Running Head: BARRIERS TO ON-DUTY PHYSICAL FITNESS TRAINING

Firefighting Fit: Identifying Barriers to On-Duty Physical Fitness Training in the Henrico County (Va) Division of Fire.

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Certification Statement

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

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Abstract

Many Henrico County firefighters were unable to meet recommended fitness levels. Descriptive research investigated (a) to what extent members participated in physical training, (b) how the organization motivated its members, (c) what resources were available, (d) how much time was available for exercise, and (e) how the department's uniform policy impacted participation. A survey assessed exercise habits and perceptions of barriers to exercise. Departmental records were reviewed to describe fitness participation and time availability. Results indicated many firefighters failed to meet exercise standards, and that perceived barriers, including lack of motivation from supervisors, lack of time, and poor physical resources, negatively impacted their participation. Recommendations included: develop tailored exercise plans for members, increase supervisor participation, and provide more appropriate equipment.

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Introduction

The Henrico County Division of Fire is out of shape. When compared with the general public, the Division, in aggregate, scored at the 47th percentile for cardiovascular fitness and 35th percentile for body composition (Warren, 2007). Considering that 45% of all firefighter line-of-duty deaths are directly related to cardiovascular disease (Kales, Soteriades, Christophi, and Christiani, 2007), the Division's fitness scores are alarming.

The health consequences of a sedentary lifestyle are well documented (Kravitz, 2005). Obesity and poor fitness is a growing problem across American society (President's Council on Physical Fitness and Sports, 2002). As members of that larger society, firefighters reflect to a certain degree the same negative propensities toward health and diet that afflict the larger society. However, because of the physical demands of the job, firefighters are at greater risk of death from acute coronary disease, because "such an event is far more likely to occur during specific [fire service] duties – dramatically so during fire suppression . . ." (Rosenstock and Olsen, 2007).

The Henrico County Division of Fire attempts to promote the health and safety of its members through an on-duty fitness training program. This program provides firefighters access to peer fitness trainers, exercise equipment, and annual fitness testing. Despite efforts to maintain or improve firefighter physical fitness, the 2006 fitness screening process revealed that the majority of firefighters still do not meet recommended fitness levels (Warren, 2007).

The purpose of this research was to identify barriers that prevented operational members from participating successfully in the on-duty physical fitness training. Descriptive research was used to answer the following research questions: (a) to what extent do operational members participate in on-duty physical training, (b) how does the organization provide motivation and support for members to participate in on-duty physical training, (c) what resources and equipment are available for members to utilize for on-duty physical training, (d) how much time is available for members to participate in on-duty physical training, and (e) how does the department's policy on wearing of uniforms impact participation in physical training?

Background and Significance

Fire service agencies have made great strides in improving the safety and health of firefighters through a number of initiatives, including the widespread use of self-contained breathing apparatus, sophisticated turnout gear, and the use of incident command and accountability systems, just to name a few (Jenaway, 2006). Despite these advances, the number of firefighters killed in the line of duty continues to remain around 100 per year, nationwide (United States Fire Administration [USFA], 2006). When evaluating the root causes of these deaths, the single most common factor is overexertion and stress (USFA, 2006). The specific link between poor physical fitness and fire service occupational mortality related to stress and overexertion was described by Kales et al. (2007) using a retrospective study of ten years' data spanning 1994 to 2004. This study found the risk of sudden cardiac death during fire suppression activities to be as high as 100 times more likely than during non-emergency activities.

Prior to discussing the implications of this data within the Henrico County Division of Fire, a description of the agency is helpful. Henrico County is one of the oldest counties in the United States, having been established by the King of England in 1611. The jurisdiction encompasses over 270 square miles and surrounds the City of Richmond on three sides. The County is home to more than 300,000 permanent residents, and land use ranges from high density mixed urban development to rural farmland, although the former is quickly overtaking the latter.

The Division of Fire is an all-hazards emergency services agency that was formed in 1962. The Division is staffed with 525 paid members who provide fire prevention and suppression, emergency medical services, hazardous materials response, and technical rescue. Physical resources include 20 fire stations, 20 pumper engines, 5 aerial tower trucks, 3 heavy rescue squads, and 12 advanced life support ambulances. All members are cross-trained as firefighters and Emergency Medical Technicians, and all operational members share fire and EMS responsibilities.

The Division's standard operating guidelines (see Appendix A) require all members to participate in on-duty physical training for at least one hour during each 24-hour shift, unless exempted by the company officer for specific reason. In addition, all members are required to undergo an annual health physical performed by a physician's assistant contracted by the Division. In addition to this health screening, all members must participate in the annual fitness test, which measures each member's cardiovascular fitness, body composition (proportion of body fat to lean muscle), muscular endurance, and flexibility.

Members have voluntary access to on-duty physical fitness training assistance from other firefighters who have been trained as peer fitness trainers. Additionally, the County has a contract with Continental Health Promotion, a private vendor that conducts the fitness testing, but also provides one-on-one counseling for firefighters seeking assistance.

During the annual fitness test, each member's performance is evaluated against a scale with pass / no pass criteria for each measure. An individual performance report is provided to each member by the contractor, and a summary report is provided to the fire chief. While members are required to participate in the fitness test, there is no formal consequence for failure on any of the measured criteria. Further, supervisors are not held accountable for their subordinates' success or failure in the fitness test. In fact, members can fail the test miserably and immediately return to work. The only exception is for members who develop acute symptoms during the test, such as chest pains. In these extreme cases, the member is referred to his or her personal physician and must obtain a clearance from that physician prior to returning to work (See Appendix B).

Results of recent Division fitness tests are disappointing. "Overall, HFF [Henrico Fire] scored at the 55th percentile when compared to the American population. This is the same result as 2005" (Warren, 2006, p. 18). Specific results are outlined in Table 1.

It would be reasonable to expect that members of the Division would be at least as physically fit as the average American, but that is not the case in three of the four measurements. What is more noteworthy is that the department is a young department: a review of personnel training files disclosed that out of 525 members, 310 (59% of the Division) have less than eight years of service. This is an alarming statistic considering

that members are not eligible for retirement until they have served 25 years and because firefighters are likely to become *less* fit as they grow older (Rosenstock and Olsen, 2007). It is reasonable to expect that if nothing is done, these members' physical fitness scores will get worse over time.

Table 1

2006 Fitness Test Results for the Division of Fire

Measured criteria	Ranking vs national average (all adults)
Cardiovascular fitness	47th percentile
Body composition (% body fat)	35th percentile
Muscular endurance	45th percentile
Flexibility	70th percentile

The indication that our membership, in aggregate, was less physically fit than 40% to 50% the general public, suggests the fitness program has not been successful. The purpose of the physical fitness program is to prevent firefighter deaths and injuries, but the department is faced with the disturbing prospect that its members may suffer exactly that fate unless the department takes action to improve the physical fitness of its members. The consequences of a firefighter fatality in our organization, aside from the obviously tragic event itself, would be deep, painful, and expensive for the Division of Fire and for the County of Henrico.

The purpose of this research is to describe the level of fitness training in the division and why members do not participate more successfully in the on-duty physical fitness program. More specifically, the research will attempt to define the barriers that prevent members from successfully meeting fitness goals, whether those barriers are real or perceived, physical or mental. The research will be based largely on the use of an internal departmental survey but will also include an analysis of the amount of time available for physical training as well as the physical resources available. By identifying barriers, it is hoped that this research will allow the Division to improve the fitness training program and thereby improve overall fitness levels within the department.

This problem was selected not only because of its importance to the department, but also because of its relevance to the National Fire Academy's Executive Development curriculum. The Executive Development course focuses heavily on leading changes in organizations and the importance of the executive's role in managing change. Changing the physical fitness practices of a 525 member department is a significant challenge, and is therefore directly relevant to the goals of Executive Development curriculum.

The topic is related to two of the U. S. Fire Administration operational objectives. The first is to "reduce the loss of life from fire of firefighters," and the other is to "respond appropriately in a timely manner to emerging issues" (USFA, 2002, ¶ 4).

Literature Review

The American College of Sports Medicine (ACSM) recommends adults spend 20 to 60 minutes of "continuous aerobic activity" at 60 percent of maximum heart rate at least three times per week, and notes that "endurance training of fewer than two days per week . . . is inadequate for developing and maintaining fitness for healthy adults"

(American College of Sports Medicine [ACSM], 1990, p.265). Based on these recommendations, firefighters should participate in physical training at least three times per week or 12 times per month. Since the shift schedule typically provides ten days of work per month per employee, it is critical that members exercise each duty day in order to approach the recommended frequency of physical training. These findings are supported in the recommendations made to the Division of Fire by its fitness contractor (Warren, 2007).

The Division's fitness training requirements are loosely enforced, if at all. Consequently, the decision to exercise has been primarily an individual decision, with predictable results. To the extent that firefighters may choose not to "uptake" an exercise regime, they are not alone in American society. Marcus and Owen (1992) noted that as many as 30 percent of Americans did not engage in any physical exercise, and that for those who did take up an exercise program, there was a 50 percent dropout rate. These findings were supported by Australian researchers who found that nearly half of all adults in industrialized nations fail to exercise to the degree necessary for health maintenance (Armstrong, Bauman, and Davies, 2000). In 2002 an expert panel convened by President Bush noted that nearly half of all Americans do not exercise at all, and of the remaining portion, 70 percent exercise infrequently (President's Council on Physical Fitness and Sports, 2002).

The diversity of the fire service, from rural to urban and volunteer to career, makes it difficult to extrapolate a norm in terms of the amount of time firefighters dedicate to physical fitness training. However, in their study of cardiac-related deaths of firefighters, Kales et al. (2007) estimated the average amount of time firefighters spend

conducting various activities on duty. Their findings estimated that municipal firefighters spend 8% of their time in physical training. This measure would equate to approximately two hours of physical training per duty day for members who work 24-hour shifts. What these researchers did not provide is a description of what kind of physical training is included in their measure.

The second research question seeks to determine the how the organization motivates members to participate in fitness training. A review of the exercise physiology and social psychology literature provides insight on the reasons some people are able to begin and maintain an exercise regime while others are unsuccessful. The essential issue, of course, is motivation. What motivates people to exercise successfully? What form should this motivation take? Whose burden is it to provide the motivation?

Harrison and Liska (1994) stated that it is "critical to identify how the basic components of fitness motivation vary in strength across individuals, especially across levels and categories of health risk" (p. 48). Further, within the scope of an organizational fitness program, they identified the need for tailored, motivational "building blocks" based on a central set of components. The first of these blocks is the development of specific, individualized "exercise goals [that] should be easy to assemble and assign" (p. 49).

Researchers in Australia drew a comparison between adults who failed to give up their sedentary lifestyle (in favor of exercise) with those who attempted smoking cessation, and found similar results. Marcus and Owen (1992) concluded that different people will be at different "stages" of exercise acceptance and that a single, common approach to all employees is not likely to work. They stated that, "the reason so many

people drop out of exercise programs may be due to mismatches between their stage and typical action-oriented programs that are offered" (p. 13). Other researchers have drawn similar conclusions. Harrison and Liska (1994) argued for the use of "building blocks" in organizational fitness programs (p.49). These building blocks would focus on removing perceived barriers and giving each employee a set of specific training goals. Their research indicated that achieving these goals at each successive level creates "goal commitment" by the participant, which in turn provides the motivation to continue with the program (p. 49).

Employees' self-image and self-rated health plays a very important role in motivation and in perception of barriers to exercise. People who perceive themselves as physically unfit are generally the least likely to participate in fitness programs, because they view their health status itself as a barrier to participation (Harrison and Liska, 1994). These individuals may perceive that the physical training is either too difficult for them or they fear injury. Harrison and Liska (1994) note, "employees who could benefit the most by actively exercising . . . perceive the strongest barriers to exercise goals, because they feel too obese, exhausted, or chronically ill" (p. 51). Towers, Flett, and Seebeck (2005) summarized the issue succinctly, "self-rated health is a significant barrier to exercise" (p.13).

Specifically, body composition (the percentage of body fat), is significantly associated as a barrier to beginning exercise. As Dishman, Ickes, and Morgan (1980) noted, "prediction of [exercise program] adherence can be readily enhanced by employing two easily measured biologic variables, total body weight and percent body

fat" (p. 129). This is an important consideration for Henrico Fire, because body composition was identified as the worst score on the Division's fitness test.

The remaining research questions are directed at the identification of specific barriers, including exercise equipment and facilities, time availability, and uniform (clothing) issues. These are all examples of barriers, real or perceived, that may limit firefighters' participation in physical training.

Conventional wisdom suggests people make up excuses for not exercising but there is data to empirically corroborate this observation. In a study of physical activity and sedentary behavior, Salmon, Owen, Crawford, Bauman, and Sallis (2003) found that people who did not enjoy exercising were significantly more likely to identify barriers to exercise uptake. These barriers including such things as cost, weather, lack of time, and job requirements. The research further noted that "respondents reporting financial cost and weather as barriers to physical activity were more likely to report high participation in sedentary behavior, television viewing, and reading" (p. 186). Bowles, Morrow, Leonard, Hawkins, and Couzelis (2002) agree that self-motivation is a "common influencing factor to all reasons for reporting barriers" (p. 464).

There is another consideration regarding motivation and positive reinforcement that is implied but scarcely mentioned in the literature: people need support and leadership to overcome their motivational barriers. Towers et al. (2005) lay it out plainly: "families and physicians will need to become involved in motivating the patient . . . to ensure that exercise adoption and adherence does indeed take place" (p. 13). Bowles et al. agree that "positive reinforcement is essential for habit acquisition" (p. 464). In the

fire station this advocacy role falls to the company officer to provide the leadership and support that firefighters need to stay active in the physical fitness program.

Existing research offers important considerations when identifying barriers to participation in physical fitness programs in the Henrico County Division of Fire. First, employees who need the most motivation and assistance in order to uptake an exercise program may feel that the program is not attainable for them. However, they may be more motivated to participate if tailored building blocks were offered. These building blocks should provide specific and attainable goals, which in turn will allow employees to build confidence in their ability to exercise. This confidence is necessary for continued participation and in order to receive the desired health benefits. Second, it is important to understand that self-rated health is a significant perception barrier, especially for individuals who are obese or who have health concerns. Finally, individuals who do not enjoy exercise may identify barriers (excuses) such as lack of time, inadequate resources, high cost, etc., in an effort to avoid the exercise. Overcoming these barriers requires active participation by leaders, including company officers.

Procedures

Four methods were used in this research: (a) Daily activity reports were queried to establish the number of hours of fitness training reported by shift officers, (b) A survey was administered during the annual fitness testing to collect data on members' self-rated physical training participation and attitudes and perceptions toward the program, (c) Computer-aided dispatch data were used to measure the average time the busiest apparatus spent out of service, which provides an inverse measure the amount of time

available for fitness training, and finally (d) An inventory was created that describes the amount and types of physical fitness equipment at each fire station.

Division of Fire Daily Activity Reports

Each day at every fire station in Henrico County the shift officer completes a computerized "day log" that summarizes the activities completed the day. These data are networked to a server in the fire administration offices and is available in real-time for administrative personnel to query data and generate reports. One of the items collected on the day log is the number of man-hours spent in physical training. For the purpose of this research the system was queried to generate a report of fitness training hours from September 1, 2007, through October 31, 2007. This was approximately the same time frame that the annual fitness test was being administered.

Fitness Training Survey

A survey was designed to collect members' self-rated exercise participation, motivation, and perceptions regarding potential barriers to participation in the on-duty physical fitness program. The survey was designed to collect data from fire department personnel who are assigned to 24-hour shifts working in fire stations because this is the intended audience of the Division's fitness program. Uniform (sworn) personnel who work 40-hour weeks in the administrative offices were excluded from the study.

The survey was conducted during the annual fitness testing process. A computer was set up in the room where the fitness testing was conducted, and the survey was installed on the computer using Microsoft Access. The survey was designed to be easy for members to take. The instrument did not require respondents to possess any special computer skills. Respondents simply used a mouse to click their selected answers and

navigate forward or reverse in the program. At the end of the survey the user clicked the "finished" button, at which point the data were recorded to the hard drive and the survey was reset for the next user beginning with the instructions page. At the end of each day the data were backed up on a digital storage device.

The total population of the study, which included all operational positions, was 460 members (although a small percentage of those positions were vacant due to normal workforce attrition). In order to obtain a representative sample, 210 responses needed to be collected (Krejcie and Morgan, 1970).

The survey was administered during six 8-hour days, which included October 22, 23, 24, 29, 30, and 31. During these days, 235 members attended their fitness test and completed the survey. The remaining operational members were scheduled for fitness testing on later dates that fell outside the study timeframe. Members who were excused from active duty due to serious illness or injury were not included in the sample.

There was no difference between members who attended the fitness test during the time the survey was conducted and those who attended later sessions. Members were assigned to the fitness testing based on availability of their apparatus. Availability of apparatus was a primarily function of emergency call location and frequency, which was a random variable. Therefore, the survey participants represented a random sampling of the Division as a whole.

Participation in the survey was voluntary; however, 100% of the members who were asked to take the survey did so. They took the test at the computer in a private area. Their names were not collected, thereby guaranteeing the confidentiality of their individual answers. Each question employed a Likert scale for possible answers. The

questions were designed with input from the staff of Continental Health Promotions, the Division's fitness contractor. Additionally, staff from the Division's training section reviewed the questions for content and validity. One of the Division's management specialists programmed the survey to the Microsoft Access platform. The data were later analyzed using Microsoft Excel. The survey is attached as Appendix C.

Computer Aided Dispatch Data

An explanation of the Division's computer aided dispatch (CAD) system is necessary to explain the next research procedure. CAD is used to dispatch and track all emergency apparatus, which includes fire engines, ladder trucks, ambulances, and support vehicles, as well their associated staffing. Anytime an apparatus is dispatched to a call, whether it is a routine service call or an emergency, the CAD indicates the apparatus as "out of service." Additionally, if an apparatus becomes unavailable for any other reason, such as a mechanical problem, or for any other reason identified by the apparatus officer, the apparatus is indicated as out of service in the CAD. Once the assignment is completed and the apparatus is ready for another assignment, CAD then indicates the apparatus as "in service."

Any time an apparatus and its crew are out of service, this is time that they are occupied and cannot be involved in on-duty physical fitness. This represents non-discretionary time; in other words, they must complete the assignment they have been given. Any time the apparatus is in service it is available for emergencies. During this discretionary time, firefighters may choose, or be assigned by their officer, to complete routine activities, including preparation of meals, station cleaning, informal training, and leisure activities such as television viewing. It is during this discretionary time that

firefighters are expected to perform their on-duty physical fitness training. The purpose of measuring out of service time is to estimate the amount of discretionary time that may be available for physical training.

Division policy allows firefighters to sleep from 8:00 pm until 7:00 am. Therefore, this time frame was not included in the review of out of service time, because the Division does not expect firefighters to perform physical fitness training during the night. In addition, the first hour of the duty shift (from 7:00 am to 8:00 am) is used to check apparatus and equipment for operational readiness and safety. Therefore, the timeframe from 8:00 am to 8:00 pm was set as the parameter for review of out of service times.

Because the Division of Fire operates 28 pieces of fire apparatus and 12 ambulances, it was neither feasible nor necessary to collect the out of service times for all 40 apparatus. The ambulances have much heavier call volume and the average ambulance call is much longer than the average call for a fire apparatus, so ambulances spend much more time out of service. For the purpose of this study, the out of service time for ambulances only was selected since ambulance workload represents the worse case scenario in terms of having enough time to participate in physical training..

CAD data were collected for all 12 ambulances encompassing the time frame January 1, 2008, through January 12, 2008. The CAD software would not allow an automated query to summarize out of service time from 8:00 am to 8:00 pm each day, so this information was manually counted and recorded in minutes and hours. If an ambulance was assigned to a call prior to 8:00 am but did not return to service until after 8:00 am, the entire timeframe of that incident was included as part of the out of service

time. Similarly, if an ambulance was called out of service prior to 8:00 pm and did not return to service until after 8:00 pm, the entire out of service time from that block was included in the data.

Inventory of Station Fitness Resources

Firefighters must have access to fitness equipment in the fire station if they are expected to participate in fitness training. In order to describe what equipment is available for this purpose, an inventory of all fitness equipment in each fire station was accomplished. This inventory counted aerobic exercise equipment, free weights, and gym packs. It was not within the scope of this study to identify the condition or quality of these resources. If the equipment was serviceable, it was included in the inventory.

The inventory also counted whether or not the physical fitness area within each fire station was air-conditioned. A number of the fire stations in the county were not designed for their current occupant load, and in those cases the physical fitness equipment is frequently located in the apparatus bays, which are all heated but do not have air conditioning. Newer stations have heated and air conditioned rooms designed for fitness training.

Limitations of Data Collection Methods

The day log program was only useful to the extent that station officers accurately recorded the correct time for each participant. If they forgot to make the entry or made an incorrect entry, this would likely skew the results.

With regard to the survey, responses were subjective and might not have reflected the actual performance levels of personnel. In addition, if a member had irregular exercise routines, he or she may have had difficulty deciding how to answer the survey

accurately. For instance, if a member had recently started a physical training program, he or she may have indicated high levels of participation, despite the fact that he or she had only been following that routine for a few weeks.

In both cases, with the day logs and with the survey, there was no effort to determine whether the physical training conducted was beneficial. The data did not determine whether members used the correct methods of exercising, nor did it attempt to measure the intensity of their routines.

With respect to the CAD data, a portion of the necessary data was not available. For instance, ambulances become available after they leave the hospital. However, it might take an ambulance 30 to 45 minutes to drive from the hospital back to the fire station. Therefore, using the out of service time as an indirect measure of discretionary time in the fire station underestimates the actual amount of time these apparatus are away from the station. It remained, however, the best option for measuring discretionary time.

The survey of fire station fitness equipment and facilities provided a limited view of the issue. The data did not describe the condition of the equipment other than serviceable or not serviceable. However, members may have been less motivated to use equipment that was old, dirty, or difficult to use.

Perhaps the most significant limitation of this study is that it focused solely on fitness training that occurred on duty. It did not attempt to investigate fitness training that members conducted at home or in their off-duty time. In cases where members preferred to exercise at home and not at work, their responses to the survey might suggest they did not ever exercise, which would be incorrect. However this might distort the picture, the purpose of this research is to describe the *on duty* fitness training program exclusively.

The data from these investigations are intended to provide four separate viewpoints of the same situation. While they each have limitations, by using all four viewpoints, it was assumed that an accurate description of the problem and its variables would result.

Definition of Terms

CAD: computer aided dispatch software system that assigns and tracks fire department units and their associated personnel.

Cardio equipment or *cardio exercise*: equipment or exercise designed to strengthen aerobic and cardiovascular fitness.

Day log: software system that allows Henrico Fire station officers to record daily workload indicators.

Discretionary time: time in the fire station that firefighters may spend on non-emergency activities, such as cleaning, studying, or fitness training.

Fitness testing: the annual fitness test performed on all Henrico firefighters by Continental Health Promotions.

Free weights: for purposes of this research, a free weight set was considered complete if it contained two weight bars, a reclining bench, bar weights up to 200 pounds, and dumbbell sets up to 50 pounds.

Gym pack: an integrated system of cable-drawn weights designed for one person to use for strength training.

In service: status of fire department apparatus and their crew indicating they are available for emergency calls.

Out of service: status of fire department apparatus and their crew indicating they are not available for emergency calls.

Results

Research Question 1: To What Extent Do Operational Members Participate in On-Duty Physical Training?

Data collected from the day log program revealed that firefighters spent an average of eight *minutes* per duty day on physical training (see Appendix D). Because regulations require every member assigned to a fire station to complete one hour of fitness training per day, it is possible to identify the expected total number of man-hours of training at each fire station each day. Since the average staffing level per station was 5.5 members, the average expected fitness training in man-hours was 5 hours and 30 minutes. Data collected from the day log program revealed that the actual amount of time spent at Henrico fire stations, per day, on average, was 44 minutes (see Table 2).

Table 2

Hours of Physical Training Reported on the Day Log System (All Entries) from September 1, 2007, to October 31, 2007

Unit of measure	Expected mean PT time per day	Actual mean PT time per day
Individual firefighter	1 hour	8 minutes
Fire station	5 hours, 30 minutes	44 minutes

One of the recognized limitations of the day log instrument is that officers may have failed to enter hours of physical training on their daily logs. When all null entries were removed from the data set, and only those days with a positive entry were counted, the average amount of time spent per firefighter, per day, increased to 34 minutes, or an average of 3 hours and 7 minutes per fire station (see Table 3).

Table 3

Hours of Physical Training Reported on the Day Log System (Only Positive Entries) from September 1, 2007, to October 31, 2007

	Expected	Actual
Unit of measure	mean PT time per day	mean PT time per day
Individual firefighter	1 hour	34 minutes
Fire station	5 hours, 30 minutes	3 hours, 7 minutes

The other measure of participation in fitness training was provided by the survey. Responses indicated that 6% of firefighters and 13% of company officers never participated in physical training. While 94% of all firefighters and 87% of all officers reported some level of participation in fitness training, only a minority (20% of firefighters and 19% of officers) reported exercising on duty at the recommended level of eight to ten times per month.

Figure 1: Survey Participants by Rank
(N=235)

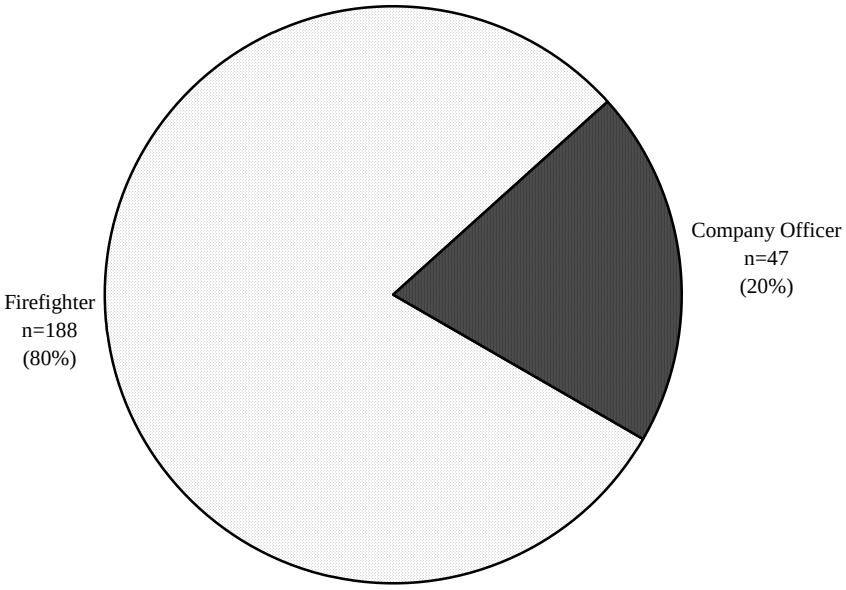
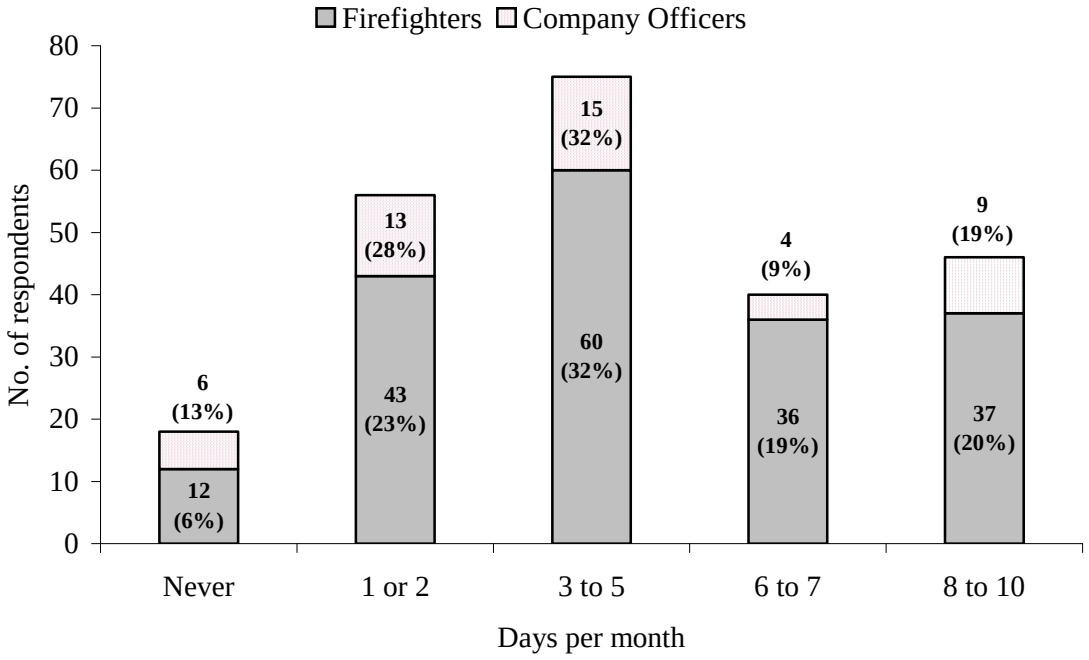
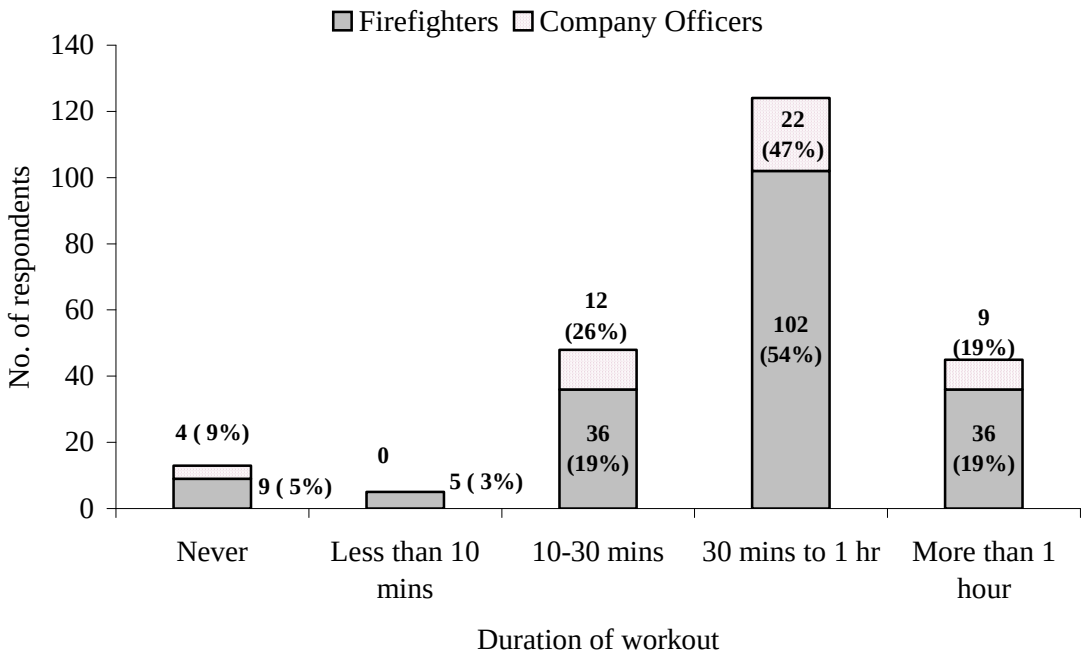


Figure 2: How Many Duty Days per Month do You Work Out?



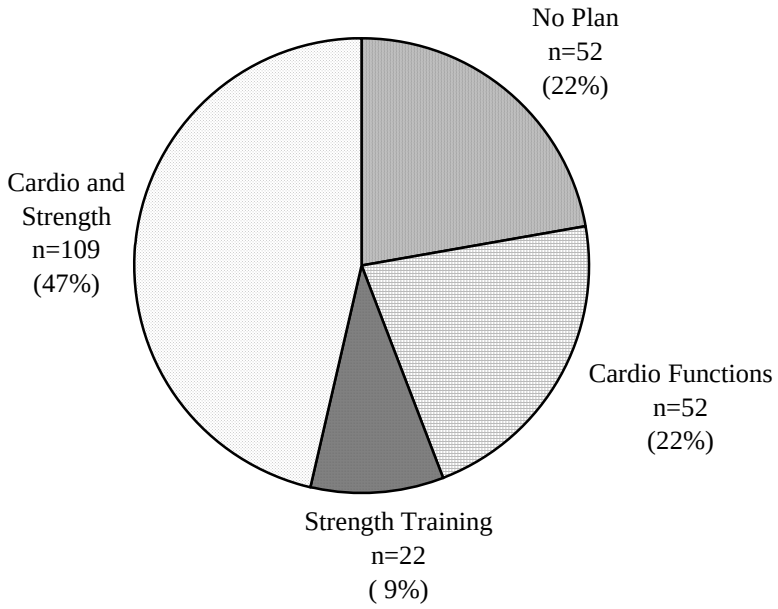
Most respondents indicated their workouts lasted thirty minutes to an hour (assuming they were not interrupted by an emergency call), although 36% of firefighters and 19% of officers indicated their workouts lasted more than one hour. A small percentage indicated they never worked out, or that their workouts were less than ten minutes in total duration.

Figure 3: How Long Does Your Workout Last?



In order to describe members' fitness participation goal, the survey asked, "What type of workout do you follow?" While 22% of all respondents indicated they had no established plan to follow, the largest proportion, 47%, indicated they performed both cardio and strength training (see Figure 4).

Figure 4: Types of Workout Plans Indicated
(All Respondents, N = 235)



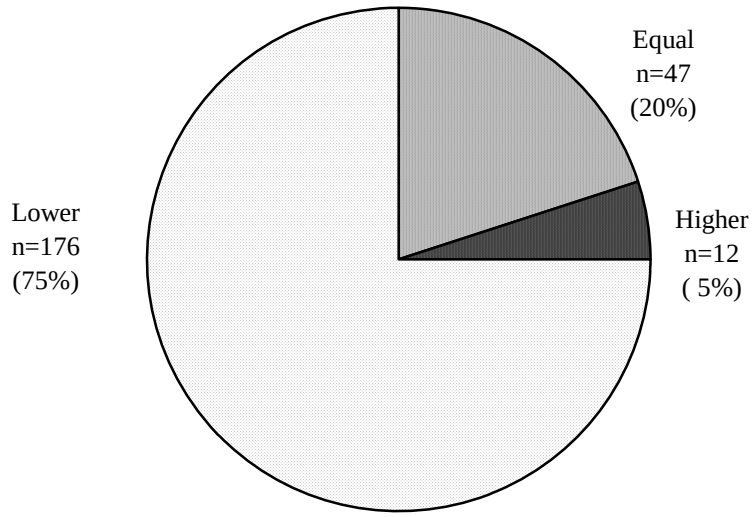
There was an inconsistency between the two research tools used to describe members' fitness activities. The survey results would indicate a much higher level of physical fitness participation than what was indicated on the day log entries. Both the day log program and the survey have limitations, but regardless of which measure one chooses to view, they both conclude the same result: most members of the Division of Fire are not participating in on-duty physical training to the extent expected by the Division.

Research Question 2: How Does the Organization Provide Motivation and Support for Members to Participate in On-Duty Physical Training?

Five survey questions were created to measure employees' perception about how the organization motivates or supports them to participate in physical fitness training. The first question dealt with priorities and sought to understand members' perception of the relative importance of physical training versus other activities that competed for their

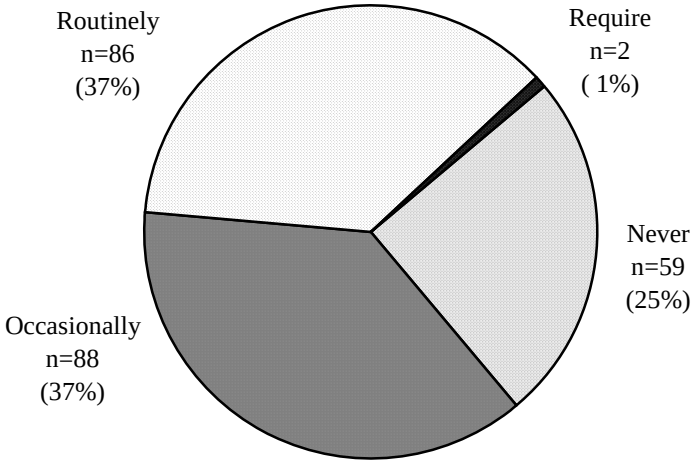
discretionary time. Interestingly, 75% of all respondents (firefighters and officers) reported physical training was given *lower* priority than activities such as cleaning, inspections, report writing, and other non-emergency activities (see Figure 5).

Figure 5: Perceived Priority of Physical Training.
(All Respondents, N = 235)



The next questions focused on the role of immediate supervisors in leading the example and encouraging firefighters to train. A quarter of respondents indicated their supervisors never encouraged physical training, 37% occasionally encouraged physical training, and only 37% routinely encouraged their employees to exercise on duty. Two respondents indicated their supervisors used authority to require physical training (see Figure 6).

Figure 6: Perceived Frequency that Supervisors Encourage Members to Exercise
(All Respondents, N = 235)



With regard to leading by example, the results were almost identical: 25% of respondents indicated their supervisor never led the physical training, 38% indicated their supervisor occasionally led them, and 31% indicated the supervisor often led by example. For this question, 6% of the respondents did not answer (see Figure 7).

Respondents were asked to consider their agreement with the statement, “the Division of Fire has given me both the motivation to work out on duty, and the permission to do so.” More than half, or 56%, indicated they either somewhat or strongly agreed with the statement, although 30% of respondents disagreed (see Figure 8).

Figure 7: Perceived Frequency that Supervisors Lead by Example with Physical Training (All Respondents, N = 235)

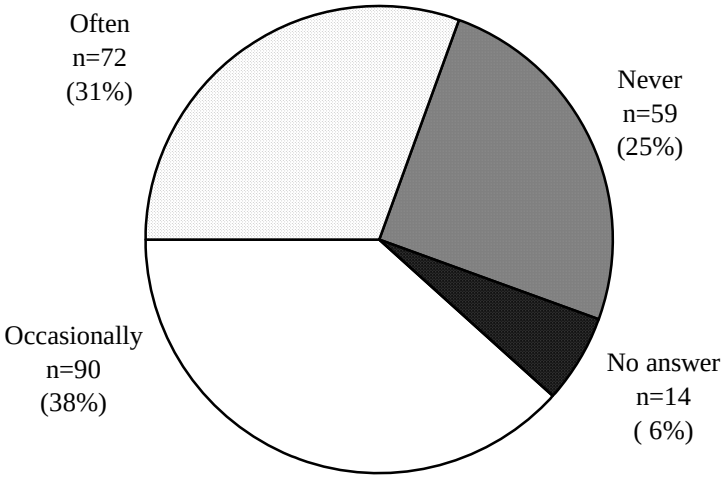
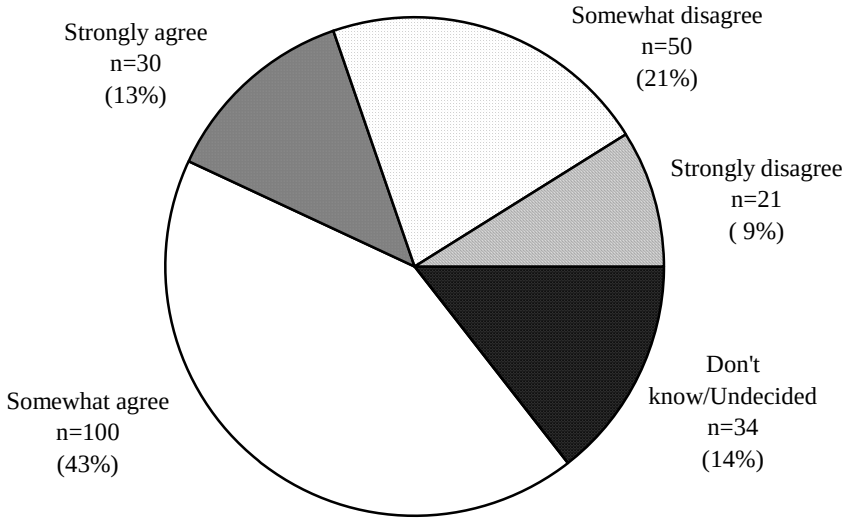
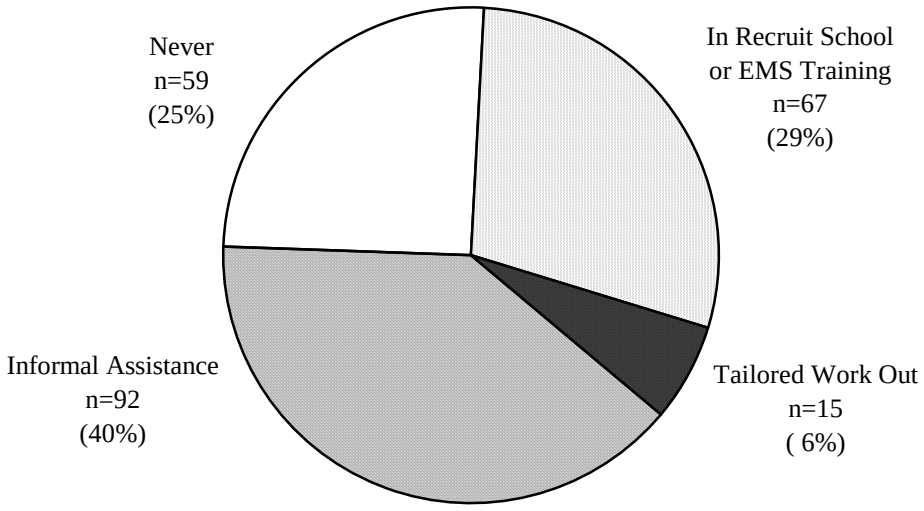


Figure 8: The Division has Given Me Motivation and Permission to Work Out (All respondents, N = 235)



The Division of Fire has a program in place for peer fitness trainers to work directly with individual firefighters, to provide them education, support, and motivation to participate in fitness training. The survey sought to determine how many members utilized this resource. The response indicated only 6% of the members had received individual training. The survey revealed that 29% had attended peer fitness training as part of a group class during recruit training or an EMS course, 40% had received some sort of informal, un-structured training, and 25% never received any help from a peer fitness trainer.

Figure 9: Members Who Have Received Training From a Peer Fitness Coordinators
(All respondents, N = 234)



Research Question 3: What Resources and Equipment are Available for Members to Utilize for On-Duty Physical Training?

The inventory of fitness equipment found that most stations had only two pieces of cardio or aerobic exercise equipment, suggesting that only two members at a time

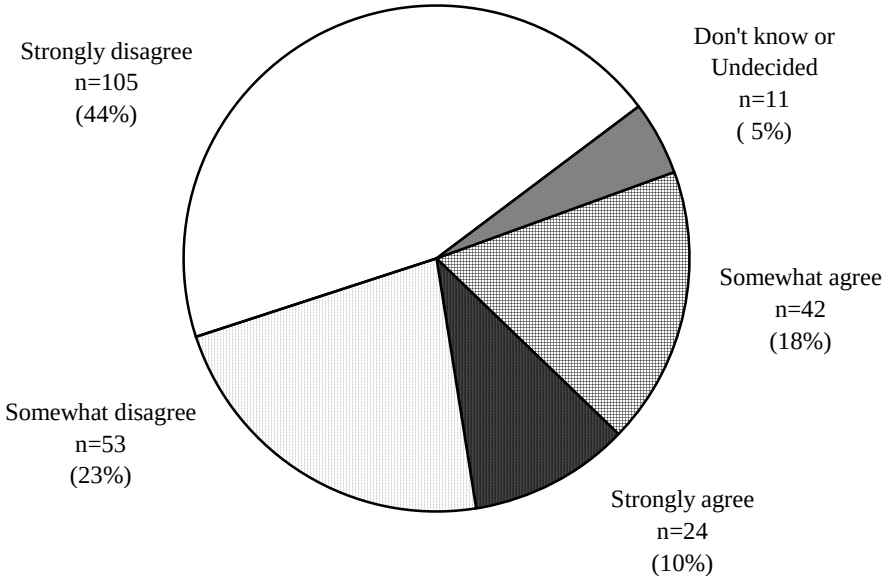
could engage in an aerobic exercise using Division equipment (see Appendix D). It was possible for members to complete other aerobic activities, such as jumping rope, without the use of a machine. However, the findings suggest that an insufficient quantity of equipment was in place for most shifts to complete aerobic exercises together as a group. Another common finding was that most stations did not have a complete set of free weights. The newest fire stations are equipped with complete sets, but most others had only a small or incomplete collection of weights, most of which were brought in by firefighters or donated by residents. Most stations had a functioning "gym pack," which is a machine with cable-mounted weights.

In addition, it was noted that only nine of the 20 fire stations had air-conditioned physical training room. In the remaining 11 fire stations, firefighters use fitness equipment in the apparatus garage area, which have heat only. In these 11 stations, during hot weather firefighters had no other option but to exercise in the heat.

Not surprisingly, 67% of survey respondents perceived the physical environment of their station as not being conducive to fitness training. (see Figure 10).

Survey responses were nearly evenly split on the issue of whether or not adequate equipment is provided in the fire stations for fitness training. Regarding cardio equipment, 49% found the equipment to be conducive to fitness training while 45% disagreed (see Figure 11). Similar results were recorded regarding the strength training equipment (see Figure 12).

Figure 10: Physical Environment Conducive to Working Out
All Respondents (N = 235)



Figue 11: Cardio Equipment Conducive to Working Out
(All Respondents, N = 234)

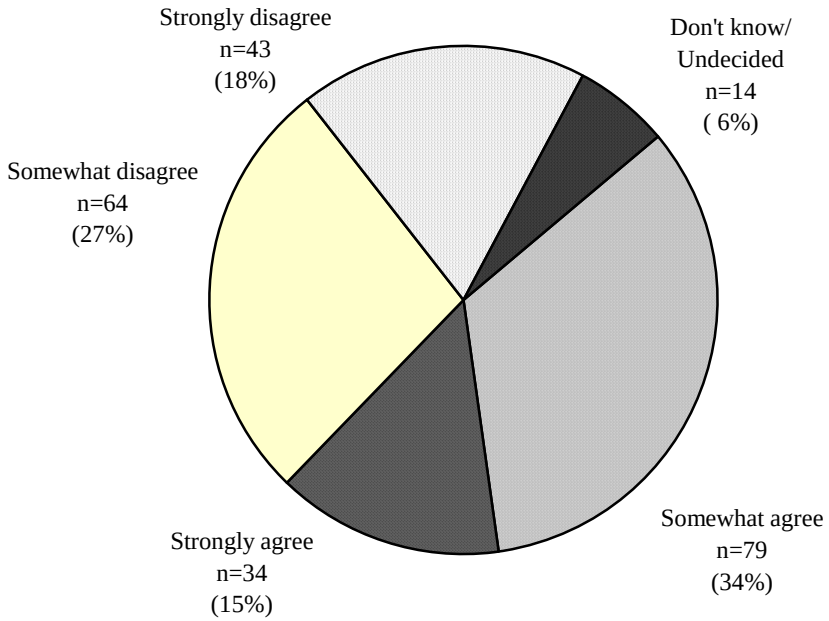
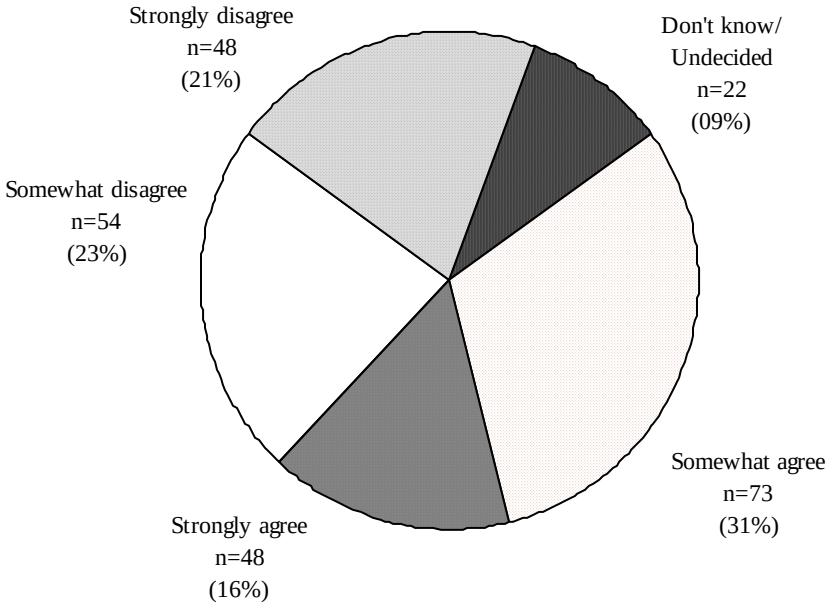


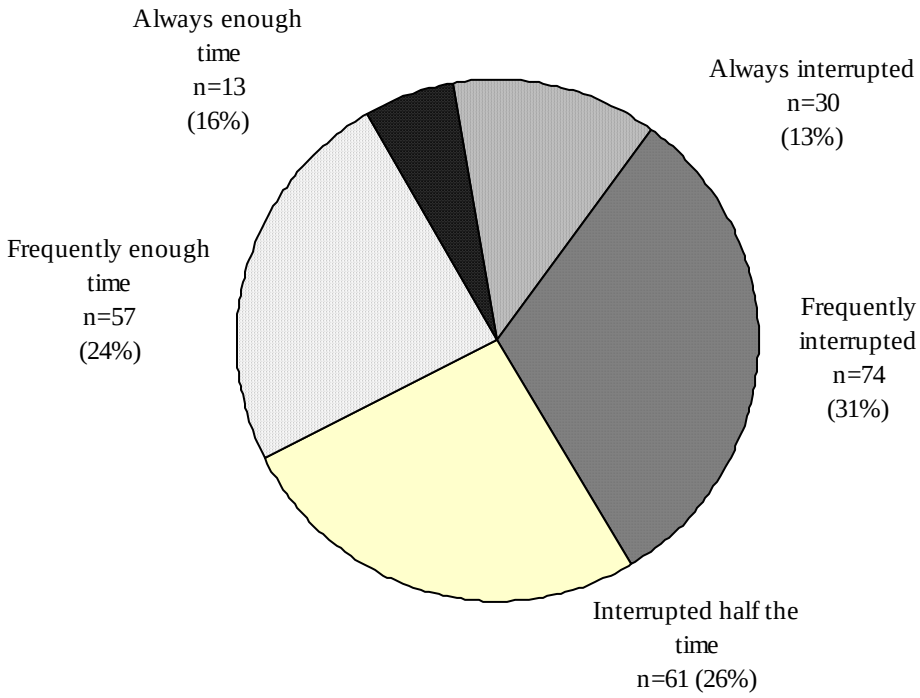
Figure 12: Strength Training Equipment Conducive to Working Out (All Respondents, N = 234)



Research Question 4: How Much Time Is Available For Members to Participate In On-Duty Physical Training

Only 40% of survey respondents indicated there was frequently or always enough time to conduct fitness training on duty. The remaining 60% indicated their workouts were always (13%), frequently (31%) or half the time (26%) cut short because of emergency calls (see Figure 13).

Figure 13: Perceived Adequacy of Time for Fitness Trainig
(All Respondents, N = 235)



The analysis of out of service time for the busiest units revealed an average out of service time of three hours and 36 minutes. This would suggest an average of eight hours and 24 minutes were available each work day for discretionary activities such as physical training (see Table 4).

Table 4

Average Out of Service Time for Henrico Fire Ambulances from 8:00 am to 8:00 pm January 1, 2008, Through January 12, 2008.

Ambulance No.	Average out of service time (hours:minutes)
Fire Medic 3	3:49
Fire Medic 4	2:23
Fire Medic 5	4:23
Fire Medic 6	3:38
Fire Medic 7	3:12
Fire Medic 9	4:44
Fire Medic 11	4:11
Fire Medic 12	3:49
Fire Medic 13	3:42
Fire Medic 14	3:54
Fire Medic 15	2:53
Fire Medic 16	2:34
Total	3:36

Research Question 5: How Does the Department's Policy on Wearing Uniforms Impact Members' Participation in Physical Training?

Survey results revealed that 60% of respondents felt the Division's uniform policy presented a barrier to participation in physical fitness. Specifically, 23% indicated the uniforms frequently prevented them from participating, and 38% indicated the policy sometimes prevents them from completing fitness training. Only a third of the respondents indicated that uniforms presented no barrier at all (see Figure 14). These results were very closely replicated with the following question, which asked whether a change in the uniform policy to allow coveralls would make members more likely to work out. Twenty-five percent of the respondents indicated that having the option to change clothes into coveralls would make them much more likely to work out, and 29% indicated such an option would make them somewhat more likely.

Figure 14: Perceived Impact of Existing Clothing Policy on Physical Fitness Participation
(N = 235)

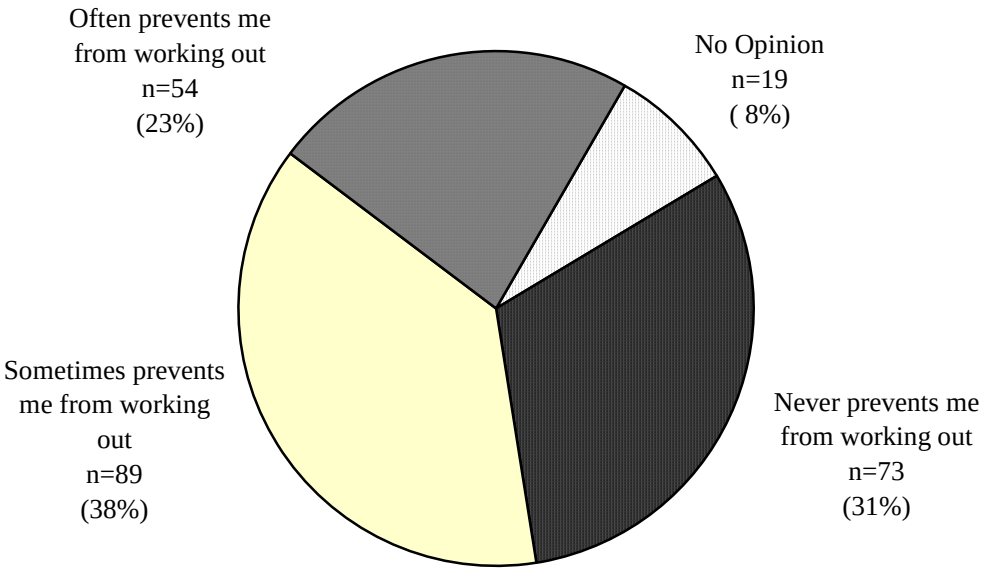
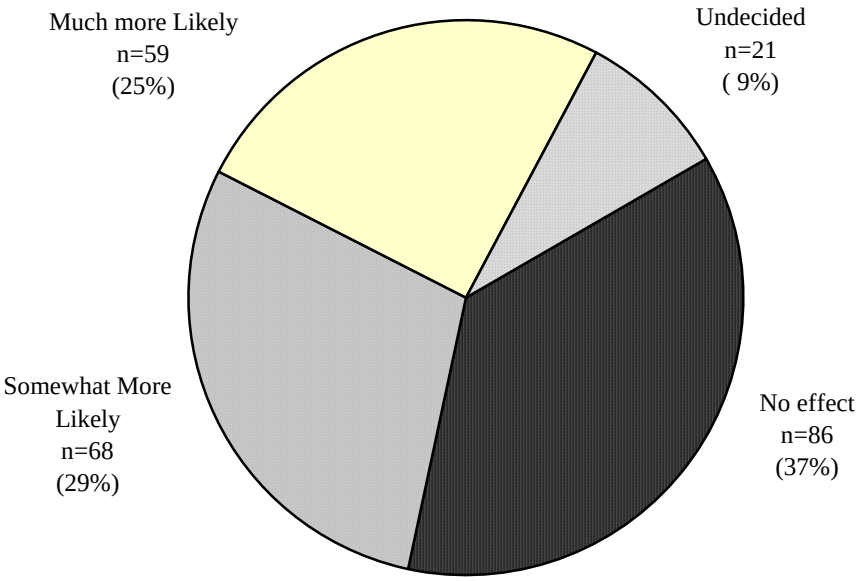


Figure 15: Would the Option of Changing into Coveralls Make You More Likely to Work Out?
(N = 234)



Discussion

Research Question 1: To What Extent Do Operational Members Participate in On-Duty Physical Training?

Multiple approaches were used to describe the on-duty exercise habits of Henrico firefighters. A two-month review of the automated day log program revealed that fire fighters spent an average of eight minutes per day engaged in physical training. However, considering the number of null entries in the system, it is likely that officers failed to enter all the physical training hours into the day log program. After removing all the null entries from the data set, the resulting average increased to 34 minutes per firefighter per duty day spent on exercise.

In the survey 29% of members self-rated their exercise frequency at less than twice a month, or not at all. This is consistent with the exercise habits of the general public

(Armstrong, 2000; Marcus, 1992). However, research by Kale et al. (2007) found that municipal fire departments spent an average of 8%, or almost two hours per day, conducting physical training. This would suggest that Henrico firefighters' exercise habits, while similar to the national average for all adults, were not as aggressive as some other municipal fire departments.

The ACSM (1990) calls for adults to maintain an exercise frequency of at least three times a week, but the survey revealed only 19.5% of the Division participated in on-duty physical training that came close to that frequency. The ACSM also recommends exercise duration of 20 to 60 minutes; the survey indicated 72% of Division members exercised for more than 30 minutes, with 20% reporting their exercise lasted more than one hour. These two measures taken together would suggest that members did not work out as often as they should, but when they did work out, the duration was close to the recommended time.

ACSM (1990) also recommends "a well-rounded training program including resistance training and flexibility exercises" (p. 270), but unfortunately, 22% of the survey respondents admitted they had no workout plan at all. This was compounded by the response that only 6% of the respondents had ever met with a peer fitness trainer to develop a customized, well-rounded exercise program. Research concludes employees are much more likely to continue with a fitness training program if they are given specific goals and a designed workout to meet those goals (Harrison and Liska, 1994).

In summary, this research concluded that the majority of members did not engage in physical fitness training on duty with enough frequency to meet accepted fitness

standards. Questions remain about the quality or intensity of workouts completed on duty; however, these questions were not within the scope of this research.

Resea*rch Question 2: How does the Organization Provide Motivation and Support for Members to Participate in On-Duty Physical Training?*

Research suggests giving up a sedentary lifestyle, in order to participate in exercise, is akin to giving up tobacco or alcohol addiction (Marcus and Owen, 1992). In many cases people need motivation from their friends, health care professionals, or co-workers (Harrison and Liska, 1994). Marcus and Owen take it one step further and recommend that occupational fitness programs be designed specifically to suit the needs of targeted groups, with gradual building blocks, so that participants can see early success from their efforts (p. 13).

Considering the importance of motivating people to begin exercise, it was interesting to note that 75% of the survey respondents perceived the organization placed a lower priority on physical training when compared to other non-emergency, discretionary activities. Even more telling is that only 37% of respondents indicated their supervisor routinely encouraged them to participate in physical training, with 25% reporting their supervisor never encouraged them to exercise on duty. Only 31% of respondents perceived their supervisors led them by example to exercise, and 25% reported their supervisor never led them by example to complete physical training. Combined with the fact that only 6% of the division reported meeting with a peer fitness trainer to design a tailored workout routine, it must be concluded that the Division is not providing a high level of formal motivational support to its members to become engaged in physical training.

This conclusion is supported by the finding that only 13% of the Division's members strongly agreed the organization had given them motivation to exercise on duty.

Research Question 3: What Resources and Equipment are Available for Members to Utilize in On Duty Physical Training?

The inventory of fitness equipment supported mixed conclusions. While each station had a limited supply of equipment that will allow a few members to work out at once, none had adequate resources for a full shift of firefighters to work out together. This limitation of equipment and space likely required some scheduling between members to share the equipment, thereby creating a perceived barrier to participation. In addition, 11 of the 20 fire stations did not have air conditioning in the garage areas where the exercise equipment is kept, which may have served as a comfort barrier during hot weather.

Considering the results of this inventory, it was no surprise that 67% of the survey respondents indicated dissatisfaction with the physical environment of the workout areas in the stations. Only 24% of the respondents rated the physical environment as strongly conducive to working out. With respect to aerobic exercise machines, 49% of the respondents rated the machines as conducive to working out. A similar number, 48%, found the weight training equipment conducive to working out.

It is likely that some members perceived these equipment and environment barriers greater than they really were, and in turn use these perceived barriers as reasons to avoid exercise. Harrison and Liska (1994) found that "employees with high health risks were .5 to 1.2 standard deviations higher in perceived barriers than employees with low health risks" (p.67). Towers et al. (2005) described a certain "exercise defiance"

from “men in poor health;” this defiance is built upon identification of perceived barriers (p.13). Salmon et al. (2003) reported similar findings, indicating that people who enjoy sedentary behaviors were statistically more likely to identify physical barriers to their participation in exercise (p.186). Therefore, it will become important to address these barriers – real or perceived – in order to increase exercise participation within the Division.

Research Question 4: How Much Time is Available for Members to Participate in On-Duty Physical Training?

Survey results indicate that 60% of respondents perceived their workout routines were interrupted by emergency calls at least half the time. It is not clear how often members would return to their exercise routine after being interrupted, and this was an important consideration that was not investigated on the survey.

The analysis of ambulance out of service time suggests that, even for the busiest response crews in the organization, an average of eight hours and 24 minutes is available each day, during the hours of 8:00am to 8:00pm, for discretionary (non-emergency) activities. Combined with the earlier finding that 75% members believed physical training was given a lower priority than other discretionary activities, an interesting trend emerges. The data suggest that adequate time was available for physical training, but that time may have been consumed with other priorities other than physical training.

After considering the survey results, combined with the analysis of out of service time, it must be concluded that enough time was available for fitness training, provided members were willing to complete multiple short-duration exercises, instead of relying on one lengthy exercise that was more likely to be interrupted.

Time availability may have been more of a perceived barrier than an actual barrier. As with the discussion of equipment and resources, any steps that can be taken to reduce the perception barriers are likely to reduce the levels of exercise defiance among those who would benefit the most from participation.

Research Question 5: How does the Department's Policy on Wearing Uniforms Impact Members' Participation in Physical Training?

The Division's uniform (clothing) requirement was identified as a significant barrier to participation in on-duty exercise programs. A total of 61% of the Division reported the uniform requirement either sometimes (38%) or often (23%) prevented them from participating in fitness training. Only 31% reported that the policy never prevented them from participating. A potential solution to this barrier was indicated when almost the same proportion of respondents indicated they would be somewhat more likely (29%) or much more likely (23%) to work out if they were allowed to change into coveralls instead of regular uniforms when emergency calls interrupted physical training.

Summary of Key Findings

The majority of members of the Division of Fire did not participate in on-duty fitness training at levels prescribed by the Division, or at levels recommended by the health and fitness industry.

Many members did not have a specific fitness training plan, which suggests they would be much less successful in achieving health goals. In addition, the vast majority of members did not receive any individual assistance from peer fitness trainers to develop an exercise plan.

There was a very strong perception within the Division that physical fitness training was given low priority. Many supervisors did not actively encourage physical training, and a quarter of supervisors were perceived by their subordinates to have completely failed to lead by example with physical fitness training.

A very basic level of exercise equipment was available for on-duty training. Adding additional equipment may improve exercise participation by reducing a perceived barrier. Many firefighters viewed facility design issues (such as a lack of air conditioning), as a barrier to their participation in physical training.

Adequate time was available for on-duty fitness training; however, members may need to work around interruptions by completing multiple short workouts, rather than one single long workout during the work day.

Uniforms were a significant barrier to participation in physical training; however, survey results indicate this barrier might be reduced by amending the policy to allow members to utilize coveralls when their workout is interrupted by an emergency call.

Recommendations

Recommendation 1: The Division Should Provide each Member an Individual Fitness Training Plan that Focuses on Achieving Short and Long Term Fitness Goals.

This recommendation is based on the body of knowledge that identifies the importance of tailored, motivational plans as a critical component of successful exercise uptake and maintenance. In particular, this will help those who are most exercise defiant, by allowing them to perceive their participation as achievable. Fitness training plans should be focused on achievable goals that allow members to see success, thereby giving them the motivation to stay with the program and continue to improve their condition.

Rather than require an arbitrary, un-enforced amount of time for working out on duty each day, the Division's policies should focus on individual goal achievement for health and fitness benefits.

This will be a difficult goal because of the size of the organization. However, by initially targeting only those members whose fitness scores were the lowest of the test group, an immediate impact could be made in the area where it is needed the most.

Recommendation 2: The Division Should Increase the Number of Peer Fitness Trainers and Enhance their Availability to Help Firefighters with their Fitness Plans.

In order to achieve the first recommendation, the Division will need to train more members to serve as peer fitness trainers. A process is already in place to provide this training, consistent with the IAFC/IAFF Wellness and Fitness Program. The number of trainers should be expanded to ensure that each member has access to a trainer, both for initial consultation and for on-going assistance.

Recommendation 3: Require Supervisors to Establish a High Priority for Participation in Physical Fitness Activities, and Use their Own Participation to Lead by Example.

In order to establish physical fitness as an organizational priority, it is necessary to hold mid-level managers (company officers) accountable to lead the effort. They are the individuals who establish the priority and order of activities in the fire station each day. Company officers must play a part in encouraging physical fitness and they should be expected to do so by setting the right example. Their participation in this effort is critical to the health and safety of their personnel, which is the most important priority for any fire service company officer. Their success in this regard should be a measured dimension on the annual performance appraisal.

Recommendation 4: The Division Should Ensure That Each Fire Station has Adequate Aerobic and Strength Fitness Equipment for at Least Three Firefighters to Exercise at the Same Time.

All fire apparatus in the Division of Fire are staffed with a minimum of three firefighters. Inherent within this recommendation is the notion that a company of firefighters should be able to exercise together using the same motivational team approach that is used for all other company-level activities. Additionally, by providing adequate equipment, a perceived barrier to exercise participation would be reduced.

Recommendation 5: The Division Should Amend the Uniform Standard to Allow Firefighters to Wear Coveralls if Their Workout is Interrupted by an Emergency Call

A majority of members perceived the uniform clothing requirements as a barrier to participation in physical training. When an emergency was received during physical training, members were required to remove their shorts and tee shirts, and don their long uniform pants and collared shirt. This recommendation calls for reinstitution of a previous policy that allowed members to don uniform coveralls over their workout clothes if they were interrupted by an emergency call.

In conclusion, achievable opportunities exist to reduce barriers to participation in physical fitness training within the Henrico County Division of Fire. Any future study of this type should consider use of a focus group to discuss perceived barriers in more detail beyond what was available from a survey instrument. In addition, a more exact measure of the existing fitness equipment should be undertaken, because assessing the quality of the exercise equipment was outside the scope of this research. Finally, the day log reporting device was found to to be an unreliable resource due to officers not inputting

data properly; therefore, any similar data collection method should first ensure the working validity of the reporting device.

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Appendix A

Standard Operating Guideline for On-Duty Fitness Training

County of Henrico **Division of Fire** By order of: **Ronald L. Mastin** **Chief, Division of Fire**	HENRICO FIRE	**Title:** SOG **Effective Date:** **Rescinds:**

PURPOSE - To establish a standard and consistent physical fitness program for all sworn members of the Division of Fire.

PROCEDURE - The physical health and fitness of all sworn personnel is a priority of the Division of Fire. When the physical aspects of the job of firefighting are considered, it must be realized that above-average physical fitness is necessary and must be maintained.

1. Physical fitness shall be a mandatory program for all sworn Division personnel.
2. All 40-hour employees should perform 1 hour of physical fitness training at least 3 days per week. All station personnel shall be required to perform 1 hour of physical fitness training during their tour of duty. It is recognized that extenuating circumstances may excuse physical fitness training for that tour of duty, i.e., during days of extreme physical workload. This shall be at the supervisor's discretion.
3. All outside physical fitness activities (volleyball, basketball, etc.) are not allowed between the hours of 0700-1630 on all duty days.

Using Outside Facilities

- Companies may utilize outside facilities within their first due district to facilitate physical fitness training and exercise.
- It will be the responsibility of the company involved to gain permission and acceptance from the facility they wish to utilize. After such permission is granted, approval should be forwarded through the chain of command to the Division Chief.
- Exercise sessions should be kept to a one-hour time frame if possible (this does not include travel time, etc.).
- Please arrange to use the facilities during off-peak periods and park the apparatus in areas that do not congest the parking lot.
- All members of the shift shall engage in some type of physical activity while at the facility.
- All companies must remain in-service during this time.

Appendix B

Standard Operating Guideline for Fitness Testing

County of Henrico
Division of Fire

By order of:

Ronald L. Mastin
Chief, Division of Fire

Title:

Effective Date:

Rescinds:

PURPOSE – To state the guidelines to be used regarding Division of Fire employees that are taking the annual physical capabilities assessment.

PROCEDURE - The following criteria will be used in determining who may or may not participate in the assessment (test) and what procedures will be followed during the testing process.

I. During any testing, a Division of Fire Representative will be assigned and identified. This individual will be responsible to ensure that all guidelines are followed.

II. Contraindications for performing a submaximal treadmill test on apparently healthy adults are as follows:

   a. Resting diastolic blood pressure >115 mm Hg or resting systolic blood pressure >200 mm Hg.
   b. Advanced or complicated pregnancy
   c. Neuromuscular, musculoskeletal, or rheumatoid disorders that are exacerbated by exercise.
   d. Recent cardiovascular history including chest pain, stroke or TIA.

III. General indications for stopping an exercise test in an apparently healthy adult:

   a. Onset of angina or angina-like symptoms.
   b. Significant drop (20mm Hg.) in systolic blood pressure or failure of the systolic blood pressure to rise with an increase in exercise intensity.
   c. Excessive rise in blood pressure: systolic pressure >280 mm Hg. Or diastolic pressure >115 mm Hg.
   d. Signs of poor perfusion: lightheadedness, confusion, ataxia, pallor, cyanosis, nausea or cold and clammy skin.
   e. Failure of heart rate to increase with increased exercise intensity.
   f. Unusual or severe shortness of breath.
   g. Subject request to stop.
   h. Physical or verbal manifestations of severe fatigue.
   i. Acute myocardial infarction or suspicion of myocardial infarction.
   j. Serious arrhythmias (e.g., second or third-degree atrioventricular block, sustained ventricular tachycardia or increased premature ventricular contractions, atrial fibrillation with fast ventricular response.)
   k. Any chest pain.
   l. Less serious arrhythmia such as supra ventricular tachycardia.

IV. If the test is never started due to the above contraindications, or is stopped due to any of the general indications, then the following guideline will be applicable:

a. If the test is never started or is stopped, inform the employee as to why.
b. The medical evaluator will confer with the Division of Fire's on scene representative.
c. Advise the employee that he/she will not be able to finish the duty shift or return to work until he/she has seen either Employee Health or a physician.
d. The employee will be given a Physician's Capability Form and a list of approved physicians.
e. The Division of Fire's on scene representative will ensure that the employee is not allowed to ride the apparatus back to the station and will ensure that the employee does not go back to work.
f. The Division of Fire's representative will arrange for transportation back to the employee's duty station and will ensure that the employee seeks the required medical attention. If necessary the Division's representative will provide transportation to an approved medical facility.

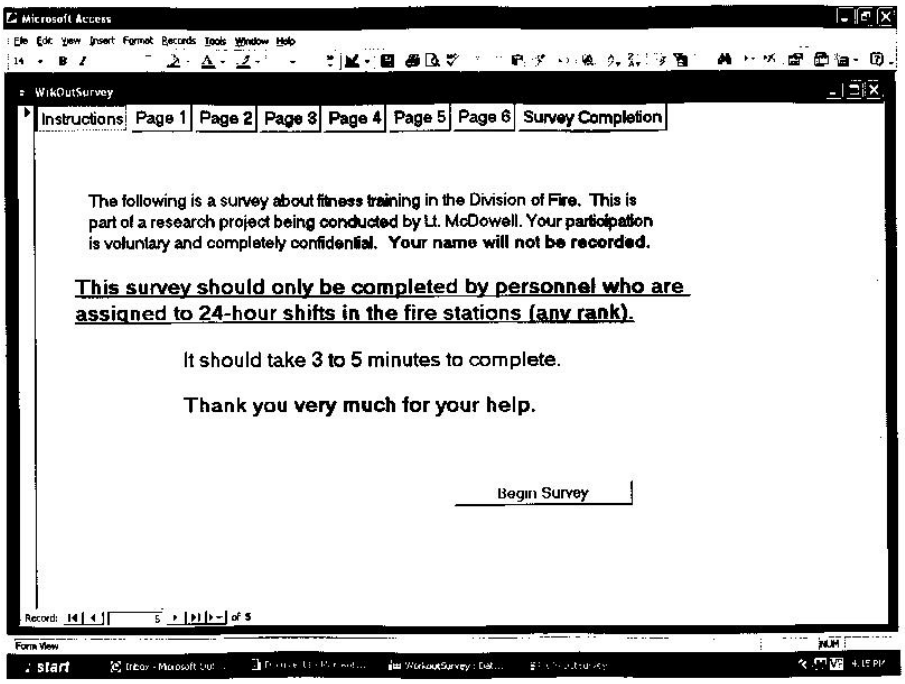
V. Once notified the employee must comply with the following guideline stipulations:

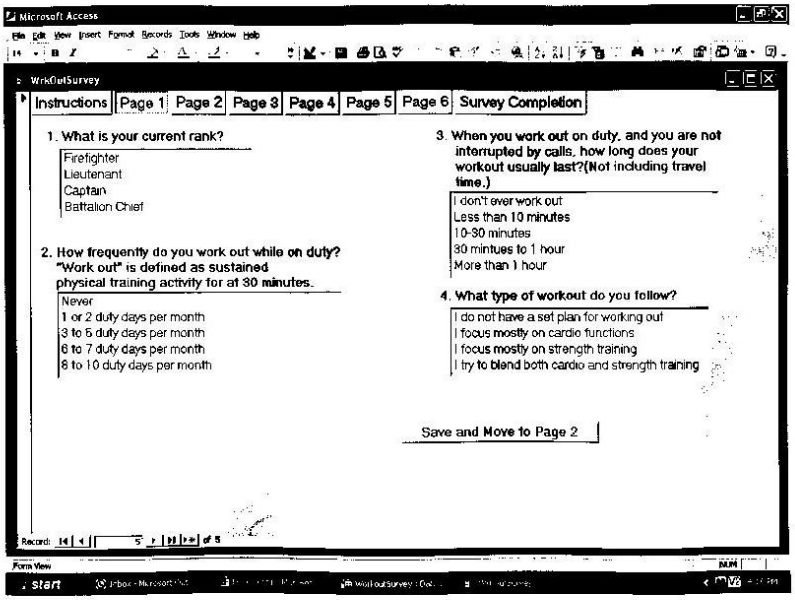
a. The employee must follow the instructions of the Division's representative at the testing facility.
b. The employee may not travel back to their duty assignment or any other location on fire apparatus. (Pumpers, Tankers, Trucks, Brush Units)
c. The employee notified shall not respond to any emergency operation but will go directly back to their work station and mark off duty.
d. The employee must seek medical attention at the earliest available appointment. This medical attention may be in the form of seeing Employee Health or any other approved workers compensation facility as listed on the Panel of Approved Physicians Memo.
e. The employee must have a copy of a Physician's Capability Form completed prior to returning to duty. The employee must turn in the completed form to their Battalion Chief prior to returning to duty. Any Physician's Capability Forms that indicate anything other than a release for FULL duty must be delivered to the Assistant Chief, Operations or the Deputy Fire Chief for " light duty" determination and approval.

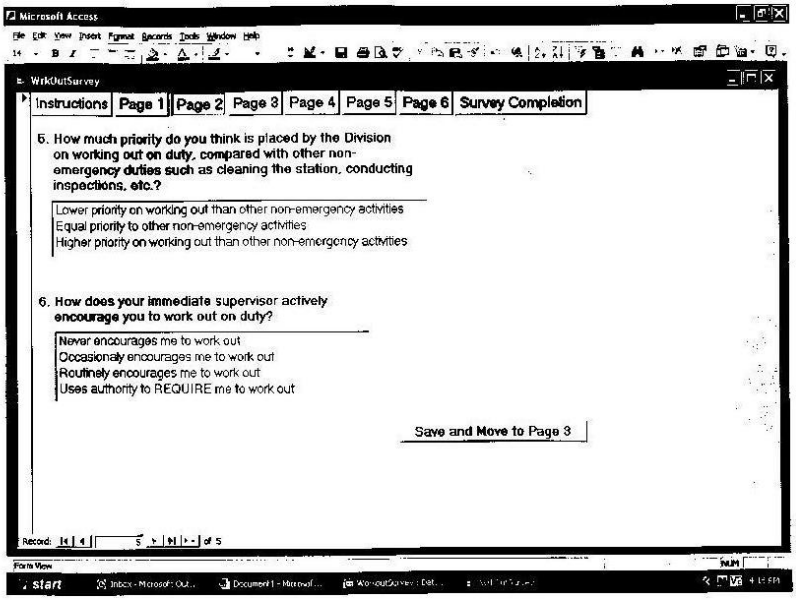
VI. During the employee's annual physical at Employee Health, medical personnel will review this guideline and will take the necessary steps to ensure that employees who have contraindications will be notified and advised of the proper course of action that must be taken. In some instances, Employee Health may remove the employee from duty. When this is done, Employee Health must notify the Chief's office immediately, indicating who the employee is and what the nature of the situation is. Employee health will make recommendations necessary to insure that the employee does, in fact, seek timely medical evaluation and treatment. The employee must seek medical treatment and follow-up, and before returning to work must complete the Physician's Capability Form in its entirety.

Appendix C

Internal Survey



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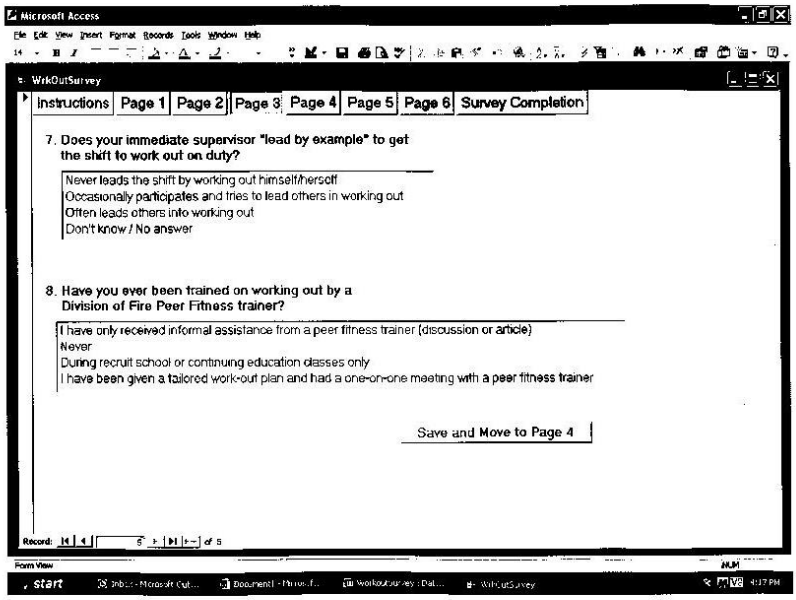
Survey Completion
5. How much priority do you think is placed by the Division on working out on duty, compared with other non-emergency duties such as cleaning the station, conducting inspections, etc.?
Lower priority on working out than other non-emergency activities
Equal priority to other non-emergency activities
Higher priority on working out than other non-emergency activities
6. How does your immediate supervisor actively encourage you to work out on duty?
Never encourages me to work out
Occasionaly encourages me to work out
Routinely encourages me to work out
Uses authority to REQUIRE me to work out
Save and Move to Page 3
Record: 5 of 5
Form View
start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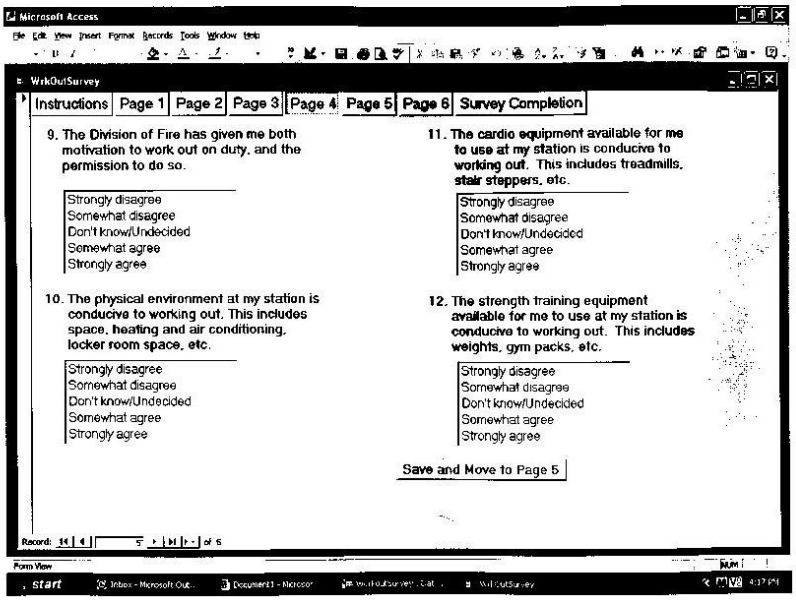
Survey Completion
7. Does your immediate supervisor "lead by example" to get the shift to work out on duty?
Never leads the shift by working out himself/herself
Occasionally participates and tries to lead others in working out
Often leads others into working out
Don't know / No answer
8. Have you ever been trained on working out by a Division of Fire Peer Fitness trainer?
I have only received informal assistance from a peer fitness trainer (discussion or article)
Never
During recruit school or continuing education classes only
I have been given a tailored work-out plan and had a one-on-one meeting with a peer fitness trainer
Save and Move to Page 4
Record: 6 of 5
Form View
start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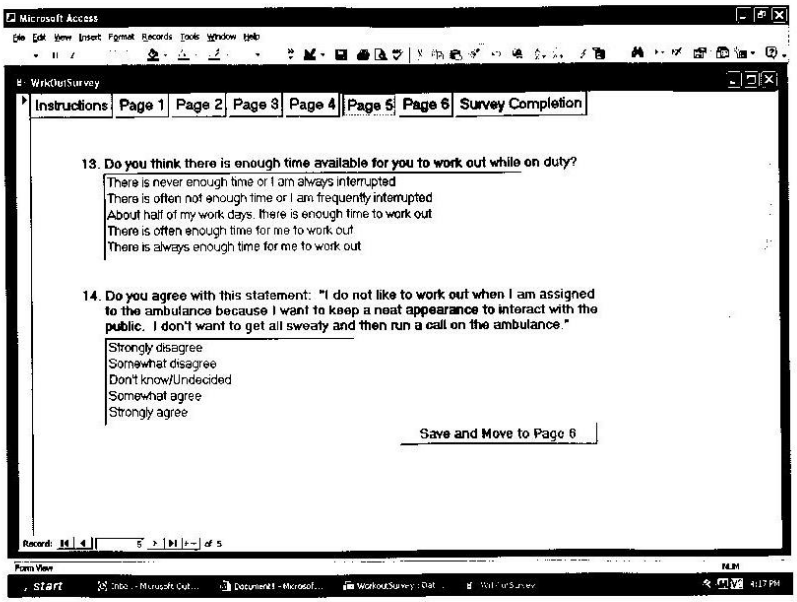
Survey Completion
9. The Division of Fire has given me both motivation to work out on duty, and the permission to do so.
Strongly disagree
Somewhat disagree
Don't know/Undecided
Somewhat agree
Strongly agree
10. The physical environment at my station is conducive to working out. This includes space, heating and air conditioning, locker room space, etc.
Strongly disagree
Somewhat disagree
Don't know/Undecided
Somewhat agree
Strongly agree
11. The cardio equipment available for me to use at my station is conducive to working out. This includes treadmills, stair steppers, etc.
Strongly disagree
Somewhat disagree
Don't know/Undecided
Somewhat agree
Strongly agree
12. The strength training equipment available for me to use at my station is conducive to working out. This includes weights, gym packs, etc.
Strongly disagree
Somewhat disagree
Don't know/Undecided
Somewhat agree
Strongly agree
Save and Move to Page 5
Record:
Form View
start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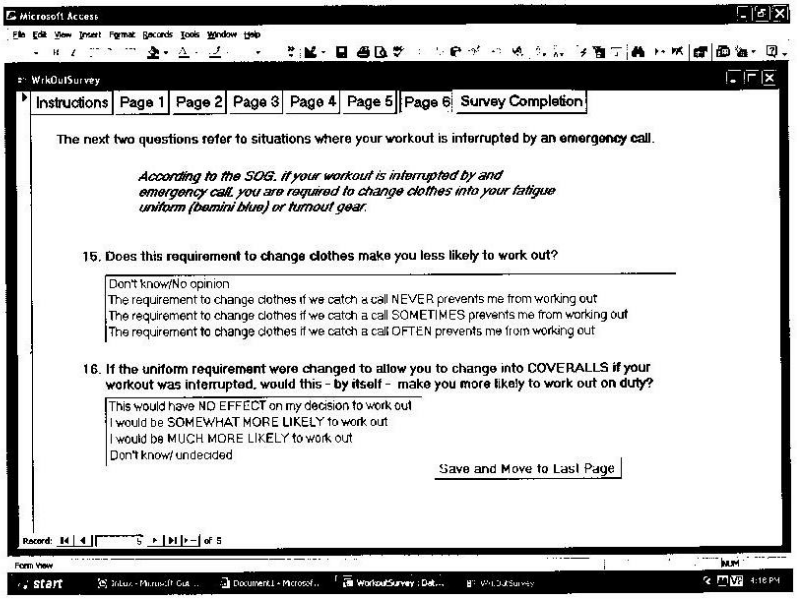
Survey Completion
13. Do you think there is enough time available for you to work out while on duty?
There is never enough time or I am always interrupted
There is often not enough time or I am frequently interrupted
About half of my work days, there is enough time to work out
There is often enough time for me to work out
There is always enough time for me to work out
14. Do you agree with this statement: "I do not like to work out when I am assigned to the ambulance because I want to keep a neat appearance to interact with the public. I don't want to get all sweaty and then run a call on the ambulance."
Strongly disagree
Somewhat disagree
Don't know/Undecided
Somewhat agree
Strongly agree
Save and Move to Page 6
Record:
Form View
start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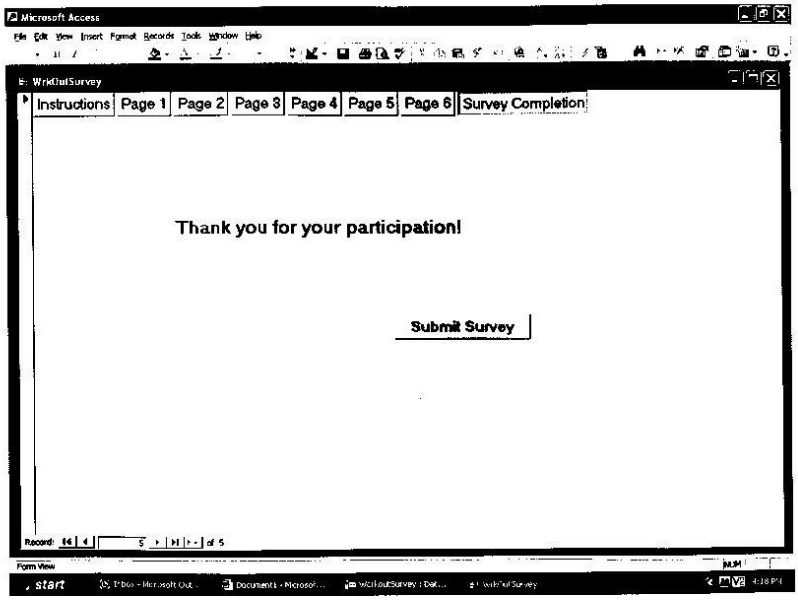
Survey Completion
The next two questions refer to situations where your workout is interrupted by an emergency call.
According to the SOG, if your workout is interrupted by and emergency call, you are required to change clothes into your fatigue uniform (bemini blue) or turnout gear.
15. Does this requirement to change clothes make you less likely to work out?
Don't know/No opinion
The requirement to change clothes if we catch a call NEVER prevents me from working out
The requirement to change clothes if we catch a call SOMETIMES prevents me from working out
The requirement to change clothes if we catch a call OFTEN prevents me from working out
16. If the uniform requirement were changed to allow you to change into COVERALLS if your workout was interrupted, would this - by itself - make you more likely to work out on duty?
This would have NO EFFECT on my decision to work out
I would be SOMEWHAT MORE LIKELY to work out
I would be MUCH MORE LIKELY to work out
Don't know/ undecided
Save and Move to Last Page
Record: 5 of 5
Form View
start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Survey Completion
Thank you for your participation!
Submit Survey
Record: 5 of 5
Form View
start

Appendix D

Sample of Day Log Information

Henrico Division of Fire
District Summary Detailed (page 2)

Start Date: 10/1/2007 **End Date:** 10/31/2007

Date	Shif	Station	Physical training hours	FF Injuries Incident	FF Injuries Fitness	FF Injuries Training	FF Injuries Other
10/1/2007	B	Station 01	0	0	0	0	0
10/1/2007	B	Station 02	0	0	0	0	0
10/1/2007	B	Station 03	0	0	0	0	0
10/1/2007	B	Station 04	0	0	0	0	0
10/1/2007	B	Station 05	0	0	0	0	0
10/1/2007	B	Station 06	0	0	0	0	0
10/1/2007	B	Station 07	0	0	0	0	0
10/1/2007	B	Station 08	1	0	0	0	0
10/1/2007	B	Station 09	0	0	0	0	0
10/1/2007	B	Station 10	6	0	0	0	0
10/1/2007	B	Station 11	0	0	0	0	0
10/1/2007	B	Station 12	0	0	0	0	0
10/1/2007	B	Station 13	0	0	0	0	0
10/1/2007	B	Station 14	0	0	0	0	0
10/1/2007	B	Station 15	0	0	0	0	0
10/1/2007	B	Station 16	5	0	0	0	0
10/1/2007	B	Station 17	1	0	0	0	0
10/1/2007	B	Station 18	3	0	0	0	0
10/1/2007	B	Station 21	0	0	0	0	0
10/1/2007	B	Station 22	0	0	0	0	0
10/2/2007	C	Station 01	0	0	0	0	0
10/2/2007	C	Station 02	0	0	0	0	0
10/2/2007	C	Station 03	0	0	0	0	0
10/2/2007	C	Station 04	0	0	0	0	0
10/2/2007	C	Station 05	0	0	0	0	0
10/2/2007	C	Station 06	0	0	0	0	0
10/2/2007	C	Station 07	0	0	0	0	0
10/2/2007	C	Station 08	0	0	0	0	0
10/2/2007	C	Station 09	0	0	0	0	0
10/2/2007	C	Station 10	0	0	0	0	0
10/2/2007	C	Station 11	0	0	0	0	0
10/2/2007	C	Station 12	4	0	0	0	0
10/2/2007	C	Station 13	2	0	0	0	0
10/2/2007	C	Station 14	1	0	0	0	0
10/2/2007	C	Station 15	0	0	0	0	0
10/2/2007	C	Station 16	0	0	0	0	0
10/2/2007	C	Station 17	0	0	0	0	0
10/2/2007	C	Station 18	0	0	0	0	0
10/2/2007	C	Station 21	2	0	0	0	0
10/2/2007	C	Station 22	0	0	0	0	0

Appendix E

Inventory of fitness equipment in Henrico fire stations

Station No.	Minimum Daily Staffing	No. of treadmills	Other cardio devices	Complete set free weights?	Working gym pack?
1	6	1	1 bike	Y	
2	3	1	none	N	N
3	5	1	1 stepper	Y	Y
4	5	1	1 stepper	Y	Y
5	5	1	1 elliptical	N	N
6	8	1	none	N	Y
7	5	1	1 stepper	Y	N
8	3	1	none	N	Y
9	5	1	1 stepper	N	Y
10	6	1	1 stepper	Y	N
11	5	1	1 stepper	N	Y
12	8	1	1 elliptical 1 free climber	Y	Y
13	8	1	1 stepper	Y	Y
14	5	1	none	N	Y
15	5	1	1 stepper	N	Y
16	5	1	1 stepper 1 bike	N	Y
17	3	1	1 stepper 1 bike	N	Y
18	6	1	1 elliptical 1 bike	Y	Y
21	6	1	1 stepper	Y	Y
22	7	1	1 bike	Y	Y

Note . Other cardio devices included stair-steppers, elliptical machines, and stationary bikes. A free weight set was considered complete if it contained two weight bars, a reclining bench, bar weights up to 200 pounds, and dumbbell sets up to 50 pounds