FIREFIGHTER NUTRITION

Executive Analysis of Fire Service Operations in Emergency Management

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CERTIFICATION STATEMENT

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

Signed:_____

ABSTRACT

The problem this project examines is the Anchorage Fire Department (AFD) was embarking on a nutrition improvement initiative and had limited knowledge of the obstacles and challenges involved with implementation of a firefighter nutrition program.

The purpose of this research was to identify and evaluate the challenges, obstacles, and opportunities associated with implementation of a firefighter nutrition program.

Descriptive research methodologies answer the following research questions:

1. How do members of the Anchorage Fire Department rate their nutrition education level and how do they rate their ability to apply nutrition knowledge? How do members rate the quality of nutrition training provided by AFD and their need for additional training?
2. How do members of the Anchorage Fire Department rate the nutritional quality of their past and present dietary intake? How do members rate the importance of and their willingness to pursue healthful nutrition?
3. How do Anchorage Fire Department members rate fire station culture, schedule, facilities, environment, and incident rehabilitation as they relate to healthful nutrition?
4. What ideas and advice do the University of Alaska nutrition interns have to improve the wellness of AFD members?

The procedures involved each member's self-evaluation of knowledge, environment, and willingness to improve. This survey data answered questions one through three. Nutrition interns from the University of Alaska did an analysis of the survey results and provided professional opinions to answer question four.

Research results provided a department “status report” on numerous nutrition topics. Respondents recognized the importance of nutrition in job performance and health maintenance. They felt their nutrition education was good, but desire additional higher quality training. Members gave an extremely low rating to the nutritional quality of firehouse weekend breakfasts, but report a willingness to “strive to improve” their nutritional habits.

Recommendations included enhancement of Anchorage Fire Department’s commitment to the nutrition program, support of creative nutrition initiatives, and AFD firefighters serving as role models.

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INTRODUCTION

The Municipality of Anchorage (MOA) and the Anchorage Fire Department (AFD) allocated substantial resources to the health and safety of fire fighting personnel. As part of this commitment, the department is striving to meet safety standards established by the National Fire Protection Association NFPA. Additionally, AFD is working to achieve the goals set forth by the International Association of Fire Fighters and the International Association of Fire Chiefs (IAFF/IAFC) in the Fire Service Joint Labor Management Wellness-Fitness Initiative. The problem this project examines is the Anchorage Fire Department was embarking on a nutrition improvement initiative and had limited knowledge of the obstacles and challenges involved with implementation of a firefighter nutrition program. The purpose of this research is to identify and evaluate the challenges, obstacles, and opportunities associated with the development of a successful program.

Descriptive research methodologies answered the following research questions:

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4. What ideas and advice do the University of Alaska nutrition interns have to improve the wellness of AFD members?

BACKGROUND AND SIGNIFICANCE

Background

The Anchorage Fire Department (AFD) has struggled with firefighter nutrition and fitness issues for many years. Similarly, the International Association of Fire Chiefs & International Association of Fire Fighters (1997), suggests that the fire service has a long history of debating the proper way to implement wellness programs for firefighters (p. 43).

Renewed attention was focused on firefighter fitness in 1996, when the International Association of Fire Fighters and the International Association of Fire Chiefs joined together to work on The Fire Service Joint Labor Management Wellness-Fitness Initiative (the initiative) (International Association of Fire Chiefs & International Association of Fire Fighters, 1997, p. iii). The initiative looks at the history of fire fighter health and identifies the inadequacies of contemporary programs. It continues by stressing the importance of intervention by fire service management. In concurrence, Bellingham (2001) stresses the importance of leaders responding before, during, and after a crisis occurs (p. 11).

Reacting to this need, AFD applied for and received a 2001 fitness and wellness program grant through “Title XVII – Assistance to Firefighters” (Bruno, 2001, February, p. 16). A portion of the grant money was spent on nutrition training for AFD members. Unfortunately, a lack of knowledge about the challenges, obstacles, and opportunities involved with a nutrition program limited the effectiveness of the original effort. For example, the department blundered in hiring a physical therapist to conduct the nutrition training. While the training was helpful, the physical

therapist did not have the knowledge, experience, or background to address effectively many challenges presented by the members.

In February 2003, 30 members of AFD were trained as Peer Fitness Trainers (PFTs). Among other topics, this course provided the trainers with basic fire fighter nutrition information. Regrettably, the education level of the PFTs does not permit them to prescribe diets or recommend specific supplements (International Association of Fire Chiefs, International Association of Fire Fighters, & American Council on Exercise, 2003, p. 17).

In the fall of 2003, Anchorage budget shortfalls resulted in the elimination of 40 AFD positions including the Municipality's only heavy rescue unit. Based out of midtown, Rescue 4 had responded to most "substantial incidents" in Anchorage. This staffing reduction refocused attention on the critical importance of the ability of every member to perform when the "unforeseen emergency" occurs.

If changes in AFD membership nutrition do not occur, potential improvements in job performance will not be realized. Davis (1997) states, "The overarching reason for the existence of the fire department in the first place is to protect and serve the community. This mission cannot be accomplished with an unfit work force" (p. 25; Hales, 2003, November 16). Loy (2001) argues, "Obesity-hindered performance saturates fire service". In a study of New York City firefighters, the Bureau of Health Services documented that, "the average weight gain of firefighters in their first year on the job was nearly 15 pounds" (Kelly & Prezant, 2001, p. 18). Perry (2000) contends, "…the health habits many of us practice in the fire station are self-destructive" (p. 68).

Solving this problem will provide the Municipality of Anchorage and the AFD an improved chance of enjoying the benefits of physically fit firefighters. Eating the correct foods at

the correct time can improve performance (International Association of Fire Chiefs et al., 2003, p. 61). If a fire department wishes to run at peak efficiency, Coon (1996) advises ,“fit firefighters are an absolute necessity” (p. 25). Curtis and Davis (1983) state, “…fit firefighters took half the time to complete a series of simulated fire ground tasks as did their less-fit counterparts” (p. 2).

Significance

This applied research paper is linked to the National Fire Academy’s Executive Analysis of Fire Service Operations in Emergency Management (EAFSOEM) curriculum. Unit six of the EAFSOEM student manual states, “The ultimate goal is to get executive fire officers to review their own ‘critical risk’ situations, analyze their preparedness, and take the steps necessary to be prepared” (National Fire Academy, 2001, p. 6-19). This project seeks to improve the readiness, durability, and longevity, of AFD members. This project relates to one of the United States Fire Administration (USFA) operational objectives, which is to “reduce the loss of life from fire of firefighters” (United States Fire Administration, 2001, p. II-2).

LITERATURE REVIEW

A literature review was conducted to analyze the existing body of knowledge on firefighter nutrition. Various nutrition and job performance studies were examined. The literature review included a search of fire service and scientific journals, textbooks, and the Internet. This literature review added considerable support to understanding the challenges, obstacles, and opportunities associated with implementation of a firefighter nutrition program. This section will discuss critical findings in the areas of:

Industry standards
Job performance
Behavior

Change
Illness and disease
Training
Culture
Occupational athlete
Healthful eating advice
Supplements
Hydration
Incident rehabilitation
Challenges

Industry standards

The National Fire Protection Association (NFPA) mandates a firefighter fitness program in NFPA1500, *Standard on Fire Department Occupational Safety and Health Program* (Jacobs, 1990, p. 43). Further, section 5.6.2, of the standard compels the health and safety officer to incorporate nutrition into the health maintenance program (National Fire Protection Association, 2002). NFPA1583, *Standard on Health-Related Fitness Programs for Fire Fighters*, section 6.1.1 requires ongoing training and education regarding general health maintenance (National Fire Protection Association., 2000).

Under the authority of Anchorage Municipal Code 3.30.012-a, AFD has adopted NFPA standards through AFD Policy 901, Safety and Health Program dated May 8, 2000 (Wallace, 1998, p. 69). The document states, "It is the policy of the Anchorage Fire Department to strive to establish and maintain a safe and healthful work environment for its employees. *The Department will comply with all applicable State Occupational Safety & Health Regulations and National Fire Protection (NFPA) Standards"* [italics added] (Withers, 2000 p. 1).

The Fire Service Joint Labor Management Wellness-Fitness Initiative advocates, "…continually educating our uniformed personnel on the necessity of a healthy diet and teaching them how to prepare healthy meals". The initiative goes on to suggest that nutrition education become a significant part of the wellness program, and that healthy eating should be "expected" in the fire station (International Association of Fire Chiefs & International Association of Fire Fighters, 1997, p. 78).

Job Performance

Cascio (1998) states, "If you are truly committed to managing for maximum performance, you pay attention to all the details - all the factors that might affect performance - and leave nothing to chance" (p. 203). Discussing fire fighter malnutrition, Davis (1980) warns, "Malnutrition can result from too much food, too little food or the wrong kinds of food. An unbalanced diet, because of either the quality of food or its quantity, can impair job performance …" (p. 26). Howe (1978) adds, "healthy eating and cooking habits at the fire station are essential to well-being, especially on-the-job performance" (p. 18). Cascio (1998) suggests, "…performance management is a part of a continuous process of improvement over time, that demands daily…attention" (p. 199).

Behavior

Fournies (1978) explains, "When people accept employment in your company they choose to give up the privilege of behaving as differently as they might, because they choose to rent the specific behavior you will pay for." (p. 46). Daniels (2000) laments, "People frequently don't do what they are told. If we always did what we were told, we would eat only nutritious foods…" (p. 18). Harrison-Davis contends, "Good food choices do not happen by accident; they occur when a person takes the responsibility to make changes" (p. 58). Chenoweth (1989)

cautions, "…the success of the program is contingent on its ability to meet employee's needs and interests" (p. 19).

Harrison-Davis (1989) quotes registered dietician Anita L. Owen who states, "As the population ages, healthful eating may become even more widespread. Increasing age appears to be the most important factor in determining health behavior" (p. 46). Smith (1999) advises, "Keep performance, not change, the primary objective of behavior and skill change. The vast majority of people in organizations resist behavior and skill change if they believe it is an exercise in futility" (p. 203).

Coleman (1990) argues that firefighters need to do what the doctor tells them to do. He suggests that if the behavior modification is related to the diet, then the diet must change (p. 28). In an emergency responders survey, 75% of the participants said they wanted to make changes in their food choices (Harrison-Davis, 1989, March, p. 46).

Davis (2000) contends, "either you are coasting (and you can only coast in one direction – downhill), or you are proactively trying to stem the tide of the long slow slide toward taking a dirt nap" (p. 32). Loy (2001) states, "…we reach our peak physiological function at about 30 years of age with a gradual decline of about 0.75 to 1 percent per year" (p. 22). Cooper (1982) advises, "We cannot control our age, sex, or heredity; our most effective course of action, then, should be to reduce those factors which are in our control" (p. 8).

Kiell claims, "Fears of illness or death are not good keys to motivation" (p. 28). Phillips (2000) states, "the best motivation is internal, not external (p. 15). Grant and Hoover (1994) define motivation as, "providing an inner urge that prompts a person to action with a sense of purpose" (p. 162). Hayford (1995) states, "Like other values, your beliefs and attitude about fitness are an individual matter that reflects your own personality and a lifetime of experience".

Concerning the challenge to motivate, Davis (1997) suggests ,“If someone does not want to be fit, there is not much you can do about his or her attitude, but I seriously question the professionalism of a firefighter who is not up to the task” (p. 26).

Change

“Most of us fight change whether the change is ‘good’ or ‘bad’” (Kirby, 1989, p. 64). Ulrich (1997) offers ten reasons why changes do not produce change:

1) Not tied to strategy
2) Seen as a fad or quick fix
3) Short-term perspective
4) Political realities undermine change
5) Grandiose expectations versus simple successes
6) Inflexible change designs
7) Lack of leadership about change
8) Lack of measurable, tangible results
9) Afraid of the unknown
10) Unable to mobilize commitment to sustain change ” (p. 157).

Kirby (1989) states, “When going through any change, people start out ignoring the change itself or even the chance of change. Most hope that the ostrich approach of burying their heads in the sand will make the change go away” (p. 65).

"Individual change is difficult. Most New Year's resolutions fall prey to old practices; habits are hard to change and seldom do" (Ulrich, 1997, p.157). "Change takes a lot of energy as well, and most people fight having to put in the energy it takes to change" (Kirby, 1989, p. 65).

Smith (1999) suggests, "Do not ask people to commit to change; ask them to commit to performance". He goes on to warn, "If you cannot effectively link specific performance outcomes to the change you ask people to make, then you are likely to see change only among the small group of early adopters and change seekers…" (p. 203).

Harrison-Davis (1989) advises, "…nutrition changes will come easier with a healthy base of aerobic activity". She also contends, "Small changes count. Take one day at a time with your changes. Most people fail with exercise and dietary changes because they try too much, too fast, too soon, and are then harsh with themselves for not succeeding" (p. 58).

Jacobs (1990) states, "Regardless of the individual's ability and willingness to change, opportunities often depend on certain changes occurring in the department or company. If these do not take place, it is impractical for the individual to make much change". Additionally, he advises, "Rather than focusing total attention and change on the individual an equal amount of consideration must be on restructuring and changing the environment" (p. 94).

Illness and Disease

Lack of nutrition knowledge and poor diet can contribute to the development of lifestyle related diseases such as heart disease, cancer and obesity (International Association of Fire Chiefs et al., 2003, p. 26). Shelley (2001) stipulates the main causes of death in America are lifestyle-related illnesses. She goes on to point out that researchers feel poor nutritional habits are

to blame 63 percent of time (p. 38). Powers (2000) contends that good nutrition is as important as exercise. He feels poor eating habits are a big contributor to bad health (p. 68).

Training

"It is difficult to speculate about the extent to which the various misconceptions influence the nutritional status of firefighters, but the need for nutrition education in the firehouse seems evident" (Davis & Herbst, 1980, July, p. 27). "Education is the keystone to taking on any new task. When it comes to losing or gaining weight, understanding nutrition is the key to healthy eating" (Nugent, 1993, July, p. 48).

Jacobs (1990) states, "Appropriately implemented training and development renders a service and provides a return on investment to both the company and the individual" (p. 94). Green (1987) advises, "Diet modification education should contain at least three components: 1) Information on foods high in saturate fats and cholesterol which are to be eaten in moderation, 2) information on the best foods to eat, and 3) techniques on food preparation". Further, he asserts that since cardiovascular disease is the primary health problem in the fire service, nutrition education should focus on the diet-heart relationship (p. 73).

Concerning nutrition education, Harrison-Davis (1989) quotes registered dietician Anita L. Owen who stresses the importance of finding people at a time when they are willing to learn. She suggests, "…the elderly or mature population, for example, really begins to feel vulnerable at about age 50. You can get to a pregnant woman during that teachable moment in her life. Teens of course, think that nothing will ever hurt them…" (p. 49).

"It is ironic that while we train EMTs and paramedics to care for others, identify risk factors and encourage prevention strategies, we do not take the time to educate providers about

their own health and fitness" (Davies, 1998, May-June, p. 24). "Only with knowledge can you make smart, disciplined choices about what diet is best for your particular circumstances" (O'Connor, 1995, October-November, p. 26).

Bizjak and Adams (1999) state, "Each individual brings something different to the learning environment and expect something significant from the learning experience" (p. 5). "The leaders job is to work with the employee to mesh individual needs…with the organization's needs for performance and results" (Staley, 1998, p. 122).

Culture

"Ever since our time in the cave, few things have brought more people together faster than the mutual preparation and enjoyment of a beautiful meal. Nowhere is this more evident than in the firehouse…" (Powell, 1988, p.1). Phillips (2000) states, "when crews cook together, they frequently eat like royalty" (p. 14). Bonanno (1995) recalls "…wonderful meals cooked by veteran firefighters…paid no attention whatsoever to the amount of fat they used or the nutritional content of their meals. Butter was added in mass quantities to everything" (p. 2).

Shelley (2001) states, "Overeating and unhealthy foods can also be comforting". She also describes firefighters using food as a reward and that the 'macho stereotype' is a big obstacle to healthy eating (p. 38). Davies (1998) states, "Our crews are in the do-everything-fast mentality" (p. 24). Powers (2000) contends, "Contrary to popular opinion, EMS jobs do not necessitate eating at fast-food restaurants 24 hours a day" (p. 68).

Bonanno (1995) reports that when he cooked his own low-fat meals, he had to endure "…skepticism and numerous 'witty' remarks" (p. 3). Devanna (1984) warns, "Problems and

internal tensions emerge when the ideas, behaviors, and values stressed in an organization's strategy clash with those embodied in the organization's culture" (p. 218).

Fueling the Occupational Athlete

Sports nutrition specialists have proven proper diet improves athletic performance (Phoenix Fire Department, 2002, p. 8). "Like the football player, the firefighter must constantly be prepared for sustained action while on the job" (Madden, 1979, January, p. 16). Loy (2001) states, "…you need to eat the right foods at the right time. A powerful engine that's out of gas is of little value" (p. 22).

O'Connor (1995) advises, "A healthy diet can be defined as one that fosters good health and provides the necessary calories to achieve energy balance" (p. 20). He further advises, "Keep in mind that health and performance requirements are not always satisfied by the same diet. For example, you can have a very healthy diet that does not meet your caloric requirement for work and exercise" (p. 26).

"There is not consensus among nutritionists regarding what is the best diet, the healthiest diet, or the best food for enhancing athletic performance. Many are effective. The key seems to be selecting the one that meets individual nutritional needs" (O'Connor, 1995, December, p. 26).

Healthful Eating Advice

"Unfortunately, when it comes to diet and nutrition, there is no single 'answer' applicable to everyone" (O'Connor, 1995, October-November, p. 26). Stefano (2000) advises, "Remember that the goal is to improve on what you are now eating, not to live up to anyone else's standard or to achieve perfection" (p. 40).

"We all have different daily caloric requirements based on activity levels and natural metabolic rates. The number of calories consumed daily must be adjusted to fit individual needs. It's not something you can just look up on some chart" (Stefano, 2000, p. 40). "As a rule of thumb, make small, permanent changes. Trying to change all of your eating and exercise patterns at once often means feeling overwhelmed and setting yourself up for failure. Remember … that every small change counts" (Harrison-Davis, 1989, March, p. 47).

Madden (1979) says the question of how a firefighter should provide her or himself with needed energy reserves without an excessive diet is controversial among nutrition professionals. He suggests, "The consensus is that regular exercise, which raises the blood sugar level by releasing glycogen through the muscles, combined with a well-balanced diet of moderate portions rather than large ones is the best way to maintain a healthy energy level". He advises, "The food one eats can either endanger one's heart or protect it. It can make one sluggish on the job or provide one with the energy necessary to endure the rigors of…a shift" (p. 16). "People who are physically active tend to make better food choices" (Harrison-Davis, 1989, March, p. 49).

"Take command of your dietary intake. Do not settle for what is easiest" (Madden, 1979, January, p. 5). "When you figure that 40% of the population is at some sort of heart-disease risk, you realize that the total population should be following a low-fat, low-cholesterol diet" (Harrison-Davis, 1989, March, p. 47).

Powers (2000) advises, "…select foods high in carbohydrates and proteins, but low in fats. Pay attention to food groups: Grains and pastas should make up most meals, followed by fruits and vegetables and meats and dairy products" (p. 68). "Avoid dishes that are dried, deep-

fried, creamed, or served in butter sauce. Look for foods that are broiled, grilled, poached, steamed, and roasted" (Bonanno, 1995, p. 21).

Nugent (1993) advises, "The key to optimum performance is replenishing your glycogen level with foods high in complex carbohydrates during each meal" (p. 49). "Replace high-fat breakfast foods such as whole eggs, bacon, sausage, and butter- or margarine-spread muffins with whole-grain cereals, fruits, and plain bread" (Bonanno, 1995, p. 20).

Shelley (2001) states, "In every firehouse you should have a bowl of fruit out in the morning" (p. 38). "If you occasionally crave junk food, eat it early in the day" (Bonanno, 1995, p. 21).

Powers (2000) feels it is much healthier for the firefighter to pack a well balanced meal at home and bring it to work (p. 68). Davies (1998) agrees, "Packing your lunch is by far the best way to go. The major drawback is the time spent on preparation. Most providers are already on a tight schedule and may find it hard to take time in the morning to prepare the day's meals (p. 25). Bonanno (1995) warns, "Just before bed is the worst time for 'junk' food. Your metabolism works at half speed while you sleep. If you are hungry late in the evening, try a high-carbohydrate food, such as fruit, and keep the calorie count to 100 or below" (p. 21). Concerning shift work, Riese (1997) advises, "On the night shift, eat small protein-rich meals and avoid fats and sugars. Stay well hydrated…avoid using caffeine to keep you awake, especially when you plan to sleep after your shift. Have a light snack before you sleep; a bowl of cereal, some crackers, or a sandwich" (p. 63).

To improve alertness through eating procedure, Dr. Judith Wurtman recommends eating the protein portion of a meal prior to eating carbohydrates. She contends there is an 'amino horse

race' to see which chemical the brain will accept after you begin to eat. She suggests after one amino chemtestant crosses the brain's finish line, the other is locked out and that there is only one winner. Therefore, she advises shift workers to eat protein first which provides tyrosine to the brain. Tyrosine is crucial to alertness, quick thinking, fast reactions, and memory (McBride & Westfall, 1992, p. 71).

Passwater (1989) advises, "Good nourishment not only helps us become better firefighters, but we owe it to our families to protect ourselves as much as possible" (p. 45). Harrison-Davis (1989) contends, "A balanced diet of a variety of foods in moderation can be the first step to stress management" (p. 47). "From a practical standpoint your diet should include food that you enjoy. If you do not consider this last point, you will never stick to a diet" (O'Connor, 1995, October-November, p. 27).

Supplements

Concerning supplements Hayford (1997) warns, "…when something is labeled a 'dietary supplement' it is considered a food (and not a drug), and food products traditionally have not been subjected to the same level of scrutiny". He contends that if supplements were considered to be drugs, "many of the claims made by their manufactured would be exposed as false or misleading, and the products would never make it to your local health food store" (p. 72).

Passwater (1989) recommends firefighters intake 10,000 to 12,000 i.u. of vitamin A (and beta carotene), 250-1000mg of vitamin C, 50-400 i.u. of vitamin E, and 200mcg of Selenium as protection against low levels of smoke and toxic gases. (p. 44). Howe (1987) suggests, "…fire personnel should be encouraged to take - both on - and off duty a good multivitamin/mineral supplement to help avoid possible deficiencies" (p. 22).

Hayford (1997) states, “In controlled laboratory studies, the vast majority of dietary supplements have been shown to have no beneficial effect on strength endurance, health, or longevity” (p. 72).

Hydration

“Water is often the forgotten nutrient” (Harrison-Davis, 1989, March, p. 58). Nugent (1993) says water is the most vital (p. 137). “Firefighters should be especially aware of the need for generous amount of fluid intake as part of their diets. Because of the nature of the business, firefighting exposes one to a high risk of dehydration and heat injury” (O'Connor, 1995, December, p. 20).

Loy (2001) explains, “The body is like an engine – if you don’t keep it cool, it’s not going to work at peak efficiency or, in the worse case, it may not perform at all” (p. 46). “Your ability to tolerate heavy work in protective gear and in hot environments is significantly improved if you are well hydrated before you go to the fire ground” (O'Connor, 1995, December, p. 20).

“When the blood becomes too salty, it draws water from the salivary glands, this dries out your mouth and makes you feel as if you need something to drink. The salty blood signals the brain directly that more liquid is needed. Thirst is unfortunately an imperfect signal” (Nugent, 1993, July, p. 137).

Dickinson (2000) suggests the following strategies for maintaining adequate hydration:

1) avoiding excessive use of caffeinated beverages while on duty, as these liquids promote excessive urination,

2) avoiding excessive alcohol use before coming on duty; residual dehydration is common with hangovers,

3) being aggressive about personal rehydration after strenuous, non-duty related activities such as competitive sports or running,

4) monitoring urine, which is a sensitive indicator of hydration status. Urine should be clear in color and odor free. Increase fluid intake if urine darkens" (p. 117).

"Water lubricates surfaces and serves as the main avenue for temperature regulation, it is necessary for every function of the human body" (Phoenix Fire Department, 2002, p. 7). "Dehydration reduces the volume of bodily fluids. Less fluid (blood) carries less heat into the periphery, therefore, increasing the danger of cold injuries to extremities" (Kaiser, 2002, p. 89). Nugent (1993) suggests, "…drink before your body tells you that you are thirsty" (p. 137).

Incident Rehabilitation

Dickenson (2000) states, "Replenishing fluids can help in preventing dehydration, reducing the risk of certain heat-related emergencies, and lessening cardiovascular stress in already dehydrated firefighters" (p. 111). Additionally, he argues, "Because of the body's limited ability to store carbohydrates, carbohydrates must also be provided to emergency responders sent to rehab as part of fluid and food replenishment" (p. 116).

Smith (1996) advises, "When considering drinks to use during the rehabilitation cycles of a fire look for those that have glucose polymers and fructose. Try to avoid products with sucrose, dextrose, corn syrup, or sugar on the label" (p. 63). United State Fire Administration (1992) suggests, "The rehydration solution should be a 50/50 mixture of water and a commercially prepared activity beverage and administered at about 40 degrees F" (p. 4).

To supplement the beverage, "use commercially available, individually packaged snack bars for minor nutritional support." (Dickinson & Weider, 2000, p. 116). "A cup of soup, broth,

or stew is highly recommended because it is digested much faster than sandwiches and fast food products" (United States Fire Administration, 1992). Dickenson (2000) states, "…complex carbohydrates are perhaps the most important component of any solid foods provided to on-scene personnel. Fruits such as oranges, bananas, and apples are excellent sources of complex carbohydrates…" (p. 118).

Concerning rehabilitation Stefano (2000) states, "It takes 24 hours after intense exercise before muscle glycogen is restored. Studies have shown that when carbohydrate consumption is delayed after exercise, muscle glycogen storage is reduced and recovery is impaired" (p. 27). After operations are completed, Dickinson (2000) feels "firefighters should ingest an additional 8 to 32 ounces of electrolyte- and carbohydrate-containing fluids over the 2 hours following the operation". Additionally, he states, "If a firefighter notes that his or her urine continues to be dark in color or strong in odor after returning to the station or home, then additional rehydration will be necessary to restore a proper water balance" (p. 120).

Challenges

Studies and professionals have identified many challenges to a successful fire fighter nutrition program. Phillips (2000) refers to the challenge of staying away from fire station donuts, cookies, ice cream, and sweets (p. 14). "The Mayo Clinic states, "…most of us are not getting enough fiber in our diets" (p. 30). Davis (1990) states, "I have heard many comments from firefighters as to how they frequently are unable to eat a balanced meal due the heavy, and frequently interrupted, work schedule" (p. 5).

Phillips (2000) describes the challenge faced by members who are very hungry because they missed a meal and are in a hurry to eat before the next call" (p. 14). Harrison-Davis (1989) states, "…personnel already have the basics in their knowledge base. The issue seems to be a

lack of time to follow through with the information and make appropriate choices" (p. 46). Howe (1987) contends, "…convincing fire personnel to 'eat healthy' is not so clear-cut" (p. 19). Harrison-Davis quotes registered dietician Anita L. Owen who laments, "Americans seem to view the home as a place for simple and healthful foods, but once away from the home, it becomes more acceptable to satisfy the desire for the forbidden foods" (p. 47).

Davies (1998) reports, "In general they do not take the time to prepare healthy food or address their individual need for fitness" (p. 24). Howe (1978) refers to the traditional fire service diet as a "potentially fatal risk we can longer ignore" (p. 17). Harrison-Davis (1989) states, "…the most common reason given for making inadequate choices was no time…" (p. 46).

Loy (2001) laments about firefighters in denial, "It seems the prevailing health theory among firefighters is, 'If I don't know anything is wrong, then I'm healthy – I am immortal' " (p. 29). Some members may be in denial and have the big sky – little bullet theory about nutrition (Davis, 2000, November, p. 33).

Riese (1997) says shift workers may try to eat throughout their shift to stay alert. They also may crave fat and sugar-laden carbohydrates when sleepy to fulfill a calming desire and feelings of overwork. He continues, quoting Peggy Westfall-Lake, "These foods in turn may work against them causing even more fatigue. If continued, they may gain weight and have less energy and less self-esteem" (p. 61).

Davis (1990) claims, "Clearly there is a fixation about looking good. Unfortunately, simply looking good may not represent an appropriate health status. (p. 5). "People become focused on what their body weight is and what the scale says. It is healthier to focus on how fit you are" (Harrison-Davis, 1989, March, p. 49). Davis (2000) laments about unrealistic expectations of firefighters and the Adonis factor. He states, "Fitness is not about what you look

like, it is about the patency of your coronary arteries. It is about your resistance to fatigue and a lot of other neat physiological stuff" (p. 33).

Division Chief Scott Pelton of the Phoenix Fire Department states, "Firefighters who eat low carbohydrates are very vulnerable to hitting the wall, which could lead to profound fatigue and poor cognitive abilities". Kevin Malley the director of human performance for the New York City Fire Department advises, "One thing you should never do is get involved with the Atkins Diet" (Shelley, 2001, September-b, p. 40).

"Given the erratic hours, high-risk situations, and very demanding and stressful life-styles of EMS personnel, it is particularly important to make healthy food choices that increase vitality and alertness" (Harrison-Davis, 1989, March, p. 46). "Most people, firefighters included, shun a change in eating habits for two primary reasons; a lack of knowledge about the seriousness of a poor diet, and a perception that such change will be unpalatable, costly, time-consuming, and restrictive" (Howe, 1987, Fall, p. 19).

Riese (1997) cites Peggy Westfall-Lake who stresses the importance of proper diet, fitness, and sleep for shift workers. She states, "…to the shift worker, these areas are critical and could mean the difference between a full, healthy life and disastrous consequences" (p. 64). Harrison-Davis (1989) laments, "For a person who is more than ready to give of himself to others and to be on call to save other people's lives at a moment's notice, it can feel uncomfortable to consider putting yourself and your health higher on the priority list of life" (p. 47).

Bezold, Carlson, and Peck (1986) state, "...public employers are reluctant to commit the dollars to what might be perceived as 'luxuries'. As promotion of health becomes a more legitimate component of work, public sector programs are increasing…" (p. 151).

Literature Review Summary

The literature review was central to the identification and evaluation of important program components and ideas. Marvel Harrison-Davis' journal articles provided a significant contribution to this project. Harrison-Davis provided insight, ideas, and advice to members of the fire service. Her knowledge of job requirements, nutrition needs, and possible solutions made her input indispensable.

PROCEDURES

Research Methodology

The desired outcome of this research project was to foster recommendations that would promote proper nutrition and reduce future injuries and deaths of AFD members. Descriptive research methodologies answered the research questions. The research was descriptive in that a survey clarified and reported the present level of knowledge, attitudes, and opinions of the members.

Process

Literature Review

The literature review began at the Learning Resource Center (LRC) at the National Fire Academy (NFA) in Emmitsburg, Maryland. The electronic card catalogue was searched for relevant material. The key search terms used were nutrition, motivation, fitness, systems, organizational theory, and program management. The search revealed several relevant trade journals, textbooks, and Applied Research Projects. The search continued through the Anchorage Fire Department, Anchorage Municipal, and University of Alaska libraries and on the Internet.

Membership Survey

Descriptive research methodologies were used to determine and report the attitudes, opinions, and knowledge of AFD members. The purpose of the survey was to clarify the status of the membership.

The survey utilizes a Likert scale, which is described by Cornell University (2001) as a scale that may be shown as a series of numbers like one-to-ten, or ordered words like poor-to-excellent, or even as a purely graphical scale. The respondent merely checks off or circles the point in the scale that—in his or her opinion—best answers the question posed by the item. The score for the item is a value on an *ordinal* scale (para. 1).

A list of 44 survey questions (see appendix A) was compiled from information gained during the literature review. A 10-point Likert scale survey instrument was created and used in hopes that it would help to create enough point spread to adequately rank the list (see Table 1). As illustrated, a score of zero reflects a “poor” or “low” rating while a score of ten indicates “excellent” or “high”. Draft copies of the survey were submitted to 10 members for evaluation of purpose and clarity.

Table 1

Rating Scale Example

2. On average, how do you rate the nutritional quality of firehouse group weekend breakfasts?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

161 surveys (survey population n=283) were completed by the candidates prior to a training session at the AFD training center. Candidates were instructed to use the survey instrument to rate their own knowledge, skills, and abilities.

Analysis of Data

Guided by McEwen's, *Fire Data Analysis* (2000), which states, "simple average or mean is calculated by summing all the data values and dividing by the number of observations" (p. 42), the data were compiled, tabulated and assembled in a spreadsheet format. The survey results were calculated by creating a spreadsheet with a column for each of the 11 numerical choices (0 through 10). As the surveys were tallied, a mark was placed in the box below the representative numerical choice. The number of marks in each box was multiplied by the number coinciding with the column (see Table 2). For example, the number 6 (**bold column**) in the "Numerical Rating" row represents a 6-point rating. The number 16 in the "Candidate Selection" row (**bold column**) indicates that 16 candidates ranked question # 2 with a score of "6", 16 marks were made on the tally sheet as the surveys were counted (6 points × 16 marks = 96 points for the box). The sum of the totals (bottom row) were divided by the number of surveys completed by candidates (630÷161=3.92) to give the average rating found in the lower right corner of Table 2.

Table 2

Example of Scoring Method used to Determine Value Ratings

QUESTION #2 ***Nutritional Quality***							↓					Total Surveys	Total Points	Average Rating
Numerical Rating	0	1	2	3	4	5	**6**	7	8	9	10			
Candidate Selection	2	10	26	38	29	25	**16**	8	3	2	2	161		
Total Score	0	10	52	114	116	125	**96**	56	24	18	20		630	3.92

This method was recommended by Wallace (1998) in his book, *Fire Department Strategic Planning,* and was used by Strahan (2001) for data analysis in his applied research project (p. 27).

Assumptions and Limitations

The assumptions were that the respondents understood the survey questions and they answered truthfully. The validity should be high based on the assumption that a 161-person response with a base of 283 would provide close to a 95% statistical reliability based on Krejcie and Morgan's table found in the National Fire Academy's Executive Development student manual (1998, p. 3-40).

The membership survey had several limitations including:

- A linkert scale is a unidimensional scaling method and is more appropriately used to measure a concept that is one-dimensional in nature.
- The respondent might have felt the lack of a comparison reference for a particular question.
- Because of the diverse backgrounds of the respondents, various questions may have had different meanings.
- The survey procedures utilized did not provide any data analysis beyond a simple overall average (Cornell University, 2002, ¶ 2).

RESULTS

Results of this research answer four research questions.

Research Question 1. How do members of the Anchorage Fire Department rate their nutrition education level and how do they rate their ability to apply nutrition knowledge? How do members rate the quality of nutrition training provided by AFD and their need for additional training?

AFD members recognize the importance of nutrition in health maintenance, disease prevention, and job performance with "high" ratings on the survey (see table 3). They rate their knowledge of nutrition as "good", but score their knowledge of the food guide pyramid, the dietary guidelines for Americans, and the nutritional facts label slightly lower. They rate their ability to compute the percentage of fat in a food product between fair and good. The members assess their ability to set realistic nutritional goals and to modify behavior patterns as "good".

Anchorage firefighters assess the quality of nutrition training currently provided by the department as "fair". They rate their need for additional training and their willingness to assist other members in improving their nutrition habits as "medium".

Table 3

Research Question 1 Results

5. How do you rate your knowledge of **basic terms and concepts** of nutrition?										
Poor				Fair			Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Respondent Comments

- "I don't know jack about nutrition".

6. How do you rate your knowledge of **dietary guidelines of good health**?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

7. How do your rate your ability to identify **unhealthy eating patterns**?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

8. How do you rate your knowledge of **risks associated** with unhealthy eating patterns?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

9. How do you rate your knowledge of **proper hydration**?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

10. How do you rate your knowledge of the **food guide pyramid**?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Respondent Comments

- "The food pyramid doesn't help me carbs contribute to my weight gain".
- "All those healthy "diet" questions…my idea of a healthy diet is very different from the governments feedlot pyramid".

11. How do you rate your knowledge of the **Dietary Guidelines for Americans**?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

12. How do you rate your ability to interpret information presented on a **nutritional facts label**?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

13. How do you rate your ability to use a nutrition facts label to **compute** the percentage of fat in a food product?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

14. How do you rate your ability to set **realistic nutritional goals**?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

15. How do you rate your ability to **modify** your behavior patterns?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

16. How do you rate the importance of nutrition in **health maintenance**?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

17. How do you rate the importance of nutrition in **disease prevention**?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

18. How do you rate the importance of nutrition in **job performance**?										
Low					Medium					High
0	1	2	3	4	5	6	7	8 ↑	9	10

Respondent Comments

- "The nutritional aspect could be addressed during the yearly physical assessments".

19. How do you rate the importance of **hydration in job performance**?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9 ↑	10

37. How do you rate the **quality** of nutrition training provided by AFD?										
Poor			Fair				Good			Excellent
0	1	2	3	4 ↑	5	6	7	8	9	10

Respondent Comments

- "I don't believe that our contracted fitness advisor keeps up with the newest nutritional trends. Last time I spoke with her she did not even know about the new nutritional pyramid. She seems to go with the party line and not do much research to keep current. Next time I hope a better choice is made".
- "Provide better course of instruction".

38. How do you rate your need for **additional** nutrition training?										
Low					Medium					High
0	1	2	3	4	5	6 ↑	7	8	9	10

Respondent Comments

- "Specific nutrition info posted in kitchens at stations".
- "I believe there is a great void in our training and attitudes regarding nutrition. I hope that we develop a great program that is greatly supported by our administration".
- "One on one time with nutritionist would be helpful".

39. How do you rate your willingness to **assist other AFD members** in improving their nutrition habits?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

Respondent Comments

- "Unfortunately many members see information on nutrition as preaching to them there is a lack of willingness to consider new information in addition there is a large amount of misinformation among AFD personnel regarding nutrition we need training, but it will be a challenge to get the new information accepted".

Research Question 2. How do members of the Anchorage Fire Department rate the nutritional quality of their past and present dietary intake? How do members rate the importance of and their willingness to pursue healthful nutrition?

Members were asked to rate the nutritional quality of their diets at three points in time (see table 4). They said one year ago that their diet was slightly below "good". They report that prior to being hired their diet was slightly better and that presently, it is slightly better yet.

Department members appraise their effort to maintain a balanced healthful diet as "good". They claim there is a "fair to good" chance they will consume a nutritious breakfast on the morning their shift begins. They report a "medium" inclination to overeat and consume unhealthy foods. They score their inclination to use food as a reward as "low to medium".

Members rated willingness to strive to improve nutritional habits and willingness to modify eating habits in an effort to improve job performance as "medium to high". They report there is "low" possibility alcohol consumption has negatively affected their job performance.

Respondents gauged their willingness to encourage members, family, and friends to bring healthful foods to the station as "medium". The also rated their willingness to bring healthful foods to celebration events at the station as "medium".

Table 4

Research Question 2 Results

20. On average, how do you rate your **effort** to maintain a balanced healthful diet?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

21. On average, how do you rate the likelihood you will consume a **nutritious breakfast** on the morning your shift begins?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

22. How do you rate your inclination to **overeat**?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

23. How do you rate your inclination to consume **unhealthy foods**?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

24. How do you rate your inclination to use **food as a reward** to yourself?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

25. How do you rate the possibility that **alcohol consumption** has negatively impacted your job performance?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

28. How do you rate your willingness to take the **time** to prepare health foods?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

29. How do you rate your willingness to **strive to improve** your nutritional habits?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

30. How do you rate your willingness to modify your eating habits to **improve job performance?**

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

31. How do you rate your willingness to bring healthful foods to "**celebration"** events at the station?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

32. How do you rate your willingness to encourage members, family, and friends to bring **healthful foods** to the station?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

42. How do you rate the nutritional quality of your diet **prior to being hired** by the Anchorage Fire Department?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6 ↑	7	8	9	10

43. How do you rate the nutritional quality of your diet **one year ago**?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	↑	7	8	9	10

44. How do you rate the nutritional quality of your **present** diet?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6 ↑	7	8	9	10

Research Question 3. How do Anchorage Fire Department members rate fire station culture, schedule, facilities, environment, and incident rehabilitation as they relate to healthful nutrition?

Department members score the nutritional quality of firehouse group weekend breakfasts at “fair” and group dinners as “fair to good” (see table 5). They rate the overall nutritional value of foods consumed by members while on duty as “fair to good”. On average, they consider the nutritional habits of AFD members to be “fair to good”. Respondents rate social pressure as a barrier to good nutrition as “medium”, and consider cultural factors as a barrier to rank “low to medium”.

Concerning the adequacy of station facilities for preparing nutritious meals, members rated kitchen and appliances as “good”, cooking facilities and prep space as “fair to good”, and storage facilities as “low to medium”. Members rate the present AFD system for providing

timely and appropriate hydration (in rehab at an incident) as “fair to good” and score the providing of nutrition as “fair”.

Table 5

Research Question 3 Results

1. On average, how do you rate the nutritional quality of **firehouse group dinners**?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Respondent Comments

- “Depends on the cook”.
- “Don’t do them”.
- “The nutritional value could be much better as often meals get interrupted like phone calls and training. Many time folks go for the fast foods or order in/out”.

2. On average, how do you rate the nutritional quality of **firehouse group weekend breakfasts**?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Respondent Comments

- “Don’t do them”.
- “The firehouse weekend breakfast tends to be toward fatter foods - fried”.

3. On average, how do you rate the overall **nutritional value** of foods consumed by AFD members while on duty?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Respondent Comments

- "Don't know".
- "Varies by crew".
- "Christmas time".

4. On average, how do you rate the **nutritional habits** of AFD members?

Poor			Fair				Good				Excellent
0	1	2	3	4	5	6	7	8	9	10	

Respondent Comments

- "In questions asking about my perceptions about AFD meals and general nutrition (questions 1 to 4) it should be know that I work at station 1 C shift where a high percentage of employees work out on a regular basis and eat relatively healthfully. I answered such questions based on my experience with them however in traveling to other stations I have noticed a decline in the nutritional standards of employees".
- "Depends on whom".
- "Don't know".
- "Depends on the station".

26. On average, how do you rate **social pressure** as a barrier to good nutrition for AFD members while on duty**?**

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

27. On average how do you rate **cultural factors** as a barrier to good nutrition for AFD members while on duty?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

33. How do you rate the adequacy of AFD food **storage facilities** for preparing nutritious meals?

Poor			Fair				Good				Excellent
0	1	2	3	4	5	6	7	8	9	10	

Respondent Comments

- "Station 3 poor".
- "Most stations limited storage space".

34. How do you rate the adequacy of AFD **kitchen equipment and appliances** for preparing nutritious meals?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6 ↑	7	8	9	10

Respondent Comments

- "Station 3 poor".
- "Some stations appliances are old and inadequate".

35. How do you rate the adequacy of AFD food **cooking facilities and space** for preparing nutritious meals?

Poor			Fair				Good			Excellent
0	1	2	3	4	5 ↑	6	7	8	9	10

Respondent Comments

- "The quality of the kitchens really varies and makes it hard to prepare a proper meal especially station 3, 6, 10 these are inadequate facilities".
- "Station 3 poor".
- "Station 3".
- "Food prep areas small not everyone can eat at once".

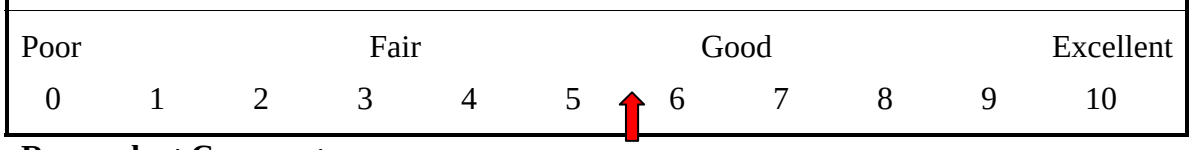
36. How do you rate the adequacy, scheduling, and allocation of **time** for preparing and consuming nutritious meals while on duty?

Poor			Fair				Good			Excellent
0	1	2	3	4	5 ↑	6	7	8	9	10

Respondent Comments

- "Its very difficult to plan to prepare health foods as a paramedic on medic rig with call volume and reports that must be written sometimes you are lucky to be able to heat up a frozen burrito. There probably is no good solution to this just an observation".
- "Very difficult when working on MICUs".
- "Time to cook can be tough depending on which station one is working at".
- "Being on a medic rig it is impossible to cook unless it involves a microwave or you may not eat".
- "Can't change - runs can't be stopped".

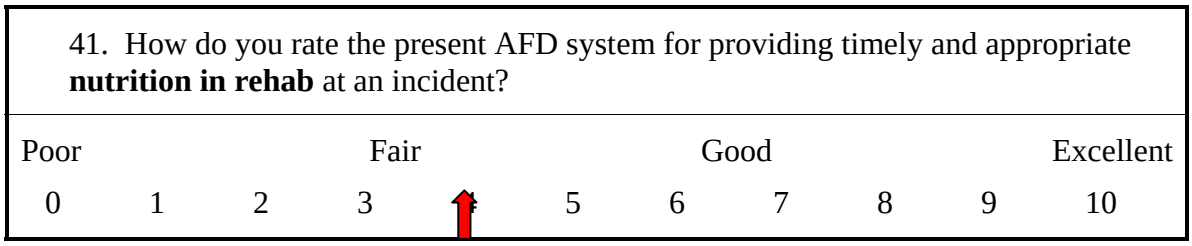
40. How do you rate the present AFD system for providing timely and appropriate **hydration in rehab** at an incident?



Respondent Comments

- "Not enough incident experience to properly assess".
- "It appears there is no system for providing h2o and food at rehab. On the early morning fires I have been on, I am starving and there is nothing there after heavy work except what I may have in my personal gear. Likewise if I make an effort to get h2o I can usually get it. But there doesn't seem to be system".
- "What system"?
- "Needs to be consistent and enforced. AFD rehab needs to be improved it seems that most firefighters do not take it seriously. I feel that the ISOs need to take a more proactive approach to insuring rehab gets set up correctly and people use it. Central Mat Su Fire Department has a very solid rehab that its medic rigs set up. They also change all of bottles so that they can keep track of who needs to be in rehab. "You have to go to the rehab people to get a bottle" A tarp is set out and all of the bottles are laid out. Like herding cattle they will go to where the watering hole/bottles are at".
- "Water provided but nothing to replace electrolytes".

41. How do you rate the present AFD system for providing timely and appropriate **nutrition in rehab** at an incident?



Respondent Comments

- "Rehab seems to be hit or miss depending who is on scene".
- "Again what system"?
- "No food generally provided unless Red Cross shows up and it is of poor quality".

Research Question 4. What ideas and advice do the University of Alaska nutrition interns have to improve the wellness of AFD members?

Five University of Alaska nutrition interns provided professional advice (see table 6) after reviewing the survey results and making ten "nutrition education" presentations to firefighters at the fire stations.

Table 6

Research Question 4 Results

1. What suggestions do you have to improve the nutritional quality of firehouse group weekend breakfasts?

- Provide fruit basket to sit around the firehouse kitchen
- Use egg substitutes
- Low fat dairy products
- Low fat meats (Ham, Bacon vs. Sausage, Beef)
- Use whole wheat bread or bagels
- Use light margarine or Pam cooking spray oil
- Use canola, olive, safflower oils
- Avoid cooking bacon, sausage, hash browns, and eggs everyday
- Limit to one big meal per weekend
- Consider oatmeal or other high fiber cereals
- Make shopping list of healthy foods
- Have a designated person to do the shopping
- Healthy choices such as fruit, bagels, scrambled egg beaters vs. high fat meats
- I am not quite sure what has already been done, but I think it is a good idea to have group breakfast so that everyone is encouraged to eat breakfast. For general breakfast ideas, use ham instead of sausage or bacon, use whole wheat flour mix to make pancakes, use sugar free syrup, and try to have something whole wheat.

2. What recommendations do you have for firefighters concerning the consumption of a nutritious breakfast everyday?

- Breakfast is important to get the metabolism going for the day. Choose foods that are nutritious to ensure proper consumption of vitamins and minerals (Refer to question #1)
- Limit caffeine to 2-3 cups per day
- 3 food groups and a balanced breakfast (fruit/grain/dairy/protein)
- A nutritious breakfast is important to consume every day, especially for firefighters, as others lives depend on their life and health.

3. What suggestions do you have to improve the nutritional quality of firehouse group dinners?
   - Consider baking, grilling, broiling, steaming, stir frying instead of frying foods
   - If frying foods, use olive, canola, safflower, or corn oil
   - Choose fruit for desserts instead of baked goods or ice cream
   - Consider lean meats
   - Use red sauce instead of creamy white sauce
   - Make vegetables the bulk of the meal (1/2 of plate should be vegetables)
   - Replace regular soda with diet, crystal light, or water
   - Limit take out to 1-2 times per week
   - Don't pour salad dressings on salads, use fork to dip in dressing on the side of the salad
   - Cooking together probably = best, easiest to cook healthy group meal
   - Emphasize colored vegetables
   - See healthy cooking tips in the self-study guide.

4. What recommendations do you have for firefighters who are inclined to overeat?
   - Increase fiber foods and water intake to feel more full
   - Fill up on vegetables
   - Eat off a smaller plate
   - Take what you need, don't take the whole bag of chips
   - Do not go back for seconds
   - Eat slowly
   - Journal, examine why you're eating vs. just eating
   - Snack on something low fat/low calorie throughout the day, so that he/she is not inclined to overeat. If they still overeat, then exercise enough to compensate for it.

5. What advice do you have for firefighters who are inclined to consume unhealthy foods?
   - Limit intake and amounts of unhealthy foods
   - Try not to buy unhealthy foods
   - Keep a variety of healthy snacks around
   - Balance unhealthy foods with healthy foods
   - Improve vending machine choices
   - Healthy snack ideas
   - Try phasing out unhealthy foods out of the diet, for example: start with cutting down on doughnuts, then cutting them out completely, then French fries, then all fried foods. Soon they won't taste as good. Or try other alternatives; drink diet soda instead of regular soda. Moderation is key!

6. What guidance do you have for firefighters concerning social pressure and cultural factors as barriers to good nutrition?

   - Set a good example for everyone else
   - Do what's best for you
   - Set specific goals
   - Use food diary to evaluate your diet

- Start slow by making small changes
- Reverse peer pressure
- Do not give up, eat somewhere else, make sure others know that good nutrition is important, use excuses, i.e.: “I have diabetes”.

7. What advice do you have for firefighters concerning fad diets?
   - Refer to self-study presentation
   - Consult a registered dietitian
   - Check credentials of person trying to promote the diet
   - Be careful long-term habits can do more harm than good
   - Discuss with MD or RD
   - Find out all you can before trying them out and see a dietitian if you want to lose weight bad enough.

8. What advice do you have for managers of fire station coffee funds?
   - Buy low fat items
   - Use for healthy foods such as fruits
   - If considering snack bar, check labels (fat should be 3 grams or less to be consider low)
   - Healthy oils
   - Keep it healthy; whole grain products instead of white, low sodium products, sugar-free products, etc are becoming more available.

9. What suggestions do you have to help the AFD increase member participation in a nutrition improvement program?
   - Give incentives
   - Advertise the program
   - Do more marketing (creative posters etc.)
   - Periodic incentives
   - Healthy breakfast speaker
   - Advertise
   - Make it interesting, repetition, encouraging tactics everywhere (i.e.: posters), provide nutrition counseling from Dietitians, etc.

10. Please describe any creative nutrition ideas you have to improve the health of AFD firefighters.
   - Provide healthy snacks for Rehab
   - Have examples and demonstrations; provide healthier options in coffee fund, at group meals, etc.

11. What advice and recommendations do you have to improve the UAA Dietetic Intern/AFD nutrition program for the future?
   - Target subjects the firefighters are interested in
   - Individual counseling
   - Heart disease
   - Supplements

- Sports nutrition
- Keep using it, updating the slides, make sure everyone knows about the self-study model, somehow make sure that everyone is able to make it to the sessions where the interns present, maybe have it throughout the year, hitting different stations and shifts.

DISCUSSION

The impetus behind this applied research project is to challenge the status quo. Advances in the nutrition and food sciences provide excellent opportunities to improve the lives of many Anchorage Firefighters (Institute of Medicine, 1994, p. xi). AFD leaders must become educated and respond.

Job performance should be the focus of the Anchorage Fire Department nutrition improvement initiative (Brownwell, Rodin, & Wilmore, 1992, p. 73). Firefighters must be prepared to execute when challenged with an unforeseen emergency. The AFD nutrition improvement program should lead the way for Municipal employees and the community.

The cardiovascular fitness of firefighters demands attention. Both the average American and the average firefighter must find a way to shift to a heart healthy diet (Green, 1987, September, p. 73; Harrison-Davis, 1989, March, p. 47; Howe, 1987, Fall, p. 17; Madden, 1979, January, p. 16; Perry, 2000, September, p. 68).

Education and example will be the cornerstone of any effort to improve job performance through sound nutrition practices (Institute of Medicine, 1994, p. 73). Combating nutrition misinformation is not an easy mission. “Food faddists may quote respected scientific journals but may slant the information or omit important aspects of scientific reports to suite their own purposes. True and false information can be so skillfully mixed that it is impossible to judge what is valid” (Eschleman, 1996, p. 316). The ability to do critical evaluations of nutrition claims

and products is crucial and the knowledge to ask specific questions is essential (Berning & Steen, 1991, p. 217).

Each year, the University of Alaska, Anchorage (UAA) accepts five post graduate students to their dietetic internship program. To become a registered dietician (RD), these students complete the internship and pass an examination. After the member survey portion of this applied research project was completed, a partnership was developed between the UAA internship program and AFD. The interns reviewed the survey results and assembled a nutrition-training program. The interns then presented high quality nutrition education and advice to the firefighters.

"A Registered Dietician…has earned an academic degree that requires a license to practice. On the other hand almost anyone can declare himself or herself to be a 'nutritionist' a title which carries no certification, standards or assurance of scientific knowledge" (Hayford, 1997, May, p. 72).

One-on-one or small group training is critical for transforming nutrition education into a healthful diet. Individuals need nutrition information that meets their specific needs (Berning & Steen, 1991, p. 217). To meet the nutrition education requirements of AFD members, registered dieticians (or equivalent) must provide small group instruction on a periodic basis.

On virtually every survey question, at least one AFD member selected the highest rating, and at least one selected the lowest rating. With some members professing to be, "nearly a doctor" and some not too far from high school, the range of knowledge, skills, abilities, and attitudes among the membership is extremely diverse. This variety demands an array of approaches to nutrition education.

Cooper (1982) attributes success of Japanese employer fitness programs to the “personal attention” paid to the employees needs (p. 213). Bizjak and Adams (1999) state, “Each individual brings something different to the learning environment and expect something significant from the learning experience” (p. 5). “The leaders job is to work with the employee to mesh individual needs…with the organization’s needs for performance and results” (Staley, 1998, p. 122).

One primary goal of proper nutrition is to achieve “energy balance”. Nutrient consumption should be equal to performance needs. Ideally, a firefighter’s body should be properly trained and have appropriate fuel on board at all times. This is extremely difficult to accomplish because the workload is unpredictable (Brownwell et al., 1992, p. 293).

While a professional athlete knows when the game begins and approximately how long it will last, the occupational athlete (firefighter) must always be prepared to perform at an unknown level, for an unknown length of time. If a firefighter adjusts nutrition intake for maximum performance but has a quiet shift, she/he will not realize “energy balance”. Conversely, if the firefighter selects a lower level of calorie consumption and job performance requirements are extreme, the lack of nutrients will impair performance (Lyman, 1989, p. 227).

In an effort to prevent energy balance discrepancies, firefighters must participate in a physical fitness program. Firefighters must “fuel the machine” through a diet that prepares them to do their job at a moments notice. However, they must also burn excess calories as required to maintain energy balance. A functional exercise program provides this balance, and enhances job performance through strength, flexibility, and cardiovascular training (Brownwell et al., 1992, p. 293).

Energy balance requirements are not static and therefore nutrient intake and physical fitness adjustments must occur when changes take place (Brownwell et al., 1992, p. 73). When transferred from a busy engine company or medic rig to a quiet station, a fire fighter must make amendments. Promotion from an active job to an office chair requires adaptation. Aging, lifestyle changes, and activity level modifications all demand a complementary alteration in diet.

Firefighters frequently focus on physical appearance when evaluating fitness. While body shape is critical, it is possible for an individual with an "overfat" appearance to be quite fit. In contrast, a person with a low amount of body fat may suffer from a low level of fitness. Davis (2000) laments about unrealistic expectations of firefighters and the Adonis factor. He states, "Fitness is not about what you look like, it is about the patency of your coronary arteries. It is about your resistance to fatigue and a lot of other neat physiological stuff" (p. 33). This discrepancy focuses attention on the need for a method to measure fitness.

A basic problem in biomedical research is the adequate choice of a metric system. Concerning proper nutrition, it is extremely difficult to identify a set of variables that provide a good characterization of individuals. After intervention strategies are tailored to the specific needs of a client, it is often difficult to assess success because of the numerous biomedical and psychological variables that are frequently difficult (and often expensive) to measure (Institute of Medicine, 1994, p. xi).

To some degree, the Anchorage Fire Department met this challenge in 2003 by adopting a fitness assessment program. The assessment is not nutrition specific, but instead measures the individual's physical capacity pertaining to his or her job-related wellness (p. 14). LeCuyer (2000) states, "The fitness assessment is the test instrument of the fitness program, which is categorically an assistance program designed to determine a level of preparedness." (p. 233). The

assessments are used as diagnostic tools (Shelley, 2001, April, p. 45).The fitness assessment results may be used in concert with annual physical examination information.

Loy (2001) states, “Knowledge is power. Armed with the knowledge of their health status, firefighters can take steps to improve their health and, consequently their fitness” (p. 30). “Start with a baseline…implement your plan and chart your progress” (Perry, 2000, September, p. 65). “These tests can provide tangible proof of the benefits of a healthy lifestyle…” (Shelley, 2001, September-a, p. 34).

To achieve nutrition intervention and education goals, a knowledge and respect of cultural values is necessary (Eschleman, 1996, p. 297). Complex symbolic, economic, sociologic, ecologic, and physiologic issues affect how a culture uses food. Food habits that appear illogical to outsiders usually make sense to insiders. Fire station dining tables suffer under layer upon layer upon layer of tradition and culture. Some AFD firefighters were born in Alaska, but the majority are from “outside”. Each new member brings a set of values to a fire station culturally cluttered food trough.

Lyman (1989) states, “Nutritional requirements are hopelessly confused with the niceties of eating as imposed or expected by one’s family and the culture in which one lives” (p. 4). “While genetic and physiological determinants shape individual food preferences and aversions, the translation of these into behavior-diet selection is mediated by socio-cultural factors” (Institute of Medicine, 1994, p. 184). To achieve nutrition intervention and education goals, a knowledge and respect of cultural values is necessary (Eschleman, 1996, p. 297).

Leaders must mandate an environment conducive to healthful nutrition. An appropriate environment will assist members striving to improve their nutrition intake. Members must push

to eliminate barriers and encourage opportunities to facilitate a workplace favorable to each individuals quest for performance improving nutrition (Lyman, 1989, p. 227).

Concerning incident rehabilitation, firefighters working hard for more than an hour will enhance performance by glucose to the muscles. Carbohydrate ingestion and fluid replacement independently improve performance and their beneficial effects are additive (Berning & Steen, 1998, p. 36; Cornell University, 2002). Incident rehabilitation with appropriate hydration and nutrition is critical to job performance on an extended response (Dickinson & Weider, 2000, p. 111).

The implication of the research results to AFD is increased wisdom concerning the present status of the members. AFD leaders now have a better understanding of the nutrition knowledge, skills, and abilities of the members. This information coupled with appreciation of advances in the nutrition and food sciences provide AFD with an opportunity for improved job performance (Davis & Herbst, 1980, July, p. 26).

RECCOMENDATIONS

AFD should immediately extend its commitment to the nutrition component of the wellness program. Aggressive efforts to cement the partnership between the University of Alaska nutrition internship program and AFD are imperative.

Stakeholders and leaders must be educated about the importance of firefighter nutrition and requested to assist. “Perhaps the real key to our past problems of getting management’s ‘backing’ is that the few times we have gotten their attention we have not been sufficiently clear about what exactly we wanted them to do” (Petersen, 1975, p. 101). Mayor Begich, Municipal Manager LeBlanc, Fire Chief Fullenwider, Assembly members, and other MOA and AFD leaders must make vocal long-term commitments to firefighter nutrition. “Top management must

lead, inspire, and involve itself in creating a culture for consistent productivity and quality throughout the organization" (Buebler, 1988, p. 486).

The program will also require constant selling and enthusiasm of leaders. "Sometimes executives underestimate how hard it can be to drive people out of their comfort zones" (Kotter, 1995, p. 60). There will also be a need for persistence and fortitude. Vroom (1990) states, "…it often takes years to effect much genuine change" (p. 7). It may take years for the members to recognize the nutrition program as a benefit that other city employees don't have (Shelley, 2001, April, p. 46).

Seeking advice from others will bring new knowledge and awareness to AFD. Mesa Fire Department's recruit academy includes a cooking class that is accredited through the local community college (Shelley, 2001, April, p. 46). Sarkis (2000) recommends looking inside the organization for assistance, "use an interest survey to find out if employees have special skills and could contribute to the program" (p. 40). All members must be encouraged assist in developing and improving the AFD nutrition program. Feedback is critical. "Every department member needs to be involved in exploiting the limitless creativity of all people" (Buehler & Shetty, 1988, p. 486).

Development of creative nutrition initiatives is essential. Expansion of the program into other MOA departments, other fire service organizations, and to the public is possible. Davis (1997) stipulates, "Firefighters should be role models for the nation in their quest for fitness". As an inspiration to the others, AFD firefighters should prove healthful nutrition is obtainable and valuable.

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APPENDIX A

Anchorage Fire Department
Nutrition Survey

SURVEY DIRECTIONS

- Indicate your choice by **circling** the appropriate number.
- Please write **comments** on the last page.

Crew

1. On average, how do you rate the nutritional quality of **firehouse group dinners**?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

2. On average, how do you rate the nutritional quality of **firehouse group weekend breakfasts**?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

3. On average, how do you rate the overall **nutritional value** of foods consumed by AFD members while on duty?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

4. On average, how do you rate the **nutritional habits** of AFD members?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Knowledge

5. How do you rate your knowledge of **basic terms and concepts** of nutrition?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

6. How do you rate your knowledge of **dietary guidelines of good health**?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

7. How do your rate your ability to identify **unhealthy eating patterns**?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

8. How do you rate your knowledge of **risks associated** with unhealthy eating patterns?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

9. How do you rate your knowledge of **proper hydration**?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Government Programs

10. How do you rate your knowledge of the **food guide pyramid**?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

11. How do you rate your knowledge of the **Dietary Guidelines for Americans**?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

12. How do you rate your ability to interpret information presented on a **nutritional facts label**?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

13. How do you rate your ability to use a nutrition facts label to **compute** the percentage of fat in a food product?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

Ability

14. How do you rate your ability to set **realistic nutritional goals**?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

15. How do you rate your ability to **modify** your behavior patterns?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

Importance

16. How do you rate the importance of nutrition in **health maintenance**?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

17. How do you rate the importance of nutrition in **disease prevention**?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

18. How do you rate the importance of nutrition in **job performance**?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

19. How do you rate the importance of **hydration in job performance**?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

Behavior

20. On average, how do you rate your **effort** to maintain a balanced healthful diet?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

21. On average, how do you rate the likelihood you will consume a **nutritious breakfast** on the morning your shift begins?

Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

22. How do you rate your inclination to **overeat**?

Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

23. How do you rate your inclination to consume **unhealthy foods**?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

24. How do you rate your inclination to use **food as a reward** to yourself?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

25. How do you rate the possibility that **alcohol consumption** has negatively impacted your job performance?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

Barriers

26. On average, how do you rate **social pressure** as a barrier to good nutrition for AFD members while on duty**?**										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

27. On average how do you rate **cultural factors** as a barrier to good nutrition for AFD members while on duty?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

Willingness

28. How do you rate your willingness to take the **time** to prepare health foods?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

29. How do you rate your willingness to **strive to improve** your nutritional habits?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

30. How do you rate your willingness to modify your eating habits to **improve job performance?**										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

31. How do you rate your willingness to bring healthful foods to "**celebration"** events at the station?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

32. How do you rate your willingness to encourage members, family, and friends to bring **healthful foods** to the station?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

AFD

33. How do you rate the adequacy of AFD food **storage facilities** for preparing nutritious meals?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

34. How do you rate the adequacy of AFD **kitchen equipment and appliances** for preparing nutritious meals?										
Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

35. How do you rate the adequacy of AFD food **cooking facilities and space** for preparing nutritious meals?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

36. How do you rate the adequacy, scheduling, and allocation of **time** for preparing and consuming nutritious meals while on duty?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

Training

37. How do you rate the **quality** of nutrition training provided by AFD?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

38. How do you rate your need for **additional** nutrition training?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

39. How do you rate your willingness to **assist other AFD members** in improving their nutrition habits?										
Low					Medium					High
0	1	2	3	4	5	6	7	8	9	10

Rehab

40. How do you rate the present AFD system for providing timely and appropriate **hydration in rehab** at an incident?										
Poor			Fair			Good				Excellent
0	1	2	3	4	5	6	7	8	9	10

41. How do you rate the present AFD system for providing timely and appropriate **nutrition in rehab** at an incident?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Quality

42. How do you rate the nutritional quality of your diet **prior to being hired** by the Anchorage Fire Department?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

43. How do you rate the nutritional quality of your diet **one year ago**?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

44. How do you rate the nutritional quality of your **present** diet?

Poor			Fair				Good			Excellent
0	1	2	3	4	5	6	7	8	9	10

Comments

(continue on back if necessary)

Question Number

Thank you.

APPENDIX B

Municipality of Anchorage

Anchorage Fire Department

Memorandum

DATE: April 28, 2004

TO: Fire Chief John Fullenwider

THROUGH: Deputy Chief Craig Goodrich

FROM: Safety Officer Tom Oxnam

SUBJECT: Nutrition Improvement Initiative

This memo is in response to the applied research project I completed for the National Fire Academy's Executive Fire Officer Program. As you recall, the purpose of my project was to identify and evaluate the components necessary to develop a strong nutrition program.

I am pleased to present you with the results of this project. The implications of this study are positive. Identification of many challenges, obstacles, and opportunities is complete. Overall, the survey established that on average members desire additional high quality nutrition training and they report a willingness to "strive to improve" their nutritional habits.

Based on the result of this project, I present the following recommendations:

- AFD should expand its commitment to the nutrition program.
- The partnership with the UAA nutrition internship program must be cultivated.
- Municipal and department leaders must make vocal long-term commitments.
- Members must mandate an environment conducive to healthful nutrition.
- AFD members must provide feedback.
- Development of creative nutrition initiatives is critical.
- AFD firefighters should serve as role models.

Thank you for your support in this research project. I look forward to your comments and opinions concerning the results of the survey and research project.