. Next, it is assumed that the authors referenced in the literature review performed objective and unbiased research. It is also assumed that data collected from City of Portage records was accurate and reflects actual events. Lastly, due to the research abilities of the author, research materials related to this topic and this applied research project might have gone undetected which could have changed the results of the research.

Definitions

Wellness- is any activity, behavior, or attitude that improves the quality of life and enables daily functions to be performed with energy and interest.

Physical fitness- a state of optimal physical well-being.

RESULTS

Answers to Research Questions

Research Question 1

1. Would a formal fitness/wellness program benefit the firefighters and citizens of Portage by assuring the most physically capable personnel respond to emergencies within the city?

Research has shown that firefighters have between 2-10 times the risks of cardiovascular disease. Firefighters in good physical condition have more ability to process oxygen in their body during the peak demands which fire fighting places upon them. Fit firefighters are able to complete simulated fire tasks in half the time than their less fit counterparts. Risk factors are greatly reduced for those in good physical

condition. Fit personnel are far less likely to sustain sprain-strain type fireground injuries than those personnel in less than optimal condition.

Research Question 2

2. Due to the aging workforce of the City of Portage Fire Department, would a formal physical fitness/wellness program help to keep an adequate number of firefighters ready to meet the physical demands of their jobs?

The aging process is inevitable, however research has shown that physical fitness slows the effects of aging. Studies indicate that the average person loses about 1% of physical ability per year after the age of forty or about 10% per decade. Research has shown that fit firefighters have been able to hold that decline to about 13% over twenty-five years. Physical fitness also helps keep aging muscles and joints toned and flexible reducing the potential of injuries. Aerobic conditioning also helps keep the heart muscle in shape for the stressors of going from “zero to sixty” while responding to incidents. In the author's own department, over 70% of the suppression staff are over 40 years of age, with the average age currently 44. PFD injury statistics report that a majority of sprain and strain injuries, over 80% were to the over 50-age group of firefighters.

Research Question #3

3. Could a formalized physical fitness/wellness program in the City of Portage Fire Department help reduce the number of job related injuries and therefore reduce the number of lost workdays due to injury and subsequently reduce the workmen's compensation costs to the city?

Fire departments from Phoenix, Arizona to Prince Georges County, Maryland, and from Palm Beach County, Florida to Portland, Oregon have documented evidence of the value of fitness programs in injury reduction. Page after page of documents extol the reduction in sick time usage and on-duty injuries for staff members. Additionally, injuries that do occur usually are less severe and the employee has less time off from work than they would have prior to implementation of the fitness program. An interview with the PFD Safety/Training Captain found that a majority of firefighter injuries were the result of strains and sprains predominately affecting the over 50-age group. These injuries averaged three days of light duty work per incident.

Research Question #4

4. If a formalized physical fitness/wellness program were instituted in the City of Portage Fire Department, would this help meet state and federal occupational health and safety standards as well as National Fire Protection Association guidelines?

The literature review has established the fact that there are national standards relating to physical fitness currently. National Fire Protection Association consensus standards have been in effect for over thirty years. The Federal Occupational Safety and Health Act, and those states with state plans, such as Michigan's MIOSHA, reference many NFPA standards currently. NFPA 1500, NFPA 1582, and NFPA 1583 clearly require actions by the fire department and their Chief's to be fully compliant. Physical fitness programs are required currently, and medical evaluations are mandated by these standards. No matter which direction you go, the legal requirements are there.

Additionally, the inception of the IAFC/IAFF Fire Service Joint Labor Management Wellness Fitness Initiative could also be viewed as a national standard as both labor and management through their parent organizations have come to consensus and supported this fitness initiative. Fire service leaders should give their support to this program.

DISCUSSION

The fire service has made great advances in improving firefighter health and safety in the last thirty years. It appears however, that most of these great strides in safety have been the result of the technology age. Our protective apparel allows us to survive in environments that we would have dared not tread thirty years ago. Our ability to make a difference at an emergency scene from the standpoint of equipment, apparatus, and devices is unparalleled.

At the same time however, most fire departments are facing personnel shortages, as budgets get tighter. Some may quickly point out that as a whole, we are seeing fewer fires. That may be true, but when we factor in the death rate of firefighters year after year, the alarm bells should go off!

No matter how many fires a community faces each year, one thing remains constant, a firefighter battles the blaze. We are demanding more out of our firefighters at each of the fires they face.

While communities make plans and budget monies to maintain their apparatus fleet to get the most out of their investment, often times they do not put the same priority on maintaining their personnel. The fitness and health of the key piece of equipment is left to chance. We hope that the individual firefighter does the “right thing” and

maintains one's self! We rationalize the lack of fitness/wellness programs by lamenting that budgets are too tight. Or, we say that it's the firefighter's responsibility to take care of it themselves.

The data is in; many positive implications to instituting a wellness program exist for fire departments. Wellness programs have a dramatic effect on lowering the number of on-duty injury rates and have decreased the amount of sick time required of employees. In many communities the base cost of workmen's compensation insurance has dropped.

But the fact that remains, cost savings or not, fitness programs save lives...the lives of our firefighters. Review any one of the NIOSH reports, and you'll be convinced of the need for fitness/wellness programs. The time is now; let's invest in our fire departments greatest resource...our firefighters!

RECOMMENDATIONS

The proceeding pages of this report illustrate the benefit to implementing a fitness/wellness program in a fire department. The Portage Fire Department currently does not have a wellness/fitness program in place. The author recommends that the fire department administration implement a mandatory comprehensive fitness/wellness program. This program should be based on NFPA 1500, NFPA 1582 and NFPA 1583 and the IAFF/IAFC Joint Labor Management Wellness Fitness Initiative.

In summary, there are documented criteria for implementing fitness/wellness programs, and clear benefits to such programs. Additionally, there is documented evidence that successful wellness programs implemented within the United States have reduced rates of fatalities and injuries.

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Appendix A

Executive Fire Officer Program Fitness/Wellness Feedback Instrument

This feedback instrument was prepared as part of a National Fire Academy Fire Officer research paper. To assist in the development of an Applied Research Project for the Executive Fire Officer Program, I am requesting that you complete the following seventeen-question questionnaire.

This information will be used to attempt to determine the potential benefits of a wellness/fitness program for the Portage Fire Department. Thirty-One evaluation tools were distributed.

1. Age: _____
2. Height: _____ ft. _____ in.
3. Weight: _____ lbs.
4. Have you gained or lost weight in the last 12 months? Yes: ___ No: ___
 - 4a. If yes; gained: _____ lbs., or lost: _____ lbs.
 - 4b. Cause: _____
5. Do you chew tobacco or snuff? Yes: ___ No: ___
6. How many hours sleep do you average per night? _____ hours
7. Are you currently involved in a regular exercise program? Yes: ___ No: ___
8. If yes, do you maintain your heart rate between 79-90% of your maximum heart rate?
Yes: ___ No: ___ If No, go to Question #13.
9. How long do you maintain this heart rate per workout? _____ min.
10. How many times per week do you work out, and for what duration?
 - 10a. Times per week: _____ Duration: _____ min.
11. What type of exercise does this involve? _____
12. Do you regularly monitor your heart rate during your workouts? Yes: ___ No: ___

13. If you don't work out regularly, are you involved in a sporadic (one which occurs occasionally) exercise program? Yes: ___ No: ___

13a. If yes, how often? _____

13b. If yes, what type of activity? _____

14. Do you practice weight lifting, or home exercise program? Yes: ___ No: ___

14a. If yes, how often? _____

14b. What type of weight lifting or home exercise? _____

15. Do you participate in competitive sports? Yes: ___ No: ___

15a. If yes, how often? _____

15b. What type of sports? _____

16. If not currently exercising, how long has it been since your last workout?
Years: ___ Months: ___

17. Please indicate the current level of your own personal fitness:

Excellent: []

Very Good: []

Good: []

Poor: []

Appendix B

Executive Fire Officer Program Fitness/Wellness Feedback Instrument

This feedback instrument was prepared as part of a National Fire Academy Fire Officer research paper. To assist in the development of an Applied Research Project for the Executive Fire Officer Program, I am requesting that you complete the following seventeen-question questionnaire.

This information will be used to attempt to determine the potential benefits of a wellness/fitness program for the Portage Fire Department. Thirty-One evaluation tools were distributed with a 74.19% return rate (23 returned).

1. Age: 44.16 Avg. Low 31 High 61
2. Height: Low 5'6" High 6'4"
3. Weight: 197 lbs. Average Low 145 High 286
4. Have you gained or lost weight in the last 12 months? Yes: 4 No: 19
- 4a. If yes; gained: 8.2 Avg. lbs., or lost: 9.8 Avg. lbs.
- 4b. Cause: Middle age & Workouts
5. Do you chew tobacco or snuff? Yes: 1 No: 30
6. How many hours sleep do you average per night? 6.6 Avg. hours Range 5-8
7. Are you currently involved in a regular exercise program? Yes:14 (60%)No: 9 (40%)
8. If yes, do you maintain your heart rate between 79-90% of your maximum heart rate?
Yes: 12 No: 5 No Answer 5 If No, go to Question #13.
9. How long do you maintain this heart rate per workout? ____0____ min.
10. How many times per week do you work out, and for what duration?
- 10a. Times per week: 3.2 Range 2-7 Duration: 62 min. Range 30-120
11. What type of exercise does this involve? Treadmill, weights, running, walking, elliptical, stairmaster, yard work.
12. Do you regularly monitor your heart rate during your workouts? Yes: 5 No: 11

13. If you don't work out regularly, are you involved in a sporadic (one which occurs occasionally) exercise program? Yes: 10 No: 9

13a. If yes, how often? _____

13b. If yes, what type of activity? _____

14. Do you practice weight lifting, or home exercise program? Yes: 13 No: 10

14a. If yes, how often? _____

14b. What type of weight lifting or home exercise? _____

15. Do you participate in competitive sports? Yes: 13 No: 10

15a. If yes, how often? _____

15b. What type of sports? Basket ball, hockey, football, volley ball, softball, soccer

16. If not currently exercising, how long has it been since your last workout?
Years: ____ Months: ____

17. Please indicate the current level of your own personal fitness:

Excellent: [1]

Very Good: [7]

Good: [15]

Poor: [0]