

Running head: PHYSICAL FITNESS

Executive Development

Physical Fitness in the Fire Service

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### Abstract

The problem was that the personnel in the Northampton Fire Department were becoming increasingly unhealthy and unfit to perform the physical duties required by firefighters. The research purpose was to identify and produce the criteria for a physical fitness program for the personnel in the Northampton Fire Department. The research questions looked at firefighter physical fitness criteria for national, state, communities of comparable size, and the Northampton Fire Department personnel. The research method used was action methodology. The procedures used included a literature review at the National Fire Academy. The results showed the variation of physical fitness evaluations in the fire service. Changes were recommended to provide for overall improvement for the physical fitness of fire service personnel.

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### Physical Fitness in the Fire Service

The American population is becoming increasingly obese and unhealthy due to lack of physical exercise in their daily lives and these unhealthy habits are becoming the number one preventable cause of death (Tanner, 2004, p. 1). The fire service is also continuing to experience an alarming increase in firefighter injuries and deaths that are contributed to by an unhealthy and unfit workforce. “The statistics are clear: firefighters are at an extremely high risk of suffering from heart attacks. The strenuous task of firefighting places increased demands on firefighter’s bodies, which, in many cases, are not physically prepared for the strain” (National Volunteer Fire Council, 2005, p. 1). Firefighters have a responsibility to the people they protect and serve and the brothers and sisters they work with to be able to perform in an effective, efficient, and productive manner. “As a firefighter, given the physical demands and unpredictability of the job, your body has to be ready at a moment’s notice for every possible situation” (Meyer, 2005).

The research problem is that the personnel in the Northampton Fire Department are becoming increasingly unhealthy and unfit to perform the necessary physical duties required by firefighters. This has contributed to an increased health risk to each individual firefighter and the people they protect and serve.

The purpose of this research is to identify and produce the criteria for a physical fitness program for the personnel in the Northampton Fire Department.

The research questions that will address this problem are: What are the national physical fitness criteria for firefighters? What are the state physical fitness criteria for

firefighters? What is the physical fitness criteria used by departments of similar size?

What are the criteria for a physical fitness program for the Northampton Fire

Department?

The procedure used will be action methodology. A literature review on the subject matter will be done at the Learning Resource Center and also at local libraries. A feedback form will be sent to area fire departments of similar population and land area to help obtain information about current physical fitness requirements and evaluations being used to assess physical fitness conditions of their personnel.

#### Background and Significance

The Northampton Fire Department is comprised of 56 full-time firefighters and serves a community of approximately 30,000 people. It covers a land area of approximately 35 square miles and is located in the Connecticut River Valley in Western Massachusetts (Massachusetts Municipal Association, 2006). Located in the Five College Area of the Pioneer Valley, the City of Northampton is home to Smith College. The City is lively, diverse, and has influences from many different cultures around the world. The City is served by the Northampton Airport, Interstate 91, and an active rail line operated by the Springfield Terminal, home to the Hampshire County Correctional Facility, and traversed by the Connecticut River. All of these elements, including the old timber and brick construction where many of the downtown buildings share common walls, high rise residential structures, commercial and manufacturing buildings, and a hospital located within the community, contribute to some unique, hazardous, and challenging conditions that could be encountered by fire personnel.

The personnel are divided up into four groups and work twenty-four hour shifts responding out of two stations. The fire department provides multiple services to the community and the people within including: fire suppression, emergency medical services (EMS), hazardous materials response, water, ice, and technical rescues, and various other emergency responses.

In 1998, the City of Northampton hired an outside consultants group to investigate and review the operating and administrative procedures of the fire department. Once completed, a list consisting of eighty-eight corrections were identified that needed immediate attention. Out of this report came a newly created position of a department Training Officer. The responsibility and function of this position is to coordinate and oversee the development and continued learning of the skills required in the fire service and also to oversee the safety and health and fitness of the department personnel.

Now that individual's were being held accountable during these training evolutions, the department started realizing how many individual's were not capable of completing the basic skills required in the fire service. Three people were taken off shift work due to physical inabilities when operating with a self-contained breathing apparatus (SCBA). This clearly started to identify what the consultants report revealed previously that a physical fitness program should be developed for all full-time personnel in the department. The report recommended that the fitness program should include annual physical fitness ability testing; individualized workout programs for all employees, a full fitness evaluation from a certified exercise provider, and time for workouts while the firefighters are on duty (Municipal Resources, Inc, 1997).

The fire service has always prided itself on prioritizing life safety at every incident and every response. This priority not only included the general public, but also the firefighters themselves (Smith, 2002). One of the organizational values of the Northampton Fire Department is training/education as stated on our mission statement. This includes the development of the personnel to provide the highest and safest level of life safety services possible. Firefighters are called upon to perform unimaginable tasks in extreme conditions and continue to do this for the duration of their careers. Examples of this include fire suppression, high angle rescues, hazardous materials response, and weapons of mass destruction emergency responses.

The physical fitness and conditioning of the firefighters is a crucial component in delivering and providing the services expected of the fire service. In their book, *Comprehensive Wellness For Firefighters*, Hayford, Pearson, and Royer (1995) have emphasized that firefighters have a responsibility to the public to participate in physical fitness programs to enable them to perform their duties and respond to a variety of emergencies and the associated hazards. They have found that regular participation in a physical fitness program is essential to meet these requirements.

Firefighter's physical fitness has been and continues to be a leading contributor to the number one cause of firefighter fatalities, which is cardiac arrest. Roughly 44 percent of firefighter fatalities dating back to 1984 can be contributed to heart attacks making this the number one killer of on-duty firefighters for years (Perry, 2005, 180-189). The research into this problem will relate to the United State's Fire Administration's (USFA) mission in helping to respond appropriately in a timely manner to emerging issues and also helping to reduce the loss of life from fire of firefighters. This research will also

continue to examine the purpose and objectives of the Executive Development Class, as stated in the Operational Policies and Procedures, which looks at a series of case studies and assessments to teach students how to enhance team development and apply action research (NFA, 2003, pg. I-4).

My research will contribute to the resolution of the problem by contributing valuable information on how physical fitness affects firefighter's health, safety, and job performance. By producing criteria for a physical fitness program for the personnel of the Northampton Fire Department, the goal is to increase the fitness levels of the firefighters and also to lower the risk of death and injury from health related issues.

This research plans to carry out the investigation and implementation by using action research. At the end, this will produce criteria for a physical fitness program for the personnel of the Northampton Fire Department (Appendix D). This will allow the department to take immediate action on the specific problem that exists in the organization.

#### Literature Review

A review of relevant literature found that coronary heart disease, which often results in a heart attack, is contributed to a lack of physical fitness and numerous other health and wellness components. The National Volunteer Fire Council (NVFC) conducted a study in conjunction with the USFA and the American Heart Association (AHA), and found that physical activity is one of the best ways to help prevent and control coronary heart disease (National Volunteer Fire Council, 2005, p. 6).

Firefighters respond to a variety of emergencies requiring strenuous physical demands and exertion. Firefighting includes fire suppression, emergency medical



services, hazardous material incidents, rescue of trapped individuals, and numerous other technical rescues. The U.S. Department of Labor (2005) describes the firefighting occupation as assuming a range of responsibilities including fire suppression, EMS, fire prevention, training, maintenance of equipment, and participating in physical fitness activities.

These incidents all contain some element of risk and personal harm associated in responding and working as a firefighter. These risks show the obvious need for firefighters to be conditioned and have appropriate levels physical fitness. “Firefighting requires high physical work capacities. Many of the physical work tasks that confront the firefighter demand high levels of aerobic power” (Gibbs, J., Hilyer, J., Hunter, G., Spruiell, W., Weaver, M., 1999, p. 60). Robert J. Coon found, in his study on firefighter wellness programs done in 1996 for his Executive Fire Officer Project (EFOP), that the fire service should be concerned with the health and fitness levels of its firefighters. He found that in order to operate at peak efficiency and decrease firefighter fatalities, they must be in good physical condition.

The occupation of firefighting, however, has changed over the years, as the public is becoming more educated about fire safety and fire protection systems are becoming more sophisticated. This has led to a decrease in fires and causing more down time for firefighters. This increased down time has led to a more sedentary work place, but has not changed the hazards associated with firefighting, as it still remains one of the most hazardous occupations in America.

At an annual American College of Sports Medicine (ACSM) meeting in 2002, Michael Fragen M.D., explained how the injury rates in firefighting are four to five times

higher than in other occupations. He suggests that, because of this, there needs to be department fitness programs put into place to help combat this preventable risk factor in the fire service.

Physical fitness and the physical condition of firefighters are crucial to job performance and the health and well being of the individual firefighters because they are in a profession that expects them to be able to exert a high level of physical attributes within seconds. Wade Womack conducted a study at Texas A&M University on the health of firefighters and found that fighters do need more exercise. “When firemen do fight fires, it is work that is both very strenuous and stressful, and very physically exerting” (Womack, 2003, p. 1). Womack goes on to add that although many municipalities and fire departments are aware of the risks associated with the job, many departments do not require any physical activity and do not have any physical requirements that must be maintained.

Many departments are made up of not only full time firefighters, but also full time firefighters supplemented with on-call or volunteer personnel. There are also departments that are exclusively on-call or volunteer personnel. As reported by the NVFC, there are nearly 800,000 volunteer firefighters in the United States who work their primary jobs that are far less physically demanding than firefighting (NVFC, 2005, p. 3). The transition from their full-time job, responding to fire calls, and the different demands associated with firefighting, lead to additional stresses placed on the body.

In a study done by Brian J. Sharkey, Ph.D. found that Federal and state wildland firefighters have lower mortality rates from cardiovascular disease than municipal employees because few municipal and volunteer departments have mandatory physical

fitness testing. In contrast, most federal and state agencies require and administer physical fitness testing on an annual basis (Sharkey, 2001)

In Sandra Bells article, *Smokejumpers Must Be in Exception Physical Condition* (2005), she talks about the physical requirements in being a smokejumper and states, “Smokejumpers need to be in exceptional physical condition. These men and women are the Green Berets of the fire fighting profession”(p.1).

In a Needs Assessment done by the National Fire Protection Association (NFPA) in 2002, they found that the roughly 800,000 volunteer firefighters are on fire departments with no programs or equipment to help achieve or maintain health and fitness. Many of the personnel are motivated to increase their fitness levels, but don’t have the proper equipment to pursue their goals. Often the opposite is the case in career departments were they have the equipment but few personnel take advantage of the benefit.

The initial training and testing along with continuing health and fitness evaluations obviously have an expense associated with it, but the question is at who’s expense. In 2002, Allegheny, PA had three firefighters die in the line of duty all related to heart ailments. Pennsylvania Fire Commissioner Ed Mann stated, “there are no standards in the commonwealth of Pennsylvania for physical fitness” (Guerrieri, 2002). Pennsylvania State Rep. Tim Solobay said that state officials have talked about mandatory physical requirements, but that would add expense and potentially decrease the volunteer pool. “Do you make an annual physical mandatory? If you do, how do you pay for it?” (Guerrieri, 2002).

Physical fitness is the cornerstone of job performance in the fire service. The fire service requires such a multi faceted approach to the job responsibilities that firefighters need to have a balance between the five components in health and fitness. These include cardiovascular fitness, muscular strength, flexibility, muscular endurance, and body composition. These physical components are key in allowing firefighters to perform their tasks allowing for the highest level of life safety for the public they serve and also their fellow co-workers. Jim Hilyer, an exercise physiologist, who designed fitness programs for the City of Los Angeles Fire Department says, “An unfit firefighter puts himself, his co-workers and the public in danger. Any department that doesn’t require and test for fitness is sending people to do life-threatening work without knowing whether they are capable” (Hall, 2005).

Part of the problem associated with such a high percentage of deaths contributed to heart attacks, are the pre-existing conditions of individuals. “According to an National Fire Protection Service’s (NFPS) study, almost half the firefighters who died on duty from 1995 to 2004 suffered heart attacks. And nearly half of those the fatalities who had documented medical conditions had known heart problems” (Purser, 2005, p. 2)

In 2005, heart attacks were responsible for the deaths of 48 firefighters (USFA, 2006, p. 1). This has been a continuing trend in the fire service. In 1997, the International Association of Fire Fighters (IAFF) in conjunction with the International Association of Fire Chiefs (IAFC) began the Fire Service Joint Labor Management Wellness-Fitness Initiative. The purpose of this collaborative initiative was to institute a positive perception on health and physical fitness in the fire service and have a commitment from the key stake-holders in the communities to help pursue and institute

non-punitive health programs that incorporates medical and physical evaluations for the fire service (IAFF, 2005).

Most fire departments in Massachusetts are Civil Service and require only the initial physical fitness examination. The General Laws of Massachusetts, Chapter 31, Section 61A (2005), states that anyone appointed to the position of firefighter after November 1, 1996 must take and pass the initial medical and physical examinations, but no continuing evaluations. Any municipality may adopt stricter health and fitness standards related to the duties and responsibilities of the position subject to collective bargaining and approval of the executive body.

Many of the Civil Service departments have age restrictions on them that will not allow anyone over the age of thirty-two to be hired by that department. Part of the reasoning behind this is the fact that younger individuals are usually more physically capable of performing the tasks associated with the fire service. Communities look at their personnel as assets and want to get a good investment and ensure that the personnel will be able to serve the community for a long time. Haverhill, MA acting fire chief Lewis F. Poore states that, “if Haverhill did away with the age cap, it would have to institute a fitness/wellness program for firefighters and police officers that would cost the city anywhere from \$160,000 to \$240,000” (Gillis, 2005, p. 2).

The Eagle Tribune, a Massachusetts newspaper, wrote an article about a gentleman who was over the age limit, thirty-two, applying for a firefighters position on a local department. The author argues that a physical exam should be administered to everyone on the department, every year, regardless of their age or time on the job. The article goes on stating that it isn't the age limit that should be such a concern, rather the

physical abilities and competencies of the individual to perform the tasks required in the fire service (Armerding, 2005).

Mark Boyd examined the criteria for an effective physical fitness program for the Memphis Fire Department (MFD) and found that a physical fitness program would be the first step in developing an overall program for improved health and fitness in the MFD. Boyd recommends components such as health education, nutrition, and behavioral modifications all need to be incorporated into a physical fitness program (Boyd, 1999). *Managing Fire and Rescue Services*, also recommends comprehensive programs that not only involve fitness programs, but also health prevention programs, determining health baselines, rehabilitation, and corrective action policies. These comprehensive programs address physical, mental, and the overall health and wellness of the employees (Compton, D., Granito, J., 2002, p. 347).

This literature review had a significant impact in supporting and influencing the purpose of this research paper. The research clearly showed how long this has been a problem in the fire service and the implications associated with it. Donald Jacobs wrote in his book in 1976 that one consideration that the fire service needs to address is the level of physical fitness maintained by the firefighters (Jacobs, 1976, p. 1-2). The number of firefighter deaths that correlate with physical fitness, 48 in 2005 (USFA, 2006, p. 1), has not significantly decreased over the years. Even after all of the improvements in firefighter safety equipment and implementation of the incident command system, accountability systems, and personal alert safety devices, the one constant variable is the physical condition of the individual firefighter.

## Procedures

The initial research began in the Executive Development Class at the National Fire Academy from August 8, 2005 through August 19, 2005. We began formulating ideas about different issues affecting our departments and across the country. As identified in the Background and Significance section of this research paper, there were some individuals on my department who were not physically capable of performing the duties required in the fire service.

The research began by investigating the problem and gathering information at the Learning Resource Center at the National Fire Academy on the Computerized Card Catalog. I was searching with key words and phrases such as “firefighter physical fitness” and “physical fitness standards in the fire service”. Three EFOP papers in used as sources of information and guides in developing and generating ideas were Boyd’s (1999) paper on the Criteria for an Effective Memphis Fire Department Physical Fitness Program, Coon’s (1996) paper on The Need for Firefighter Wellness Programs, and Marsh’s paper (1997) on the New Medical/Physical Standards for Frederick County Firefighters.

On September 2, 2005, a feedback form was developed (see appendix A) to mail and distribute to the fire departments of both similar land area and population. For this information, Glenda Stoddard (Personnel Communication), the Human Resource Director for the City of Northampton, email me these benchmark communities of similar size (see Appendix B). The feedback forms were placed in a self-addressed stamped envelope with a return date of November 21, 2005, allowing for at least six weeks for each department to reply. The questions I generated on the feedback form reflected what the

purpose of my research was trying to accomplish. Ten of the feedback forms were returned by November 30, 2005 and were used to answer question number three in the results section of the research paper.

Additional research was conducted at the library at the Northampton Fire Department headquarters and also using the computer in the library to search web sites for additional information. Key search words such as, “firefighter health and fitness”, “firefighter wellness”, and “firefighter fitness requirements” generated a wealth of information on web sites that was downloaded and used for reference material.

NFPA documents were viewed off of their web site using the department’s subscription to the organization. The documents that were looked at include NFPA 1001, 1500, 1582, and NFPA 1583. The Northampton Fire Department Physical Fitness Program policy (see appendix C) was copied off of the department’s shared network and used in this research paper to identify current policies and training opportunities in place.

I had an additional opportunity to go back to the Learning Resource Library at the National Fire Academy from December 12, 2005 to December 16, 2005. During this time period, I found three more references that I used in this research paper. A rough draft of this paper was completed on January 20<sup>th</sup>, 2006 and was given to firefighter Matt Lemberg of the Northampton Fire Department for review and critique. The draft was then reviewed and revised and submitted for evaluation.

## Results

1. What are the national physical fitness criteria for firefighters? The National Fire Protection Administration (NFPA) is a non-profit organization that develops standards and guidelines to help public safety organizations improve their overall safety,



performance, and effectiveness. It must be noted that these are only guidelines for most communities who do not adopt these into their city charters and therefore are not mandatory.

NFPA has numerous standards related to physical fitness and health and fitness of firefighters. One of the most well known NFPA documents is NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program* (2002). NFPA 1500 works in conjunction with NFPA 1582 (2003) and NFPA 1583 (2002) in identifying the medical, physical and health and wellness issues that need to be addressed by the fire service.

These standards encourage fire departments to develop and implement physical performance requirements for personnel who are involved in emergency operations. These members would have their physical performance evaluated annually by a physician appointed by the fire department. Anyone who could not pass their annual evaluations would not be able to engage in emergency operations of the department. NFPA 1500 states that, the department physician would determine these fitness levels and the purpose of these evaluations would be to “reduce the probability and severity of occupational injuries and illnesses”(NFPA, 2002).

NFPA 1582 (2003), *Standard on Comprehensive Occupational Medical Program for Fire Departments*, identifies some of the essential job tasks associated with firefighting and also the medical requirements for firefighting. One important statement noted on this standard is the fact that this does not differentiate between volunteer, paid-on-call, part-time, or career firefighters because the tasks in the fire service are all the same. The following reference explains the importance of physical and medical examinations in the fire service.

While some may say that the cost of medical exams is too high, one must measure that against long-term job related illnesses, injuries, and fatality costs. Fire departments spend a lot of money on preventive apparatus and equipment maintenance; however, that is an inefficient use of resources if they do not have medically qualified personnel to operate them and to respond to emergency incidents (NFPA, 2003, p. 2)

This clearly identifies a risk/benefit associated with a physically fit workforce. The personnel in the fire service are the most important and critical resource and must be maintained just as all the other resources.

Some of the tasks of firefighters listed in NFPA 1582 Chapter 5 include hoseline operations, crawling, lifting, rescue operations, wearing personal protective ensembles (PPE), and working in extremely hot and cold environments for long periods of time. Based on these tasks associated with the fire service, medical evaluations are done on personnel identifying the individual's ability and safety of performance.

NFPA 1582 (2003) states that medical evaluations shall be done prior to training programs and also any emergency response activities. All personnel which have a medical condition affecting the ability to safely perform the job tasks associated with firefighting will be placed in Category A or B. Category A represents medical conditions not fulfilling the requirements of the standard and Category B represents medical conditions that fulfill the requirements of the standard only if they can perform the tasks while not posing any significant risk or health issues to themselves or others.

The areas examined in both categories include, but are not limited to, head and neck, eyes and vision, ears and hearing, dental, nose, lungs and chest wall, heart and

vascular system, spine and skeleton, extremities, neurological disorders, skin, and blood. These areas are all examined in relation to how they will function under the conditions described earlier in the job tasks associated with the fire service. Working with the department physician, body organs and organ system can be evaluated to determine how fit an individual is to perform the necessary tasks of firefighting.

NFPA 1583 is the *Standards on Health-Related Fitness Programs for Fire Fighters*. The purpose of this standard is to have more explicit explanations and advice for achieving and maintaining firefighting fitness. “Overweight, out-of-shape fire fighters are an accident waiting to happen. The multiple stress factors and rigors of the profession require fire fighters to be medically and physically fit in order to perform the required tasks” (NFPA, 2000, p. 1-2). Chapter 4 in this standard states that fitness assessments shall be conducted annually by the department physician. The fitness assessment components listed in NFPA 1583 include: Aerobic capacity, body composition, muscular strength, muscular endurance, and flexibility.

The Bureau of Land Management (BLM) employs some of the most elite fire fighters in the country known as smoke jumpers. These smokejumpers fight the wildland fires requiring long hours of high muscular and aerobic fitness levels to perform the necessary tasks. Smokejumpers demand peak physical conditioning due to the demands of the job and a medical evaluation is required during the first year as a smokejumper. The physical training requirements include: run 1.5 miles in 11:00 minutes or less, 7 pull-ups, 45 sit-ups, 25 push-ups, and pack 110 pounds on level terrain in 90 minutes or less. These all have a maximum of five minutes rest between exercises (National Office of Fire and Aviation, 2005).

Another division in the BLM is Hotshot training for wildland firefighting. Minimum requirements for this are 1 hour of physical fitness training, 5 days a week. The fitness training focuses on stretching, aerobic fitness, and strength building. The one standard that the Hotshots have for all members including continuing employees includes the pack test consisting of carrying a 45-pound pack for 3 miles on level ground in 45 minutes or less (National Office of Fire and Aviation, 2005).

The United States Department of Agriculture (USDA) Forest Service used tests for many years that tested only for aerobic capacity. Recently, they have realized that firefighting incorporates many more components of health and fitness than just aerobic capacity. The test used by the USDA Forest Service now is the Pack Test. This tests the candidates wearing a weighted pack while walking a flat course. The distance of the course and the weight of the pack are determined by the fitness level for which the candidate is testing. The two categories for testing are the Wildfire Suppression and Prescribed Burning. The Pack Test for Wildfire Suppression requires the candidate to walk three miles with 45 lbs. within 45 minutes. The Pack Test for Prescribed Burning requires the candidate to walk two miles with 25 lbs. within 30 minutes (Nature Conservancy, 2006, p. 1-2).

## 2. What are the state of Massachusetts physical fitness criteria for firefighters?

Communities in Massachusetts either have Civil Service or Non-Civil Service fire departments with the authority having jurisdiction setting the performance standards for physical fitness. The General Laws of Massachusetts, Chapter 31, Section 21 (2005) states “the administrator may also establish physical requirements, in addition to those

established by statute and rule, as prerequisites for appointment to any civil service position” (2005). Massachusetts currently has no mandatory fitness standards for firefighters after they join a department.

The Firefighter Physical Abilities Test (PAT) is used by the civil service departments to evaluate the physical fitness of the firefighting candidates. The PAT is designed to represent firefighting activities and tasks and test the cardiovascular fitness, endurance, muscle strength, muscular endurance, and flexibility of the candidates. The PAT consists of 7 events, which during each one, the candidate wears of weighted vest simulating the weight of firefighting clothing and gear. The seven events are a stair climb, ladder event, hose advance, forcible entry, search, rescue through a doorway, and a ceiling hook. Each event is timed with specific criteria that need to be met to continue.

The stair climb requires each candidate to step at a certain pace for a period of 200 seconds. The ladder event consists of removing a ladder from a rack; raising and lowering the ladder and putting it back on the rack within 35.56 seconds. The hose advance requires each candidate to advance a fully charged hose through a U-shaped course within 20 seconds. The Forcible Entry event requires hitting a rubber post with a 12 lb. sledge hammer and moving it a pre-determined distance. The search event requires the candidates crawling through a dark wooden tunnel with obstacles and turns in it to find there way through within the 39-second time limit. The rescue through a doorway event requires the candidates to drag a 125-pound dummy 50 ft. within 36 seconds. The ceiling hook event requires a series of push-pull actions using a pike pole to simulate actions used in the fire service. A series of 25 full repetitions must be done to complete the evolution (Commonwealth of Massachusetts, 2002, p. 2-3).

Candidates enrolled at the Massachusetts Fire Academy attend 12 weeks of basic firefighting training to become Firefighter I + II qualified. During the 12 weeks, the candidates begin every morning with physical fitness training. Unfortunately, this study does not have more information on the program because they have had some candidates get hurt and sick from the physical training and the program is currently under review.

3. What is the physical fitness criteria used by departments of similar size? A feedback form was sent to thirty fire departments across the state of Massachusetts (see appendix) of similar size in land area and population to gather information on what the physical fitness entrance requirements were for that department and also if there were any continued physical fitness evaluations of their personnel. Ten departments returned the form with the information related to this study.

All ten of the departments that returned the forms required each entry-level firefighter to pass the state sponsored PAT to work for their department. It must be noted that three of the communities that returned the responses are non-civil service communities, but still elected to administer the standard state physical abilities test. All responses agreed that the initial physical testing does not reflect the work environment and physical requirements needed in the fire service. Many responses commented on the weight of the protective gear and self-contained breathing apparatus used in the fire service and how the testing procedures do not properly reflect the actual conditions by having the candidates just wear a weighted vest during the evolutions.

Once employed, every community supported the local department with equipment and the ability to work out on duty, but none of the communities had or even

require annual evaluations for the fire personnel. Five of the ten departments that responded had agreements with local health clubs for discounted memberships and free nutritional advice. The other five departments that did not have any agreements with health clubs all had their own fitness equipment in the fire stations that their personnel had access to during working hours.

Only two of the ten departments that responded had any monetary incentives for physical fitness. The others commented how their incentives are having the equipment available to workout while on duty. Four of the ten departments that replied work twenty-four hour shifts and felt that having equipment available enables personnel to workout if they want to and help make better use of available down time.

All ten responses felt that in order to maintain firefighters physical fitness over the course of their careers that physical fitness needs to be instilled as one of the values in the fire service and also have the labor unions and administrations work together to support and fund the appropriate resources needed to evaluate physical fitness in the fire service

Eight of the ten responses felt that nutrition and diet could be modified in order to help increase physical fitness levels. Eating smaller meals, having consultants come for educational meetings, and making time to eat healthy a priority, were all ideas suggested by these departments. It was noted that many times fire service personnel eat fast food or unhealthy food due to the increases in call volume or the unexpected and uncontrollable variables associated with emergency response professions.

4. What are the criteria for the physical fitness program for the Northampton Fire Department? Any prospective new hire for the Northampton Fire Department must currently complete and pass the state PAT. The test is designed to provide an understanding of the minimum qualifications associated with the job of firefighting. Four of the five fundamental components of health and fitness are evaluated in the testing process includes: cardiovascular fitness, muscular strength, muscular endurance, and flexibility, with body composition being excluding in the testing process. As noted in question two of the Results section, there are seven events simulating activities that are part of firefighting. These include a stair climb, a ladder event, hose advance, forcible entry event, search, rescue through a doorway, and a ceiling hook event. All of these events are timed events and each candidate wears a weighted vest simulated to be the weight of the gear and equipment worn by firefighters. It should be noted that this initial test is given only during the hiring process for candidates. There is no requirement once hired for continued evaluation or performance requirements for physical abilities.

The Northampton Fire Department has a policy for a physical fitness program (see Appendix C). The policy allows for personnel to walk at two designated areas within the City during working hours, while still maintaining the ability to respond to calls. This is not a mandatory policy and allows flexibility to the individuals in how much and how often they want to improve their health and fitness. The Northampton Fire Department also has both stations equipped with equipment and machines enabling all personnel the ability to workout while on duty. Some personnel are reluctant to workout on duty because the current Physical Fitness Program specifies only a walking program.



This action research will reflect a change in the policy (Appendix E) to allow and encourage all members to utilize the fitness equipment while on duty.

The Deputy Chief's Association recently instituted a voluntary physical fitness program, which gives them monetary incentives for performance-based events. The voluntary concept was based on introducing a change into an organization with no punitive damages for not complying with the program. The events currently are limited to just running, walking, push-ups, and sit-ups, but will be adjusted to be more job specific in the future.

#### Discussion

The comparison of the literature review and the study results clearly identify physical fitness as an important component in the fire service. The job tasks associated with firefighting as identified by the U.S. Department of Labor (2005) clearly show that the physical capabilities of the fire service personnel require a great deal of health and fitness.

In the study conducted by Womack (2003), he found that the work performed by firefighters is extremely strenuous, but many municipalities do not require or evaluate physical fitness. This contributes to an increase in injuries and possibly deaths. As stated in Hall (2005), unhealthy and unfit firefighters are not only putting themselves jeopardy, but also the people they protect and serve and their co-workers. Womack's study supports the purpose of having annual evaluations for firefighters to help improve safety and decrease the mortalities in the fire service.

One of the problems identified in the literature review was the pre-existing condition of the individual's. Purser (2005) found that nearly half of the fatalities from

1994 through 2004 related to heart attacks had known heart problems. If departments implemented annual physical fitness evaluations, these could help alleviate some of the injuries and deaths associated with health problems. If there isn't a baseline to identify what physical condition a person is in, then you cannot fully reason what the contributing factors actually are to these injuries and deaths.

NFPA 1582 (2003) states that it does not differentiate between volunteer, call, part-time, or full-time firefighters. The risks associated with the fire service do not differentiate between full-time or part-time and the fires are just as hot in volunteer communities as they are in career communities. Unfortunately, many of the volunteer fire service personnel have less physically demanding jobs and are asked to perform activities on the fire ground at a moments notice under extreme conditions. Although the personnel at risk do not all work for the fire service as a career, they are all still susceptible to the same hazards and dangers and need to have some physical evaluation performed during their participation in firefighting.

It was noted in the literature review that some elected officials are concerned about the financial implications associated with the medical and physical evaluation programs. NFPA 1582 (2003) mentions the risk benefits associated with physical fitness evaluations and how they can be used as preventive measures to ensure a safer more effective and efficient workforce. The most important asset the fire service has is its' personnel and attention needs to be given to help take care of this valuable resource.

The interpretation and evaluation done by this author of the study results strongly favors the annual physical fitness performance evaluations, as done by the Federal and State wildland firefighters. The study done by Sharky (2001) clearly identifies the

importance of physical fitness in the fire service. Federal and National fire services have lower mortality due to the implementation of annual physical fitness evaluations for all fire service personnel. The core foundation to completing our mission and purpose and allowing for increased performance relies on the physical conditioning of the personnel.

The implications of the results for the Northampton Fire Department are to look towards the future in improving the health and fitness of its personnel. The department needs to start holding it's own members more accountable and working together help provide and better service to the community and also a better life for its personnel. The training programs will be implemented on a voluntary basis in the hopes to encourage more participation in the future.

#### Recommendations

It is recommended that the personnel in the Northampton Fire Department begin the voluntary physical fitness program in Appendix D and all members are encouraged to follow the changes reflect in the revised Physical Fitness Policy (Appendix E). This will allow for on duty personnel to have a reference point to begin a physical fitness program and the flexibility and support from the department administration to utilize the fitness equipment in the stations while on duty.

The fire department should work with the local community hospital to obtain a department physician to consult with on health and fitness issues. This physician could also be used for personnel who voluntarily seek annual fitness evaluations.

The local firefighters union should establish a health and safety committee to assist with implementing the new fitness program (Appendix D), encourage all members to participate in the revised Physical Fitness department policy (Appendix E), and also

act as a body for questions, concerns, or ideas about health related issues. This committee should work in conjunction with the fire department administration in obtaining physical fitness coordinators or personal trainers to assist firefighters with achieving and maintaining their fitness goals.

Each of these recommendations reflects a positive change towards improving our own safety and well being as a department. Anything that can be done to decrease the number of firefighter deaths and injuries needs to be addressed. Voluntary, non-punitive evaluations help ease any anxiety that might influence anyone's decision not to participate in any health and fitness programs.

General recommendations for "future readers" who may wish to replicate some or all of this study within their own organization is to find out why fire service personnel are so resistive to change and the fear of annual physical fitness evaluations. The purpose of this study is to identify and produce the criteria for a physical fitness program for the personnel in the Northampton Fire Department. If this program helps one person in having a healthier life style, then it is well worth the research.

## References

American College of Sports Medicine. (2002). *Firefighter Fitness and Healthcare Issues*.

[Electronic Version] Retrieved from

<http://www.acsm.org/publications/newsreleases2002/firefighter062102.html>

Armerding, Taylor. (2005, January 23<sup>rd</sup>). *All firefighters should have to meet fitness standards*. [Electronic Version] Retrieved November 19<sup>th</sup>, 2005, from

[http://www.eagletribune.com/news/stories/20050123/LN\\_002.htm](http://www.eagletribune.com/news/stories/20050123/LN_002.htm)

Bell, S. (2005). *Smokejumpers: Physical Condition Requirements*. [Electronic

Version] Retrieved November 19<sup>th</sup>, 2005, from

[http://www.associatedcontent.com/pop\\_print.cfm?content\\_type=article&content\\_type\\_id=10652](http://www.associatedcontent.com/pop_print.cfm?content_type=article&content_type_id=10652)

Boyd, M. (1999, June). Criteria for an Effective Memphis Fire Department Physical Fitness Program. (Applied Research Project). Emmitsburg, Md: National Fire Academy, Executive Fire Officer Program.

Commonwealth of Massachusetts, Human Resource Division. (2002). *Massachusetts Fire Department Physical Abilities Test Preparation Guide*. [Electronic

Version] Retrieved November 15<sup>th</sup>, 2005, from

[http://www.mass.gov/Ehrd/docs/cs/publications/fire\\_pat\\_prep\\_guide.doc](http://www.mass.gov/Ehrd/docs/cs/publications/fire_pat_prep_guide.doc)

Compton, D., & Granito, J. (Eds.) (2002). *Managing Fire and Rescue Services*.

International City/County Management Association.

Coon, R. (1996, December). *The Need For Firefighter Wellness Programs*.

(Applied Research Project). Emmitsburg, Md: National Fire Academy, Executive Fire Officer Program.

- Gibbs, J., Hilyer, J., Hunter, G., Spruiell, W., Weaver, M. (1999). In Station Physical Training for Firefighters. *Strength and Conditioning Journal*, Volume 21, pgs 60-64.
- Gillis, W. (2005, January 30<sup>th</sup>). *Age limits still on for safety jobs*. [Electronic Version] Retrieved November 19<sup>th</sup>, 2005, from [http://www.eagletribune.com/news/stories/20050130/LN\\_010.htm](http://www.eagletribune.com/news/stories/20050130/LN_010.htm)
- Guerrieri, V. *Exercise Mandates for Firefighters Discussed*. [Electronic Version] Retrieved November 19, 2005, from [http://www.pittsburghlive.com/x/search/s\\_107278.html](http://www.pittsburghlive.com/x/search/s_107278.html)
- Hall, L L. *Fit Firefighters*. [Electronic Version] Retrieved November 19, 2005 from <http://www.local1259iaff.org/fitfirefighters.htm>
- Hayford, J., Pearson, J., Royer, W. (1995). *Comprehensive Wellness For Firefighters*. Van Nostrand Reinhold.
- International Association of Fire Fighters. (2005). *Fire Service Joint Labor Management Wellness-Fitness Initiative*. [Electronic Version] Retrieved November 29<sup>th</sup>, 2005, from <http://www.iaff.org/safe/wellness2.html>
- Jacobs, Donald, T. (1976). *Physical Fitness and the Fire Service*. National Fire Protection Association.
- Marsh, A., D. (1997). New Medical/Physical Standards for Frederick County Firefighters. (Applied Research Project). Emmitsburg, Md: National Fire Academy, Executive Fire Officer Program.

- Massachusetts General Laws. (2005). *Chapter 31: Section 21 Educational and physical requirements; eligibility based on gender*. [Electronic Version] Retrieved November 19<sup>th</sup>, 2005, from <http://www.mass.gov/legis/laws/mgl/31-21.htm>
- Meyer, R. (Sept. 2005). The 3 F's of Firefighter Conditioning. *Firehouse*, pp. 56-59.
- Municipal Resources Incorporated. (1997). *City of Northampton, Massachusetts Fire Department*.
- National Fire Academy. (2003, September). *Executive Fire Officer Program Operational Policies and Procedures Applied Research Guidelines*. Emmitsburg, MD: Author.
- National Fire Protection Association. (2002). *A Needs Assessment of the U.S. Fire Service*. Federal Emergency Management Agency: Author.
- National Fire Protection Association. (2002). *NFPA 1500, Standard on Fire Department Occupational Safety and Health Program*. Quincy, MA: Author.
- National Fire Protection Association. (2003). *NFPA 1582, Standard on Comprehensive Occupation Medical Program for Fire Departments*. Quincy, MA: Author.
- National Fire Protection Association. (2000). *NFPA 1583, Standard on Health-Related Fitness Programs for Fire Fighters*. Quincy, MA: Author.
- National Office of Fire and Aviation. (2005). *Bureau of Land Management Hotshots General Training Requirements*. [Electronic Version] Retrieved November 19<sup>th</sup>, 2005, from <http://www.fire.blm.gov/ihc/training.htm>
- National Office of Fire and Aviation. (2005). *Bureau of Land Management Smokejumper Requirements*. [Electronic Version] Retrieved November 15, 2005, from [http://www.fire.blm.gov/smokejumper/first\\_year/requirements.htm](http://www.fire.blm.gov/smokejumper/first_year/requirements.htm).

- National Volunteer Fire Council (2005). *Face the Facts*. Retrieved December 5, 2005, from <http://www.healthy-firefighter.org/pdf/2005-resourc-guide.pdf>
- Nature Conservancy. (2006). *Fire Management Resources-Measuring Your Physical Fitness*. [Electronic Version] Retrieved January 5<sup>th</sup>, 2006, from [http://tncfire.org/efm\\_FMR\\_physicalFitness.htm](http://tncfire.org/efm_FMR_physicalFitness.htm)
- Perry, M. (2005, June). In the Heat of the Moment. *Men's Health*, 180-189.
- Purser, B. (2005). *Exercise Regimens, Gyms Increasingly Adopted By Fire Departments*. [Electronic Version] Retrieved January 6<sup>th</sup>, 2006, from <http://cms.firehouse.com/content/article/printer.jsp?id=46736>
- Sharkey, B. J., (2001). *Cardiovascular Risks of Wildland Firefighting*. [Electronic Version] Retrieved November 19<sup>th</sup>, 2005, from <http://www.firejock.com/articles/Cardiovascular%20Risks%20of%20Wildland%20Firefighting.htm>
- Smith, J. (2002). *Strategic and Tactical Considerations on the Fireground*  
Prentice Hall, Upper Saddle River, NJ.
- Tanner, L. (2004). *Americans Eat Themselves To Death*. [Electronic Version] Retrieved November 20<sup>th</sup>, 2005, from <http://www.cbsnews.com/stories/2004/03/09/health/main604956.shtml>
- United States Department of Labor. 2005. Bureau of Labor Statistics. [Electronic Version] Retrieved November 25, 2005, from <http://www.bls.gov/oco/ocos158.htm>



United States Fire Administration. (2003). *Executive fire officer program operational polices and procedures applied research guidlelines*. Emmitsburg, MD: United States Fire Administration, National Fire Academy.

United States Fire Administration. (2006). *USFA Releases 2005 Firefighter Fatality Statistics*. [Electronic Version] Retrieved Jan 15<sup>th</sup>, 2006, from <http://www.fema.gov/about/media/2006releases/010906.shtm>

Womack, W. (2003). *Health Inferno: Firefighters' Greatest Risk May Not Be Fires, But Killer Heart Attacks*. [Electronic Version] Retrieved November 30, 2005, from <http://rev.tamu.edu/stories/03/100103-12.html>

Appendix A



# Northampton Fire Department

**26 Carlon Drive, Northampton, Massachusetts 01060-2373**

Telephone: (413) 587-1032 Fax: (413) 587-1034

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Fire Prevention/Operations Officer: Duane A. Nichols  
Deputy Chiefs: Dana Cheverette, David Gagne,  
William Hurley, and Timothy McQueston  
Training Officer: Andrew S. Pelis

**Website: [Http://: www.Northamptonfire.org](http://www.Northamptonfire.org)**

**Christopher Norris  
Captain/Paramedic**

**To whom It May Concern:**

**I am currently enrolled in the National Fire Academy's Executive Fire Officer Program and I am developing this feedback form to help complete my research paper for the Executive Development class. The purpose of my research is to identify and produce physical fitness criteria for the personnel in the fire service. I have included some questions with a stamped, self-addressed envelope that would greatly assist me in producing these criteria. Please comment and make as many suggestions as possible that could be used to help produce a safer and more efficient work force. Thank you.**

***Please Return by November 21st***

1. What are the physical fitness entrance requirements for an entry-level firefighter in your department?
2. Do these entrance requirements appropriately reflect the physical demands and performance expectations of firefighters? How or why not?
3. How are the firefighters in your department continuously evaluated for physical fitness throughout their careers?
4. Please comment on how your department and the personnel are supported by the local stakeholders in the community? (i.e. Workout room, gym memberships, incentives, time on duty to workout)
5. What can be done to minimize the trend of firefighters decrease in physical fitness during the duration of their careers?
6. We understand that firefighters may be sedentary for periods of time and then suddenly called to perform extensive physical activity. Please comment on an individual's physical fitness and how it affects their health and job performance.
7. Please comment on the effect that shift work could have on physical health. (i.e. 10/14's vs. 24's)
8. Please comment on how diet and nutrition could be modified and helped to reduce physical inabilities of firefighters.

**Appendix B**

Massachusetts Communities: Population of 25,000-35,000\*  
 Northampton Population 29,287

<b>Community</b>	<b>Population</b>
Agawam	28,528
Amherst	34,567
Andover	31,933
Braintree	33,728
Chelmsford	33,957
Chelsea	34,106
Danvers	25,588
Dartmouth	31,158
Dracut	28,804
Falmouth	33,823
Franklin	30,175
Gloucester	30,730
Lexington	30,631
Melrose	26,784
Milford	27,466
Milton	25,842
Natick	32,321
Needham	29,137
N. Andover	27,925
N. Attleboro	28,102
Norwood	28,730
Randolph	30,924
Saugus	26,491
Shrewsbury	33,091
Stoughton	27,094
Tewksbury	29,288
Watertown	32,915
Wellesley	26,578
W. Springfield	27,953
Yarmouth	25,192

Information found in the Massachusetts Municipal Directory 2005-2005 published by the **Massachusetts Municipal Association**.

Appendix C

**NORTHAMPTON FIRE DEPARTMENT**

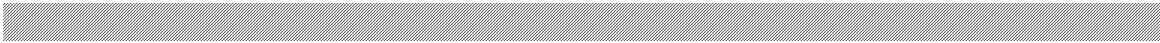
**#005**

**POLICY**

**Revision Number: 0**

**Dated: June 1, 1999**

**Physical Fitness Program Approved: \_\_\_\_\_**



**PURPOSE:**

The Northampton Fire Department would like to follow the lead of many area businesses and provide time for on-duty members to participate in a fitness/walking program.

**SCOPE:**

Firefighting is known to be one of the most physically and mentally demanding occupations today. The unique environment, and high-energy demands of firefighting, requires above average levels of physical fitness. Each year, over 50% of the firefighters who die in the line of duty succumb to heart failure. Studies have shown that an increased level of fitness can reduce the risk of these deaths.

**PROCEDURE:**

Any fire company may go to the site designate below, provided other activities have not been scheduled or assigned, between 1300 and 1630 hours. During daylight savings time only, may also include 1830 and 2030 hours. The company will remain in service by radio at all times. The duration should not exceed 2 hours, including travel time. All members should conduct themselves in a professional manner, as you will be representing the N.F.D.

Members shall dress in the station uniform when traveling to the walk site. When on site the uniform shall be uniform pants, uniform T-shirt or sweatshirt, black sneakers may be worn.

- Station 1      Smith College Track
- Station 2      Look Park

## Appendix D

### **Physical Fitness program for the Northampton Fire Department**

#### **Circuit Training:**

This is a system where the exerciser goes from station to station generally with light weight and many repetitions. Do 12-15 repetitions at a station and move to the next station with very little rest, usually 30secs. to 1 minute. Start with a weight at each station that you can lift easily for 12-15 reps. Do not increase the weight on the 2<sup>nd</sup> and 3<sup>rd</sup> sets.

Continue to work from station to station until you have completed 2-3 sets of the circuit. A total of 20-30 minutes of work. After several weeks of conditioning do 3-4 sets of the circuit, usually 30-40 minutes of work. As fitness improves, take less rest.

This program will help improve general conditioning with large groups of muscles. This program can be used for improving cardiovascular endurance, strength, and overall fitness. Beginners should start with rest between sets until conditioning improves.

#### **Sample Circuit training program:**

1. Leg press 15 reps
2. Chest press 12 reps
3. Bench step 2 mins.
4. Abdominal crunches 30 reps
5. Shoulder presses 12 reps
6. Jumping rope 2 mins.
7. Lateral pull-downs 12 reps
8. Triceps Extensions 10-12 reps
9. Bicep curls 10-12 reps
10. Quadriceps Extensions 12-15 reps

Appendix E

**NORTHAMPTON FIRE DEPARTMENT**

**#005**

**POLICY**

**Revision Number: 1**

**Dated: March 1, 2006**

**Physical Fitness Program** **Approved:** \_\_\_\_\_

**PURPOSE:**

The Northampton Fire Department would like to follow the lead of many area businesses and provide time for on-duty members to participate in a fitness/walking program and physical fitness/training program. All members are encouraged to utilize their time and the equipment available to increase their health and fitness levels.

**SCOPE:**

Firefighting is known to be one of the most physically and mentally demanding occupations today. The unique environment, and high-energy demands of firefighting, requires above average levels of physical fitness. Each year, over 50% of the firefighters who die in the line of duty succumb to heart failure. Studies have shown that an increased level of fitness can reduce the risk of these deaths.

**PROCEDURE:**

Any fire company may go to the site designate below, provided other activities have not been scheduled or assigned, between 1300 and 1630 hours. During daylight savings time only, may also include 1830 and 2030 hours. The company will remain in service by radio at all times. The duration should not exceed 2 hours, including travel time. All members should conduct themselves in a professional manner, as you will be representing the N.F.D.

Members shall dress in the station uniform when traveling to the walk site. When on site the uniform shall be uniform pants, uniform T-shirt or sweatshirt, black sneakers may be worn.

Station 1      Smith College Track  
Station 2      Look Park

In addition to the walking program, all fire department personnel will be allowed to work out on duty in the fitness room between the hours of 1800 and 0700 at their convenience.