



FIRE SERVICE OCCUPATIONAL HEALTH AND FITNESS PROGRAM EVALUATION

***TO EVALUATE AND VERIFY THE BENEFITS AND
COST EFFECTIVENESS OF THE OCCUPATIONAL
HEALTH AND FITNESS PROGRAMS
PRESENTED TO:***

***SEATTLE FIRE FIGHTERS (UNION #27)
SEATTLE FIRE CHIEFS (UNION #2898)
THE CITY OF SEATTLE FIRE DEPARTMENT***

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Executive Summary

The NewSof Group has been tasked to evaluate and verify the benefits and cost effectiveness of occupational health and fitness programs that could be provided to all uniformed Fire Department Personnel. Based on this we were to make recommendations regarding the steps necessary to maximize the health and wellness of the staff while potentially reducing the financial impact of fire fighters health status. Further we were asked to develop a framework for the evaluation of any program we would recommend.

Our work on this research project combined interviews with internal stakeholders, interviews with other fire departments, attendance at the Phoenix Health and Wellness Symposium, document review, literature review, and several interim group meetings with Local 27, Local 2898, SFD, and City representatives.

The Seattle Fire Department was invited by the International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC) to join nine other major cities in 1996 in a commitment to create what is now called the IAFF/IAFC Wellness Fitness Initiative (WFI). The WFI is designed to be a comprehensive wellness and fitness program from pre-hire through retirement for fire service personnel. It requires a commitment by labor and management to support a positive, individualized wellness-fitness program. For a variety of reasons, Seattle, one of the 10 cities, has not progressed or advanced in the adoption of policies, procedures, and practices recommended in the WFI. The result is that Seattle is currently not in compliance with NFPA 1582. Based upon our research this means that Seattle has incurred greater expenses, unnecessary illness and injury, and a greater potential for future liability.

Although the focus of this project is **to evaluate and verify the benefits and cost effectiveness of the Occupational Health and Fitness Programs**, we believe the real issue or question is: *What is the best strategy to move from the City's current approach to firefighter health and safety, costing the City nearly \$20 million dollars annually, to a more strategically managed, centralized, structured and data-driven approach that cost-effectively seeks to improve firefighter health, job-readiness, and career sustainability and, as a result, lower costs.*

What We Know About the Economic Consequences of Poor Health

The research is clear. There are five major learnings that have relevance to the population of firefighters. These learnings are as follows:

- Individuals with more behavioral risk characteristics cost more than others with lesser risks.
- This relationship between health risks and costs holds true across all age, gender, and employer groups as well as for health claims, absenteeism, productivity, and disability measures.
- More importantly, as risk characteristics change, so do associated costs; meaning as a person increases risk characteristics the cost increases and as a person lowers risk characteristics the cost lowers.

- Achieving higher participation in assessments, care, and health promotion programs results in a better return on investments.
- Achieving high levels of participation depends upon strong leadership, effective ongoing communication, comprehensive program offerings, appropriate policies, culture, and meaningful incentives.

There is conclusive research that implementing an Occupational Health and Fitness Program has the potential to generate significant net savings to the Seattle Fire Department while improving the health of all fire fighters and protecting fire fighters' careers.

A summary of the proposed program and costs represents a NPV of \$62,571 over a five-year period. This is a conservative estimate and does not include savings from reductions in medical claims. This is excluded when looking at the return from the City's perspective, as Local 27 is now responsible for its own health care costs.

	Five-Year Total	2008	2009	2010	2011	2012
Program Expenses	\$5,480,056	\$401,808	\$1,009,277	\$1,158,153	\$1,445,998	\$1,464,819
Program Savings (not including medical)	\$5,711,184	\$0	\$666,747	\$1,411,145	\$1,759,381	\$1,873,911
Total Savings/(Loss)	\$231,128	(\$401,808)	(\$342,530)	\$252,992	\$313,383	\$409,091
NPV Without Medical	\$62,571					
Total Savings(Loss) When Medical Claims Is Included	\$3,646,975	(\$401,808)	(\$59,197)	\$873,886	\$1,333,911	\$1,900,184
NPV Including Medical	\$2,658,564					

Recommendations

To accomplish this outcome the SFD will need to do the following:

- Commit to a minimum of a 5-year budgeted effort to improve firefighter health. It takes time to institutionalize programs in labor agreements or other policies and procedures geared toward protecting firefighter careers, while encouraging health maintenance and improvement.
- Start immediately with a specific objective; getting high levels of participation in medical evaluation. Focus on leveraging grant funding to get as many firefighters tested as possible with a goal of 90%+ participation. However, not reaching this goal during the first year does not mean there isn't interest in creating positive change.
- Build trust among all stakeholders. Trust will be established as there is collective commitment to firefighter health and safety and as there is a positive track record showing how individual cases regarding firefighter health and career sustainability are addressed.
- To build trust that will generate high levels of participation there must be a non-punitive focus to these programs and assured confidentiality. Not only must it be confidential, it must be perceived as confidential as it applies to medical monitoring and duty status.

- As trust is built, move from a voluntary to a mandatory attendance or participation program of medical evaluation.
- Implement ongoing persuasive and pervasive multi-channel communication. Effective communications will be a key success factor.
- Move from just evaluation and testing to the pro-active treatment, health improvement, and care management of all fire fighters to generate better results.
- Centralize the services, providers and contract models to insure that the health care delivery is built with an understanding of the nature of the firefighter's job.
- Use aggregate data from the first round of medical evaluations to set program offerings and realistic evaluative outcomes.

Situational Overview

IAFF Local Fire Fighters 27, the Fire Chiefs IAFF Local 2898, and the City of Seattle Fire Department joined the other nine cities in 1996 in a commitment to adopt what is called the IAFF/IAFC Wellness Fitness Initiative (WFI). This program is designed for incumbent fire service personnel. It requires a commitment by labor and management to a positive, individualized wellness-fitness program. The manual includes information on these topics:

1. Fitness assessment
2. Medical evaluation
3. Rehabilitation
4. Behavioral health
5. Data collection

Text boxes like these are used in this report to highlight certain concepts or are quotes from a particular source.

For a variety of reasons, Seattle, one of the 10 cities, has not progressed or advanced in the adoption of policies, procedures, and practices recommended in the WFI. During that period many other fire departments have taken a more comprehensive approach to the occupational health, wellness, and injury management of their firefighters.

There are some current events happening within SFD that represent an opportunity to move the WFI forward. As with many other fire departments, the WFI adoption was slow without an impetus of outside funding to start the initial medical evaluation components. This year, SFD has funding as a result of a grant to perform the comprehensive medical evaluation component of the WFI. In addition, SFD has funding through a facilities levy to build an Occupational Health Center. These new enablers, along with the continued work of the SFD Occupational Health and Fitness Committee (OHFC), have created the impetus for this project. This project and resulting reporting is meant to evaluate the cost-effectiveness and return-on-investment (ROI) implications of implementing the WFI.

Research Methodology

The project research combined interviews with internal stakeholders, interviews with other fire departments, attendance at the Phoenix Health and Wellness Symposium, document review, literature review, and several interim group meetings with Local 27, Local 2898, SFD, and City representatives. Exhibit 1 provides a more detailed listing of actual interviews and documents reviewed.

Current State Analysis

There may be small variances in the reporting of numbers which represents variances in the timing of data collection.

The SFD consists of the following:

79 Civilian Employees

1065 Uniformed Personnel consisting of:

36 Chief Officers

52 Captains
 162 Lieutenants
 87 Firefighter-Paramedics
 728 Firefighters

The current daily staffing model for the Operations Division requires 207 members to be on duty, 24/7. Time loss due to injury and illness must be filled to maintain the 207 member minimum staffing, and frequently require off-shift hiring per union contracts.

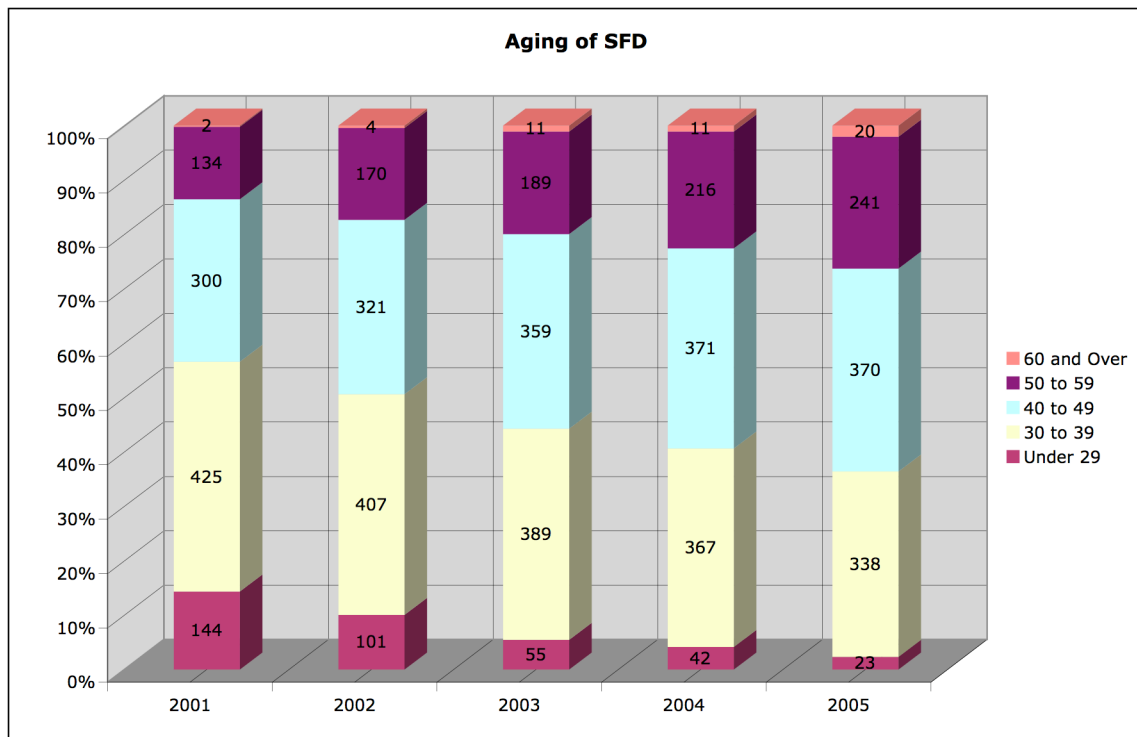
The demographic breakdown of the SFD is shown in Table 1 and the increasing age of the SFD is shown in Figure 1. As can be seen in Figure 1, the younger age bands are getting smaller over time and the older age bands are getting larger.

Table 1: Current Age Distribution of SFD

	<34	35 - 43	44 - 53	54 -64	>65
Male	150	391	280	129	2
Female	7	40	44	2	
Total	157	431	324	131	2
Percent	15%	41%	31%	13%	.2%

Data provided by the City of Seattle

Figure 1: Aging of the SFD

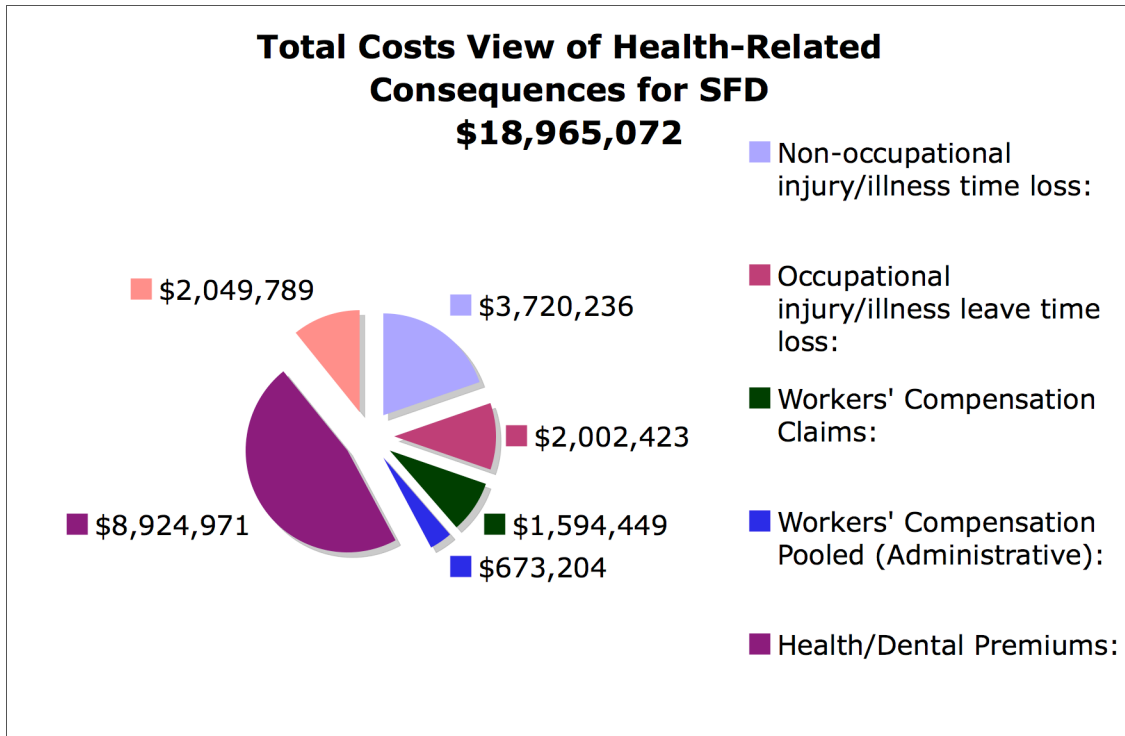


Data from NFPA Seattle Report - 2001 to 2005

The Seattle Fire Department is growing older. Age is a significant risk factor regarding health care costs suggesting future increases in health care expenditures

Figure 2 shows the view of the total costs of firefighter health and worker’s compensation liabilities based on data from 2006. This approach takes into account the total value of direct medical claims, worker compensation claims, and the costs associated with time loss and over-time pay to maintain the required duty-strength of firefighters. Medical claims were based on premiums paid.

Figure 2. Total Health-Related Cost View of SFD



Data provided by the City of Seattle (Summit Report)

Current Facts and the Firefighter’s Job

Firefighters have been described as “industrial athletes.” Imagine having to be able to jump from your seat at any time, put on gear weighing over 40 lbs., having your vision limited by a face piece and a breathing apparatus, and having to pull and carry several hundred pounds of weight in a crisis situation while your heart rate races to near maximum levels for sustained periods of time. The physiological and psychological demands on a firefighter’s cardiovascular and muscular system are extreme. It is no wonder that the following statistics are associated with this occupation:

Try to imagine wearing a firefighter’s gear while you go up and down your ladder to clean your gutters in 90 degree heat and limited range of sight while knowing the gutter could collapse.

- Fire fighters are at increased risk for

musculoskeletal injuries and cardio-respiratory illness compared to other occupations.¹⁻²

- Occupational injuries are the leading cause of disability and/or early retirement, and cardiovascular disease is the most common cause of fire fighter's work-related death.³⁻⁶
- Firefighters are injured at a much higher rate than other occupations (see Figure 3).⁷
- Health, fitness, and wellness are the dominant contributing factors to line-of-duty deaths for firefighters.⁸
- Based on reports from the Phoenix Fire Department, back, shoulder, and knee injuries are the most common type of firefighter injuries.⁹ SFD occupational injury data is consistent with the Phoenix findings. National data supports back and shoulder injuries as being most common among firefighters.⁷

Figure 3. Firefighter Injury/Illness Rates

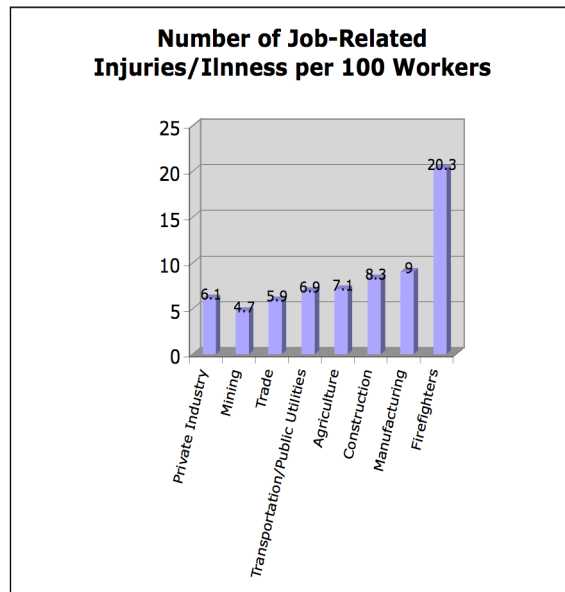
The Key Issue

Based on our interviews, SFD is not unlike many other fire departments around the country where there seems to be an inherent distrust between the firefighters and the administration. *The heart of this issue is how medical monitoring information will be used, who sees it, and how this can impact duty status.* This issue emerged with a recent incident with a Seattle firefighter and remains a sensitive issue.

Firefighters as a group are very concerned about how medical and physical conditions affect their duty-status.

Managing both policy and perceptions

about policy regarding this issue will be one of key issues that will determine the level of participation by Seattle Fire Fighters in this initiative.



Unlike many other professionals, physical and health-related deficiencies cannot only result in time loss, but also danger to co-workers and potential career loss. Thus, the sensitivity about risks associated with career loss is a major issue for all firefighters. Although it seems counter-intuitive, firefighters are so dedicated to their profession they often ignore the signs and indices that make them at risks for illness and injury.

Re-Framing the Issue

Although the focus of this project was *to evaluate and verify the benefits and cost effectiveness of the Occupational Health and Fitness Programs*, we believe the real issue or question at hand has to do with the following:

- What is the best approach to move from the City's current approach to firefighter health and safety, which costs the fire department nearly \$20 million dollars annually in health-related costs (see Figure 2), to a more strategic, centralized, structured and data-driven approach that cost-effectively seeks to improve firefighter health, job-readiness, and career sustainability?

Focusing on the individual components of the WFI is like focusing on an individual battle in a complex war without understanding the broader overall war strategy. By a more managed and data-driven approach to occupational health and safety, we are referring to an operational, procedural and data-driven strategy that centralizes provider resources and seeks to accomplish the following outcomes:

- Improve firefighter health and safety
- Increase firefighter readiness from entry to retirement
- Lower injury-rate and severity as measured by loss-time
- Lower overall health-related costs
- Improve career sustainability

Such a strategy is rooted in the centralization of care and rehabilitation with a focus on performance management as well as health management. Although performance and health management may overlap in some cases, the fundamental approach to care is driven by different objectives and care competencies. For instance, a medical doctor is driven by guidelines rooted in the treatment and amelioration of disease, while an occupational doctor is focused on the effect of the disease or condition on the performance of the worker based on an understanding of specific work requirements. As a by-product of the centralization of care, the ability to manage from a data perspective becomes possible and more affordable than current care delivery. Managing from a data-perspective means that programs and services are linked to specific problems identified through the data collection and analytical process.

As it currently stands, a firefighter can have diabetes, hypertension, and show signs of ischemia and still be actively fighting fires without anyone knowing it. In essence fire fighters are putting themselves, other firefighters, and potentially the public at risk.

The first step in moving to a strategic approach is recognizing these conditions exist and providing a structure to improve the probability that this condition doesn't contribute to a life or career-shortening event. Trust will be enhanced as these conditions are ameliorated without duty or career consequences.

Colleagues and supervisors often are aware of the health issues of their co-workers. The City needs to convert this personal awareness into a system that can change the situation for everyone's benefit.

The rest of this report will seek to provide justification, based on our findings, as to why the City should pursue a managed approach to firefighter occupational health and safety.

Our Learnings and Recommendations

As a result of our research, the following represents our findings as well as a discussion about recommendations resulting from this information.

Background on NFPA 1582 and WFI

In 1992, The National Fire and Protection Association created national standards (NFPA 1582) that provided the following:

- National consensus standard on entry requirements for firefighters.
- National consensus standard on medical guidance for managing current fire members.
- A consistent guide for development and implementation of a comprehensive occupational medicine program for fire departments.
- Defines and provides for the function of the Fire Department physician.

These standards have been updated in 1997, 2003, and again in 2007 by a committee of occupational physicians, firefighters and researchers.

These Standards are complemented by NFPA 1583 (Standard on Health-Related Fitness Programs for Fire Fighters) and both are incorporated in the IAFF/IAFC Wellness Fitness Initiative.

SFD is currently not in compliance with all elements of NFPA 1582.

These standards have been used to educate both occupational and medical personnel about how to properly medically assess the health status of firefighters in regard to their ability to safely perform their job requirements and then take steps to improve them. The implementation of standards like these need to be negotiated between the SFD and its member unions.

Although these standards provide very elaborate detail, guidelines, measurements, and policy recommendations for fire departments, the adoption of these standards has been a challenge for many fire departments.

Rather than attempt to spell out in detail what could be incorporated in this negotiation, this report is more focused on setting the expectations regarding the benefits and costs of implementing these recommendations and more importantly the critical success factors required to successfully implement these recommendations.

Motivations to Begin

As a result of reading program material and reports from other fire departments as well as talking with representatives from fire departments that have implemented the WFI, it is our view that the following motivations have been most often associated with the implementation of a more comprehensive occupational medical and fitness program:

- Reactionary – Departments overcome both financial and political barriers to get started as a result of a series of firefighter deaths or severe injuries, or there is increased focus on rising workers compensation and disability costs. The SFD has had three close calls, but no firefighter death serving as a call to action, but SFD Workers Compensation and Disability costs continue to rise annually.
- Leadership – Some departments begin these programs based on the initiative from a strong leader that champions the need for these programs overcoming years of inertia.
- Risk Avoidance – As standards become more prevalent, there is an increasing risk of liability associated with non-compliance to a standard.
- Strategic – Often linked to a strong leader, there is an analytical process linked to a mission and objective accomplishment. Strategies can be linked to financial motivations, other objectives, or simply a strong belief that such a strategy is the right thing to do.

Cost-effectiveness Data

The following data sources were reviewed and identified as having the most applicable data for reviewing the benefits and costs associated with comprehensive approaches to health management:

- NFPA - 1582 Standards
- IAFF/IAFC Health and Wellness Initiative
- NIST/Tridata Report: The Economic Consequences of Firefighter Injuries and Their Prevention
- IAFF Study: Contributing Factors to Firefighter Line-Of-Duty-Death in the United States
- Soon to be published chapter in updated WFI publication entitled, “Cost Justification of Fire Fighter Wellness and Economic Impact of The Fire Service Joint Labor Wellness Fitness Initiative”
- PHLAME Research Study
- 30 Years of Worksite Health Data
- Other Fire Department Data

30 Years of Worksite and Health Behavior Research

Certain aspects of the cross-sectional and longitudinal research conducted over the last 30 years concerning worksite preventive screening and health promotion programs can be applied to fire departments. Synthesizing this research, there are five major learnings that have relevance to the population of firefighters. These learnings are as follows:

- Individuals with higher behavioral risk characteristics cost more than those with lesser risks (See Figure 4).
- This relationship holds true across all age, gender, and employer groups as well as for health claims, absenteeism, productivity, and disability measures (See Figure 5 and 6).
- More importantly, as risk characteristics change, so do associated costs, meaning as a person increases risk characteristics the cost increases and as a person lowers risk characteristics the cost goes down. (See Figure 8).
- Achieving higher participation in assessments, care, and health promotion programs results in a better ROI.
- Achieving high levels of participation depends upon all of the following:
 - strong leadership,
 - effective ongoing communication,
 - comprehensiveness of program offerings,
 - appropriate policies
 - culture (specifically trust), and
 - meaningful incentives.

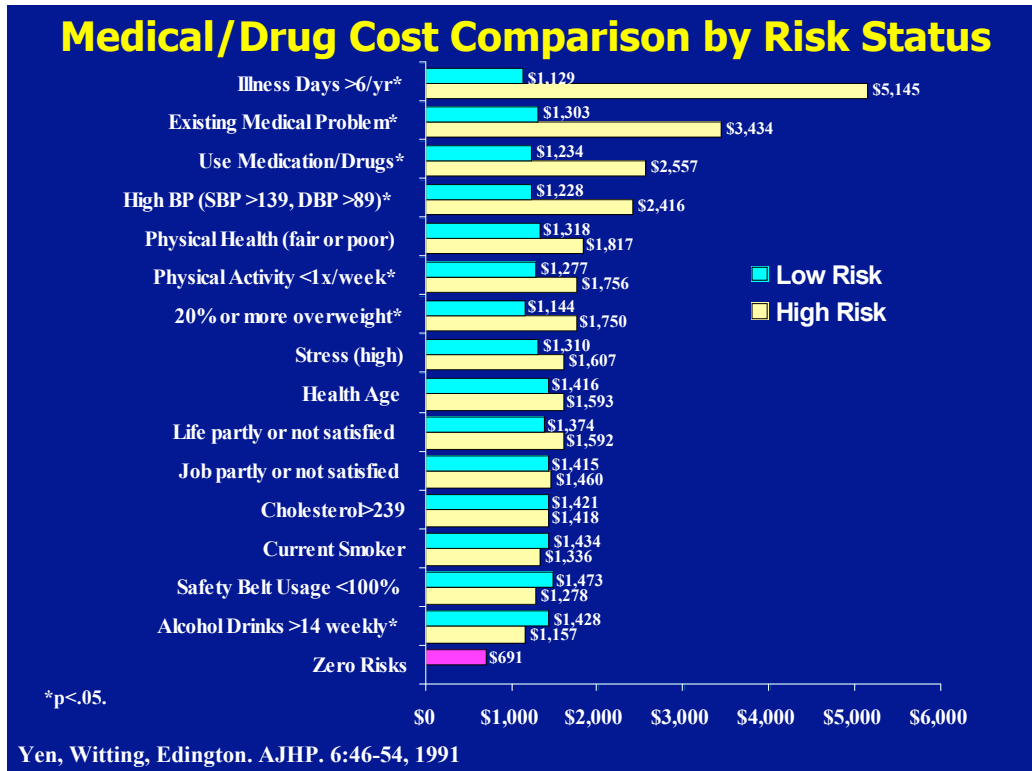
There is no silver bullet for optimizing the economic benefits of prevention and health promotion programs.

The University of Michigan's Health Management Research Centers (HMRC) has the most comprehensive longitudinal tracking database integrating health risk data, pharmacy, medical claims, disability claims, absenteeism, and productivity data. Other groups, such as the Health Enhancement Research Organization (HERO) and other universities around the country, have duplicated their results. The following figures come from the work of Dr. Dee Edington and his team at the HMRC.¹⁰

Figure 4 provides a view of the relationship between health and behavioral risk and costs. As can be seen for any risk characteristic, a person with that risk always cost more than a person without that risk. The SFD is an older population that will continue to age as a result of changes in the structure of the pension program, with higher risk propensities based on age. 72% of the population is between 35 and 55 years old with an average age of 48. Given the propensity for higher risk characteristics because of the aging SFD population combined with the increased occupational risks for injury, heart disease, and cancers the need for managing risk characteristics is even greater.

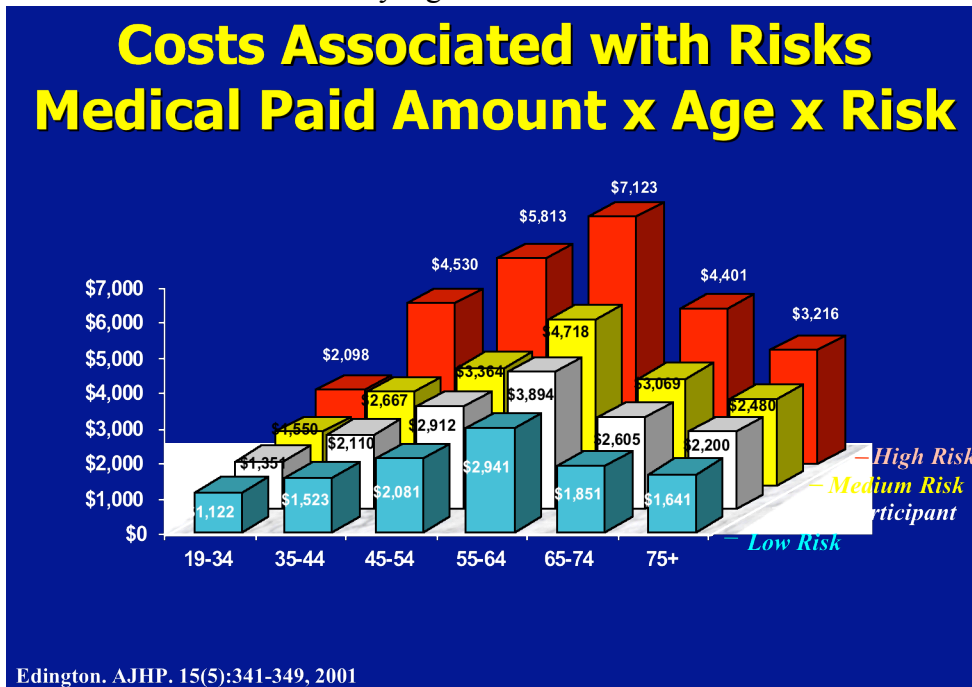
Figure 5 provides another view of this relationship of health risk and cost. In this chart the grouping of risk into clusters of low, medium, and high risk based on the number of individual risks shows that the higher risk groups costs more for all gender and age groups. As indicated previously, this same relationship (higher risks = higher costs) occurs not only for medical claims, but also for absenteeism, disability, and productivity costs.

Figure 4: Medical/Drug Cost Comparisons by Risk Status



Across a wide variety of risk factors, individuals with the risk will cost more than individuals without the risk. People with no risks cost less than all others.

Figure 5: Medical Paid Amount by Age and Risk

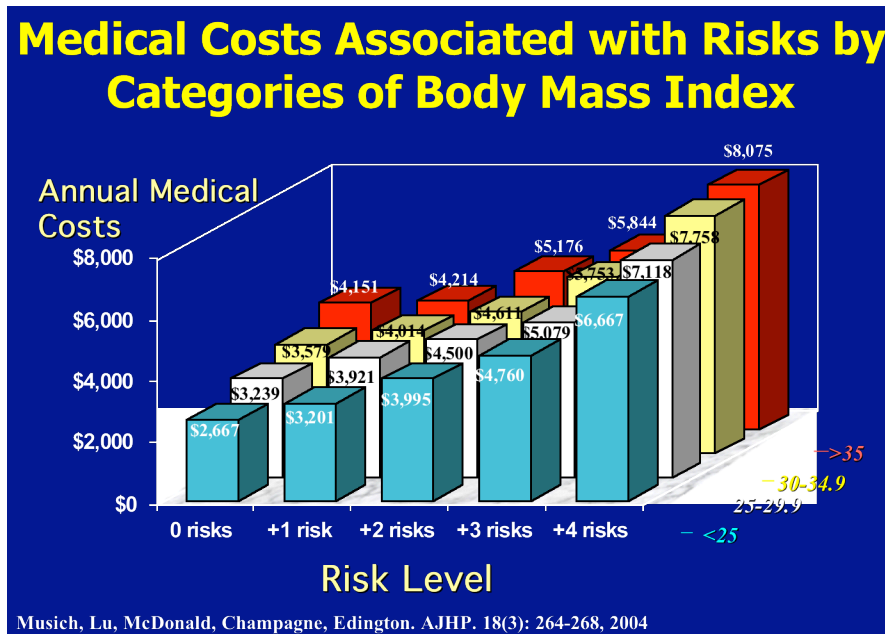


People who are low risk cost less than people who are medium risk. People who are medium risk cost less than people who are high risk. This is true in every age group.

Figure 6 represents another view that looks at the relationship between one risk (Body Mass Index - BMI) against cumulative risks and medical costs. This figure demonstrates that not only does medical cost increase with higher BMI levels, but also it holds true across groups of individuals with multiple risks. The Health Management Research Center (HMRC) has done work focusing on risk clusters and has found the most important approach in reducing overall risks is to begin at any level and any risk factor to lower that risk.

Looking at the fitness data that was available when SFD was taking blood pressure and other measures, combined with current demographics, it appears that many of the firefighters would fall into categories representing multiple risks. These most likely include higher blood pressure levels, cholesterol levels, BMI levels, and higher glucose levels. An obesity research study of Massachusetts’s firefighters found that indicators of the prevalence of obesity in their firefighter population were as high as 40%. In addition, firefighters that were obese were more likely to have other risks like hypertension and poor lipid profiles.¹¹ These are all measures that would be identified with a more comprehensive medical evaluation and more importantly, are measures that can benefit from intervention. More focused fitness training, weight loss, and nutritional training can all influence these measures as well. **It is important to emphasize there is conclusive research establishing that such programs can influence these measures and concurrent research showing that influencing these measures will result in lower health-related costs.**

Figure 6: Medical Costs by Risk and BMI Levels



The greater the number of risks and the greater the BMI are directly associated with increased cost.

Additional research has looked at the “opportunity for savings” linked to risk characteristics. The terminology used in Figure 7 refers to this opportunity as excess cost. This excess cost is on a per individual basis, and it is not appropriate to use

Figure 7: Excess Costs by Risk Groups

Association of Risk Levels with Several Corporate Cost Measures

Outcome Measure	Low-Risk (N=671)	Medium-Risk (N=504)	High-Risk (N=396)	Excess Cost Percentage
Short-term Disability	\$120	\$216	\$333	41%
Worker's Compensation	\$228	\$244	\$496	24%
Absence	\$245	\$341	\$527	29%
Medical & Pharmacy	\$1,158	\$1,487	\$3,696	38%
Total	\$1,751	\$2,288	\$5,052	36%

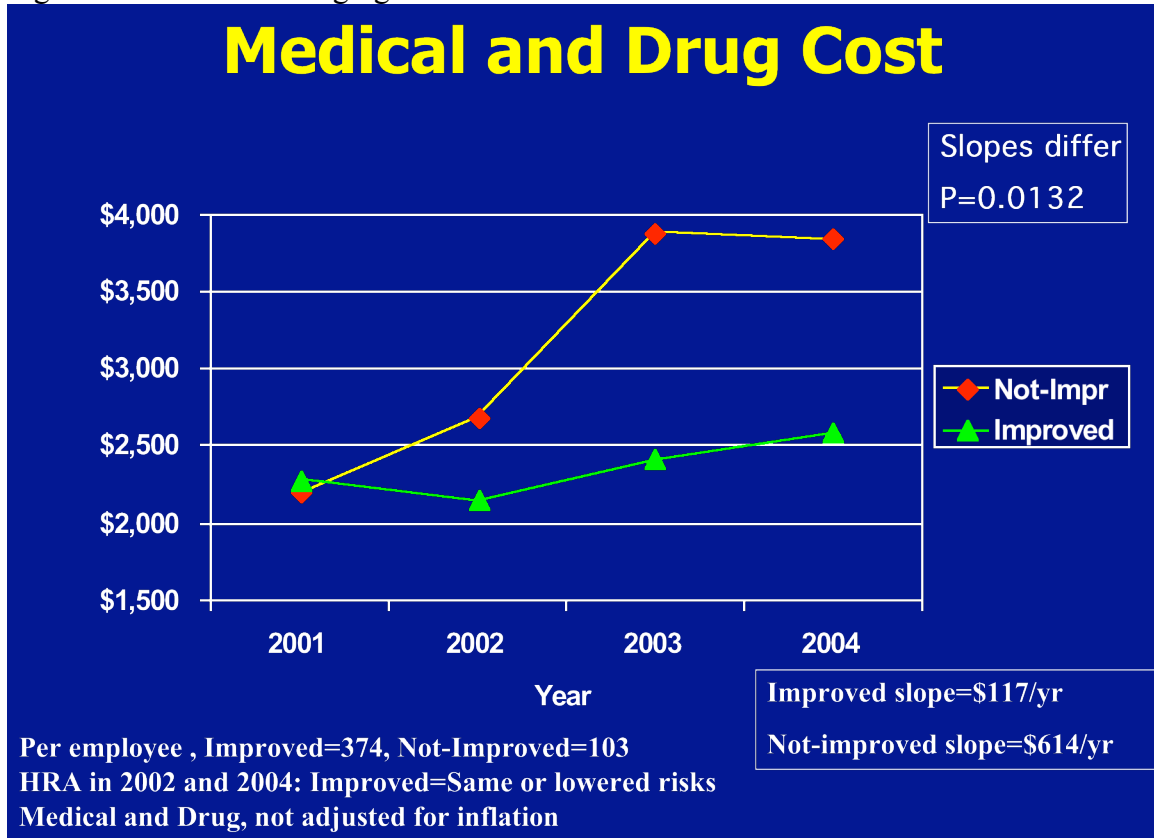
Wright, Beard, Edington. JOEM. 44(12):1126-1134, 2002

An increased number of risks are associated with increased costs regardless of which outcome measure is being reviewed.

these numbers for straight linear projection of savings. Risks and cost are dynamic within individuals and within populations. The excess cost can be safely used as potential ranges of savings linked to estimates of population shifts in risk characteristics. Again, it is important to repeat that these numbers are derived from longitudinal tracking of very large populations over significant periods of time and have held true across varied populations.

For many years skeptics have questioned this type of research by saying it is natural to expect people with higher risks to cost more, but you need to show that changing these risks will result in lower costs. This too has been clearly demonstrated by the HMRC in Figure 8. It shows that when you look at a group of people that start at the same cost level and then monitor the costs of those that improve their risk characteristics versus those that don't, you see that changes in cost trends over time between the two groups. Keep in mind that there is a natural progression over time to increase risks, just because the population is getting older. Research shows that just keeping risk levels from naturally migrating up also can lower overall medical claims costs.

Figure 8: Effects of Changing Risks on Costs



Individuals who maintained or improved their risks characteristics positively changed the trend line of their costs by almost \$500/year compared to those that didn't

The previous views demonstrate potential outcomes associated with a health promotion/management effort focused on improving health behaviors and lowering risk characteristics within a population. There have been over 143 studies demonstrating positive ROI associated with worksite health promotion programs.

Best Available Data from WFI

Although the data collection component of WFI has been slow to materialize as originally planned, we were fortunate to obtain a pre-release of some initial research data looking at the benefits known to-date, from fire departments that have implemented WFI. Final data will be available October 2007 with the release of the third edition of the WFI manual. Table 2 represents the fire departments that were able to provided injury claims, time loss hours, disability costs, and total incurred disability costs before and after the implementation of the WFI. Data from these fire departments did not include any non-occupational claims and costs, which, in our view, would under-estimate the potential effect.

Table 2: Participating Sites

FIRE DEPARTMENT	UNIFORMED PERSONNEL	NUMBER OF STATIONS
Fairfax County, VA	1280	36
Indianapolis, IN	780	26
Los Angeles County, CA	3013	165
Phoenix, AZ	1588	53
Montgomery County, MD*	1005	33

* not a Task Force Department

As can be seen in Table 2 above, most of the fire departments studied are similar in size to Seattle. Table 3 displays information from each of the fire departments listed above, which has been totaled, then combined with the other fire departments, then averaged between the five participating fire departments. Thus, the numbers presented represent the mean number of claims and costs for an individual fire department (mean of the five departments) over an annual time period. The difference between data prior to 1997 and after 1997 is that each fire department adopted and implemented the WFI. Specifically, these fire departments created assessment and testing programs defined in WFT and a process that includes:

1. Medical and fitness testing that leads to problem identification and individualized program development based on the firefighter's needs.
2. Consults with professionals that include occupational doctors, nurses, physical therapists, exercise physiologists, psychologists, and nutritionists as is deemed appropriate by the individualized health improvement plan.
3. Program offerings relating to injury prevention (with a focus on back, knees, and shoulders) that includes education, range of motion and muscular development.
4. Rehabilitation offerings focused on functional assessments of injuries with individualized exercise routines to overcome current deficiencies and prevent future problems.
5. Ease of access to appropriate training equipment for exercises and rehab as well as professional guidance through peer fitness trainers. This is often built into an on-duty exercise requirement.

As a result of the WFI implementation, the data provided from these fire departments shows an average savings of \$1.4M per fire department over a 7-year period on disability-related costs. Additionally, Table 3 shows a reduction of 159 claims, a reduction of 1,680 lost days, a reduction of 16,128 hours lost, and a total cost savings of \$1,471,283 per fire department. Table 4 below shows an example of comparing the incurred costs and claims between the WFI departments and a Non-WFI department for the time period prior to and after implementation of the WFI. Despite this not being a "true control group" there appears to be a plateau of claims and costs among the WFI departments after 1997 as compared to a steady rise and increase in claims and costs among the Non-WFI department. This is an example of only one fire department that did not implement the WFI and may not be representative of a larger sample size.

Table 3: Mean Total Injury Claims, Incurred Costs, Time Loss, and Total Incurred Disability Costs (not inflation adjusted)

Injury Date	# of claims	Incurred Cost	# of days lost	Converted Hours	** OT backfill at ~\$45	Total Estimated Incurred & Backfill
1991	169	\$1,582,424	2711	26,026	\$585,576	\$2,168,000
1992	243	\$1,951,752	3289	31,574	\$710,424	\$2,662,176
1993	341	\$2,418,216	3168	30,413	\$684,288	\$3,102,504
1994	316	\$2,289,634	3742	35,923	\$808,272	\$3,097,906
1995	413	\$2,891,724	5479	52,598	\$1,183,464	\$4,075,188
1996	368	\$2,414,312	3565	34,224	\$770,040	\$3,184,352
1997	323	\$2,310,677	2688	25,805	\$580,608	\$2,891,285
Totals 1991-1997	2073	\$15,858,739	24,633	236,477	\$5,320,728	\$21,179,467
1998	190	\$1,889,134	2658	25,517	\$574,128	\$2,463,262
1999	223	\$2,015,371	3913	37,565	\$845,208	\$2,860,579
2000	244	\$2,117,611	3195	30,672	\$690,120	\$2,807,731
2001	335	\$2,250,031	4498	43,181	\$971,568	\$3,221,599
2002	286	\$2,107,361	2546	24,442	\$549,936	\$2,657,297
2003	325	\$2,271,004	3150	30,240	\$680,400	\$2,951,404
2004	308	\$2,099,824	2993	28,733	\$646,488	\$2,746,312
Totals 1998-2004	1914	\$14,750,336	22,953	220,349	\$4,957,848	\$19,708,184

* Departments work different shifts so converted to actual hours
 ** Adjusted - not all timeloss would need backfill

\$1,471,283 Savings

Table 4: Incurred Costs and Claims of WFI Departments vs. a Non-WFI Department

Years	Not Using WFI Incurred Costs	Depts using WFI Incurred Costs	Not Using WFI # of Claims	Depts using WFI # of Claims
1991	\$1,115,058	\$2,168,000	222	169
1992	\$1,259,026	\$2,662,176	210	243
1993	\$1,335,552	\$3,102,504	237	341
1994	\$1,067,652	\$3,097,906	259	316
1995	\$2,146,397	\$4,075,188	281	413
1996	\$1,661,636	\$3,184,352	312	368
1997	\$1,539,406	\$2,891,285	258	323
1998	\$1,211,297	\$2,463,262	274	190
1999	\$1,711,094	\$2,860,579	274	223
2000	\$2,863,632	\$2,807,731	297	244
2001	\$3,164,135	\$3,221,599	345	335
2002	\$4,679,126	\$2,657,297	335	286
2003	\$5,175,166	\$2,951,404	360	325
2004	\$5,018,201	\$2,746,312	403	308

In addition to the above research, the University of Oregon has conducted research that has been labeled the PHLAME (Promoting Healthy Lifestyles: Alternative Models' Effects). This study was funded to assess ways to improve body weight, exercise and eating habits among fire fighters. Not only did this study show positive changes in lifestyle risks/behaviors like eating habits, weight gain, positive exercise behaviors, but it also showed improvements in injury rates. This type of finding is consistent with other

findings on non-firefighter populations. In addition, this same study demonstrated a \$2,610 cost savings per injury claim as a result of participating in the PHLAME program.¹²

Risk Data from other Fire Departments

Some additional data concerning the risk characteristics of firefighters from our interviews and data provided by other fire departments are included below. Orange County, California implemented the WFI in 2004 performing 619 exams and another 415 exams in 2005, representing a 90% participation rate. Initial data from this program has shown improvements in body fat percentage and aerobic capacity among participating firefighters. In addition, workers compensation costs have decreased despite higher payroll costs because firefighter work hours missed due to injury have fallen.

The evidence is convincing that if you move to a strategically more structured state of occupational health, fitness, and injury management you will see both short- and long-term financial benefit.

In LA County, testing of 515 firefighters revealed:

- 15% of all firefighters had cholesterol levels greater than 240*
 - 29% of all firefighters had cholesterol levels greater than 220*
 - 52% of all firefighters had cholesterol levels greater than 200*
- *Cholesterol levels below 200 are considered low risk, 200-240 are considered medium risk, above 240 at high risk.*

A 14 year study examining LA City firefighters revealed the following data:

- Heart attacks were 2.6x greater among unfit vs fit firefighters.
- Back injuries were 7x more likely among unfit vs fit firefighters.
- Average age of firefighters with back injuries was 45 years old.
- 75% of firefighters with back injuries were older than 40 years old.

In Phoenix:

- 20% of the firefighters had body fat percentages > 25% and 5% were over 30%.

Career Longevity; Not Career Shortening

In spite of the good intentions by all parties, it takes a tremendous amount of education and communication to convince the firefighters that participation in the WFI is in their best interest. They are concerned that testing will end up identifying issues that will ultimately shorten their fire fighting career. This is not the case. **There are a myriad of examples across North America that clearly demonstrates how the WFI lengthens careers and improves health.**

During the course of our interviews with fire departments across North America and our review of the literature, we have found virtually no examples of the WFI leading to a loss of a career. A critical element of this success was the general ability of each fire department to de-link medical screening and care from duty status. Tactics and program specifics (though all basically using national recommendations) varied, but when firefighters knew that there would be a ‘non-punitive’ approach to improving their health status, they more readily participated in programs that in effect lead to better health.

This type of data exemplifies the importance of medical screening and ongoing care. Having a non-punitive approach drives participation, which is essential to changing the health and productivity of the whole population. Indianapolis is a good example of success. They have developed the plans and infrastructure to not only identify problems, but to help firefighters take care of these issues without threat to their career

The IAFF is about to release a DVD with firefighter testimonials of how the screening and testing benefited them and their career, even when life threatening underlying disease was diagnosed. The Indianapolis fire

department also provided data to support this positive result. During the period of 2000 to 2004, the following data was presented:

- 8 cases of cardiovascular disease were discovered, treated, and all firefighters returned to duty.
- 3 cases of arrhythmia were discovered, treated, and returned to duty.
- 11 cases of malignant hypertension were discovered, treated, and returned to duty.
- 1 case of hypertension was discovered, treated and returned to duty.
- 9 cases of cancer were discovered, treated, and returned to duty.
- 5 cases of morbid obesity were discovered and all returned to duty and were able to pass their physical fitness exams.
- 4 cases of hepatitis C were discovered resulting in 1 firefighter returning to duty, 1 retirement, and 2 firefighters placed on disability.

This type of communication should be used regularly by SFD in its efforts to educate firefighters.

Critical Success Factors

What has become clear in talking to many individuals involved in implementing the WFI is that what makes rational sense isn’t enough alone to move these programs forward. For the most part even the now successful programs went through periods of adversity in trying to build their occupational health, fitness, and injury prevention services. The reality is that all cities deal with political issues, budget constraints, labor-management disputes and distrust, as well as the emotional/career issues of firefighters. Some common themes we heard from other departments that are important for Seattle to consider in reaching success are as follows:

- Many programs were enabled by grant funding, but maintained through their City budgets.

- It takes several years to institutionalize programs in labor agreements or other policies and procedures geared toward protecting firefighter careers, while encouraging health maintenance and improvement.
- To gain the economic benefits of these programs, high levels of participation is critical.
- It takes years to build trust. Trust will come one step at a time with clear successes in programming and a clear demonstration of commitment to the program for multiple years. A one year commitment is not enough to insure success.
- Programs often start as voluntary, but voluntary programs don't generally reach the desired level of participation to maximize ROI. To reach their goals Fire Departments moved towards policies and procedures that created high participation rates of 90+%, often entailing either mandatory attendance or participation in medical evaluation.
- To reach high levels of participation there must be a non-punitive focus to these programs and assured confidentiality. Not only must it be confidential, it must be perceived as confidential as it applies to medical monitoring and duty status.
- Multi-channel and continual communication is absolutely necessary to start and maintain the WFI. Success requires a true marketing model of ongoing and personal communication.
- The centralization of services and providers that understand the nature of the firefighter's job is very important.
- Moving from just screening and testing to ongoing treatment and care management will generate better results than screening with only referrals to care.
- Systems of referral should be in-place to deal with any adverse medical/fitness findings in a highly expedient manner (hours and days, not weeks and months)
- It is best not to try to implement all changes at once. Start with a specific focus, getting high levels of participation in medical evaluation. As participation reaches high levels, develop an increasing focus on prevention and ongoing health management as part of the core competencies of your centralized staff.
- As these programs take hold, they will engender trust among all stakeholders, which in turn will generate participation, which will ultimately build a culture of health.

The Economic Argument

If the SFD stays the course during the next five years, it could expect to spend over \$100 million on health and disability claims, workers compensation, time loss, and backfill costs. The question then becomes an issue of how much of that expected expenditure can be influenced by moving to a more centralized and structured approach to occupational health, injury prevention, rehabilitation, and fitness. A rough estimate of expense to implement the WFI and staff the Occupational Health Center in 2009 through 2012 would be approximately \$6.5- \$7 million. The question then becomes if SFD spends \$7 million what can it expect in return. At a minimum, if money were the only benefit, one would hope that the savings generated from the program would offset the cost of the program. ROI comprises benefits that are both monetary and non-monetary. This

analysis from a prospective basis is highly dependent on the assumptions used in the analysis. More importantly, even with agreement of the assumptions one of the biggest variants will be the overall effectiveness of the implementation in regard to issues like alleviating barriers, creating a supportive environment, building trust, and providing effective communications. In spite of these limitations, we will seek to provide an estimate and structure for understanding the costs and potential outcomes associated with implementing WFI as a result of investing in a centralized occupational health center and team responsible for implementing WFI.

As with many management decisions, there is rarely a definitive or guaranteed outcome linked to a strategy. In this case, we believe there has to be agreement around the strategy and understanding of the cost implications of the strategy, followed by an aggressive and continuous improvement process to insure the effectiveness of all implementation components. That being said, the next section explores the potential areas where savings can be expected.

Potential Impact Areas/Outcome Measures

In the beginning of this report we presented data indicating that SFD spent over \$18 million in 2006 from a total health-related costs perspective. The components of these costs breakdown as follows:

Non-occupational injury/illness time loss:	\$3,720,236
Occupational injury/illness time loss:	\$2,002,423
Workers' Compensation Medical Payments:	\$1,594,449
Workers' Compensation Pooled:	\$673,204
Health/Dental Premiums (which are based upon projected claims):	\$8,924,971
Estimated overtime backfill costs resulting from disability time loss (Disability ratio of all time loss x minimum staffing overtime):	\$2,049,789

Source: City of Seattle Summit Report

We will use these numbers to extrapolate their growth between 2007 and 2012. In addition, we have built detailed budgets that can be viewed in Exhibit 2 relating to staffing and managing of the occupational health center and delivery of the services pertaining to the WFI.

As part of an evaluation strategy, Exhibit 3 provides a potential outcome model to use in building the evaluation methodology once a program is implemented. It can also be used to set realistic expectations regarding the short and long-term impacts of a strategy focused on a centralized occupational health, injury prevention, rehabilitation, primary care, and fitness approach.

The highlighted measures are areas where SFD should see the greatest effect resulting from the programs components in WFI. Focusing on the influencers, the following color codes apply:

- Red – high potential for savings or effect
- Blue – moderate potential for savings or effect
- Green - low potential for savings or effect

As you can see in Exhibit 3 the red highlights are often associated with risk characteristics. Measures from fitness testing, blood profiles including glucose, lipids, and other measures, blood pressure, body fat or BMI, and other measures identified in the WFI are all good early indicators of program effectiveness and are most sensitive to changes as a result of program intervention.

A recent report by the City looking at the rising costs of worker's compensation gives some insights as to key outcome measures that can be influenced by the implementation of WFI. A common measure to focus on is illness/injury rates per 100 workers. For SFD, Table 5 shows the illness/injury claim rates per 100 workers over the last six years.

Table 5: Claims rate per 100 positions for SFD

Years	Total Claims	Exposure Hrs. in ATS Claim System	Est. Fire Dept. Positions Assuming 2,000 Exposure Hours per Year	Claim Rate Per 100 Positions
2001	350	2,170,028	1,085	32.26
2002	338	2,197,733	1,099	30.76
2003	361	2,221,217	1,111	32.5
2004	407	2,255,494	1,128	36.09
2005	337	2,307,735	1,154	29.21
2006	361	2,413,160	1,207	29.92
2001 thru 2006	2154	13,565,367	6,783	31.76

Taken from the SFD Workers Compensation Report, June 22, 2007

As can be seen in this chart, this measure is fairly stable ranging from a low of 29.21 to a high of 36.09 during the six-year period. Although WFI may have a small impact on this rate, it is more like to influence the severity of claims as measures by the average days lost per claim and the medical cost per claim. For SFD, Table 6 and 7 provide some historical perspective on these measures.

Table 6: Severity of Claims

Year Opened	Number of Indemnity Claims	Indemnity Claims as a Percent of Total	Number of Medical Only Claims	Medical Only Claims as a Percent of Total	Total Number of Claims
2001	178	51%	172	49%	350
2002	168	50%	170	50%	338
2003	216	60%	145	40%	361
2004	224	55%	183	45%	407
2005	190	56%	147	44%	337
2006	189	52%	172	48%	361
Six-Year Total	1,165	54%	989	46%	2,154
Six-Year Average	194	54%	165	46%	359

Taken from the SFD Workers Compensation Report, June 22, 2007

Table 7: Days Lost Per Claim

Year Opened	Days Lost	Average Number of Days Lost	Median of Days Lost	Total Number of Indemnity Claims, including 12 Recoded Medical Only Claims
2001	6,649	37	17	178
2002	6,762	40	15	168
2003	7,887	37	16	216
2004	10,021	45	20	224
2005	7,309	40	18	190
2006	5,546	31	17	189
Grand Total	44,174	38	18	1165

Taken from the SFD Workers Compensation Report, June 22, 2007

As a result of a more centralized approach to occupation health services with targeted programs focused on injury, illness, and risk reduction as well as return-to-work programs, the following specific measures are primary indicators of program effectiveness and key measures to monitor:

Health Risk (expressed as percent of population or prevalence rates)

- High blood pressure
- High glucose levels
- High BMI levels
- High cholesterol levels
- MaxVO2 less than 12 METs

Injury/Illness Rates

- Claims per 100 Workers
- Average Days Lost Per Claims
- Average Medical Payments Per Claims
- Number of PPD Claims
- Number of Time Loss Claims
- Frequency Breakdowns of Type of Claims (focus on percent of musculoskeletal) injury rates)
- Average Amount of PPD Settlement

Medical

- Number of Claims
- Average Cost Per Claim

Time Loss

- Average non-occupation loss days per FTE
- Average occupational loss days per FTE

Key Program Requirements

In terms of program components, the WFI by design focuses on the most appropriate screening components and program services for firefighters. What is important to understand is that the key program components are very much linked to the following processes:

1. Medical and fitness testing that leads to problem identification and individualized program development based on the firefighter's needs.
2. Consults with professionals that include occupational doctors, nurses, physical therapists, exercise physiologists, psychologists, and nutritionists as is deemed appropriate by the individualized health improvement plan.
3. Program offerings relating to injury prevention (with a focus on back, knees, and shoulders) that includes education, range of motion and muscular development.
4. Rehabilitation offerings focused on functional assessments of injuries with individualized exercise routines to overcome current deficiencies and prevent future problems.
5. Ease of access to appropriate training equipment for exercises and rehab as well as professional guidance through peer fitness trainers. This is often built into an on-duty exercise requirement.

Calculating Savings

We have tried to look at potential savings from a variety of perspectives taking fairly conservative assumptions based on what we know from the literature and other program data. To create a rationale for potential savings, we have used some of the program effectiveness data (Table 8) summarized in a meta-analysis of all research relating to the costs and benefits of worksite health management programs.¹³

Table 8: Summary of Effects on Program Outcomes

Percent Change in Sick Leave/Absenteeism Costs	Percent Change in Healthcare Claims Costs	Percent Change in Worker's Compensation and Disability Costs
25 Studies	28 Studies	7 Studies
-26.8%	-26.1%	-32%

Table 9 provides a summary of the assumptions used in projecting out the future costs and savings associated with the impact areas listed above and derived from the City of Seattle's Summit Report.

Table 9: Assumptions Used in Cost-Benefit Analysis

Impact Area	Future Costs Assumptions	Program-related Impact Assumptions
Non-occupational injury/illness time loss	Increase of 5% per year based on assumptions used in Dampers	Used 50% of savings projected from literature in Table 5 and distributed as follows: 2008- no impact 2009- decrease of 6.5% 2010-2012 – decrease 13%
Occupational injury/illness time loss	Increase of 5% per year based on assumptions used in Dampers	Used 50% of savings projected from literature in Table 5 and distributed as follows: 2008- no impact 2009- decrease of 6.5% 2010-2012 – decrease 13%
Worker’s Compensation Medical Payments	Increased 10% per year based on Workers Compensation report showing doubling in previous 5 years	Used 50% of savings projected from literature in Table 5 and distributed as follows: 2008- no impact 2009- decrease of 4% 2010 –decrease of 8% 2011-2012 – decrease 16%
Worker’s Compensation Pooled	Increased 10% per year based on Workers Compensation report showing doubling in previous 5 years	Used 50% of savings projected from literature in Table 5 and distributed as follows: 2008- no impact 2009- decrease of 4% 2010 –decrease of 8% 2011-2012 – decrease 16%
Disability-related backfill costs	Increase of 5% per year based on assumptions used in Dampers	Used 50% of savings projected from literature in Table 5 and distributed as follows: 2008- no impact 2009- decrease of 6.5% 2010-2012 – decrease 13%
Health/Dental Premiums*	Increase of 11% per year	Decrease the rate of increase based on savings from Table 5, resulting in a 8.14 % increase per year as opposed to 11%

* This was separated out from analysis and reported separately because of the Local 27 now managing its own health/dental plan.

Table 10 provides a summary of the program costs for the period of 2007 – 2012. More detailed program cost information can be seen in Exhibit 2. In addition, it shows the savings per year as a result of the implementing the WFI and building a centralized-approach to occupational health, injury management, fitness, and rehabilitation.

Table 10: Costs and Savings Resulting from WFI Implementation

Program Expenses	2007	2008	2009	2010	2011	2012
Medical Programs	\$0	\$246,800	\$630,750	\$676,260	\$893,236	\$926,737
Fitness	\$0	\$21,500	\$96,248	\$77,902	\$108,528	\$83,009
Rehab Programs	\$0	\$30,000	\$123,250	\$181,655	\$215,456	\$222,944
Behavioral Programs	\$0	\$24,100	\$73,350	\$126,215	\$124,215	\$121,715
Admin & Communication	\$0	\$77,400	\$83,670	\$94,112	\$102,552	\$108,403
Total Costs		\$401,808	\$1,009,277	\$1,158,153	\$1,445,998	\$1,464,819
Savings	2007	2008	2009	2010	2011	2012
Non-occupational sick leave time loss:	\$0	\$0	\$266,601	\$559,863	\$587,856	\$617,249
Occupational sick leave time loss:	\$0	\$0	\$143,499	\$301,347	\$316,414	\$332,235
Workers' Compensation Claims:	\$0	\$0	\$77,171	\$169,777	\$373,509	\$410,860
Workers' Compensation Pooled:	\$0	\$0	\$32,583	\$71,683	\$157,702	\$173,472
Estimated overtime backfill costs resulting from disability time loss	\$0	\$0	\$146,893	\$308,475	\$323,899	\$340,094
Total Savings	\$0	\$0	\$666,747	\$1,411,145	\$1,759,381	\$1,873,911
Net	\$0	(\$401,808)	(\$342,530)	\$252,992	\$313,383	\$409,091
Total Medical Savings	\$0	\$0	\$283,332	\$620,894	\$1,020,528	\$1,491,093
Net With Medical	\$0	(\$401,808)	(\$59,197)	\$873,886	\$1,333,911	\$1,900,184
Total Costs	\$5,480,056					
Total Savings	\$5,711,184					
Net Without Medical	\$231,128					
Net With Medical	\$3,646,975					
NPV Without Medical	\$62,570.87					

This data represents a marginal NPV of \$62,570 over the five-year period when medical costs are not included in the savings. However, we believe there will be substantial savings when medical costs are included. The issue is not will there be savings (there will), but who benefits from these savings. If Local 27 is responsible for the health care costs of its membership, these savings will benefit Local 27 unless some form of a shared savings agreement is created.

Other Analyses

In looking at just one component of potential savings, we looked at the literature pertaining to back and muscular-skeletal injury programs that have reported effectiveness as measure by injury reductions ranging from 30-60%. We assumed the impact of reducing injuries relating to sprains, strains, and muscular issues to be 30% based on SFD data for 2006. We also extrapolated at an injury growth rate of only 2% per year and calculated the average cost of an injury by simply dividing the total worker's compensation costs by the number of injuries. The result of this analysis indicates a potential savings of approximately \$2.4 million over a five-year period in back and muscular-skeletal injury costs (See Exhibit 4 for more information).

Finally, we looked at the advantages of staffing an Occupational Health Center with the necessary personnel to implement WFI versus contracting for services on per item basis, like in the current grant budgets. In 1999, the State of Washington performed a study to

evaluate the effect of delivering occupational health services through managed care arrangements whose design is based on an integrated, occupational health-centered delivery model. This study concluded that, “*an integrated, occupational health-centered delivery model may offer a viable approach for improving delivery systems, reducing costs and encouraging greater attention to disability prevention.*”¹⁴ Our analysis would agree with this finding as we believe there are over \$2 million in potential savings from cost and delivery efficiencies associated with a centralized occupational deliver model versus a fee for service model (See Exhibit 4).

Discussion and Recommendations

There is ample evidence to suggest that SFD needs to improve the way it is currently handling the occupational, injury prevention, rehabilitation, and fitness needs of its firefighters. As part of that improvement process, a blueprint is provided by NFPA standards and the IAFF/IAFC Wellness Fitness Initiative Guidelines that should be modeled to fit the specific needs of the SFD, Local 27, Local 2898, and the City of Seattle. These guidelines are time tested and will allow for greater inter-departmental analysis and comparative evaluation over time.

What specific program is more cost-beneficial or what medical test should or should not be included should not distract from implementation discussions. There should be a combined commitment by all parties to improve firefighter readiness, safety, and career sustainability as part of the broader mission of insuring public safety. There are greater cost implications of not aggressively managing the SFD’s annual and growing \$20 million expenditure so that the City gains the greatest “value” associated with that investment.

As with any new initiative, the WFI can be implemented in stages. Incremental investments with an emphasis on aggressive data-driven approaches to occupational and health management can yield both short- and longer-term financial benefits. There are too many variables to control to pinpoint the magnitude of those financial benefits, but the body of research and evidence to-date suggests a higher probability of a positive return than a negative one. This will be particularly true if the SFD is committed to multiple strategies to reach high levels of participation. For example, once the Occupational Health Center (OHC) opens and a staff with an understanding of the particular needs of firefighters is recruited to provide medical evaluation, it will be possible to develop a strategy of using this staff to not only provide medical screening and monitoring, but also serve as a key source for the delivery of ongoing primary and occupational health care. This can provide an alternative model for managing costs because of the financial model of an onsite service and the ability to provide a consistent level of care and referral based upon a set of providers that are knowledgeable about the specific needs of firefighters. However, this won’t occur immediately. It will require multiple years of service provision, trust building, and commitment by all the stakeholders tied to this effort.

The prudent approach for outcomes would not suggest making grandiose claims, but pursuing specific and targeted interventions for measurable problems identified as the result of population specific data. Initial data reporting should focus on identifying the magnitude of the problem and the effect of intervention.

SFD can learn from other fire departments as it moves down this path. Although this report has provided some insights, ongoing discussion should continue as program implementation becomes more concrete.

From a process and priority standpoint the following steps are all inter-related and can affect overall program adoption:

- Gain commitment on longer-term OHC plans and continuity of testing.
- Focus on leveraging grant funding to get as many firefighters tested as possible.
- Communicate current needs for participation concurrently with vision and commitments for the future.
- Begin education and communication process for all stakeholders.
- Continue to communicate even when it seems everyone is on board.
- Use aggregate data from the first round of medical evaluations to set program offerings and realistic evaluative outcomes.

Timeline

Table 11 represents high level milestones and areas of focus for moving towards a path of managed occupational health, injury prevention, rehabilitation, and fitness.

Table 11: Implementation Timeline and Budget Implications

2007	2008	2009
Area of Focus	Area of Focus	Area of Focus
<ul style="list-style-type: none"> ▪ Grant funded Medical Evaluations ▪ Focus on educating firefighters of benefits ▪ Create communication plan ▪ Strive for a minimum of 60% participation ▪ Gain budget and City approval to staff Occupation Health Center in 2009 ▪ Organize sub-committee to plan for and accommodate any issues that occur from medical evaluations ▪ Ensure cardiology review for positive findings on treadmill test is dealt with expeditiously 	<ul style="list-style-type: none"> ▪ Continue medical evaluations with goal to reach 90% of the firefighters ▪ Contract for Occupational Health Center Staff ▪ Create PFT infrastructure to begin fitness testing in 2009 ▪ Work on policy agreements regarding confidentiality, annual testing requirements, duty time vs non-duty time for participation issues, communication plans light duty, alternative duty, funding for follow-up exams and tests, and grievance processes. ▪ Create programs for rehabilitation, return-to-work, incident management, and behavioral health issues ▪ Finalize reporting and evaluation needs ▪ Ensure OHC has internal electronic medical records system. Model after other fire departments going through this process ▪ Communicate relentlessly 	<ul style="list-style-type: none"> ▪ Open the Occupational Health Center ▪ Begin annual medical and fitness evaluations ▪ Focus on continued education and communication ▪ Communicate stories and anecdotes ▪ Ensure referral networks for cardiology and other services are in place ▪ Begin to build ongoing primary care practice with Occupational Health Center Staff ▪ Place greater focus on Peer Fitness Training and expansion of program

Exhibit 1 – Interview List

Kim Favorite and Dan Nelson, Seattle Fire	June 13, 2007
Janice Dahl, Seattle Workers Comp	June 14, 2007
Chris Santos, Seattle Fire	June 17, 2007
Chief Gregory Dean, Seattle Fire	June 19, 2007
Ian Crosby, Calgary	June 20, 2007
Chief Rick Verlinda, Seattle Fire	June 20, 2007
Orlando Pena, Miami Dade	June 25, 2007
Mike Conteres, LA County	June 26, 2007
Joanne Roberts, Montgomery County	June 26, 2007
John Hoffman, City of Sacramento	June 26, 2007
Dr. Sandy Bogucki, Yale University	June 26, 2007
Ron Gemshein, Fairfax County	June 27, 2007
George Cruz, LA County	June 27, 2007
Ken Harrison, Orange County	June 26, 2007

Participants in Assorted Sessions

Christopher O'Reilly	Fire	Disability Officer: Occupational Health and Fitness Committee (OHFC)
Dallas Baker	Fire	Firefighter (Co-Chair of OHFC)
Dan Nelson	Fire	Lieutenant (OHFC)
Jeanna Hopkins	Fire	Firefighter (OHFC)
Kim Favorite	Fire	Sr. Training & Ed Coord (Occupational Health Coordinator) (OHFC)
Richard Schultz	Fire	Battalion Chief (Safety Chief) (OHFC)
William Hepburn	Fire	Assistant Chief of Safety and Employee Development
Gregory Dean	Fire	Fire Chief
Sarah Arroyo	Fire	Strategic Advisor Finance
Chris Santos	Fire	Finance Director
Julie McCarty	Personnel	Labor Relations
Michael Jurus	Fire	Deputy Chief (Co-Chair OHFC)
Melissa Kennedy	Fire	Firefighter (OHFC)
Richard Verlinda	Fire	Battalion Chief (Safety Chief) (President of Local 2898 - Chiefs)
Ryan Ellis	Fire	Firefighter (President of Local 27 - Firefighters)
Steve Wynn	Fire	Firefighter (OHFC)
Tamalyn Nigretto	Fire	Battalion Chief (Safety Chief)
Aimee Strasko Carlisle	Finance	Budget Analyst
David Hennes	Finance	Budget Analyst
Barbara Gangwer	Personnel	Management Services, Policy & Finance
Janice Dahl	Personnel	Workers Compensation
Sharon Mickelson	Personnel	Safety
Bill Budd	Personnel	Safety
Florence Katz	Personnel	Director, Employee Health Services

Exhibit 2 – Budget Detail

FITNESS PROGRAM ITEMS	Budget	Budget	Budget	Budget	Budget
	2008	2009	2010	2011	2012
Candidate Physical Ability Test (CPAT)					
Peer Fitness Trainer's Certification and CE	\$ -	\$ 16,875	\$ -	\$ 17,500	
Additional PFT expenses	\$ 4,500	\$ 17,000	\$ 13,750	\$ 25,000	\$ 15,000
Equipment safety and maintenance	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000
HTE Trng & Ed Coord., Asst					
Addition HTE staffing costs					
Fitness self assessments Info	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500
Equipment & Facilities	\$ 5,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000
Fitness Evaluations by PFT	\$ -	\$ 29,313	\$ 30,486	\$ 31,705	\$ 32,973
Web info on proper use of equipment	\$ 500	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
Exercise Prescriptions OT for PFTs	\$ 2,000	\$ 2,080	\$ 2,163	\$ 2,250	\$ 2,340
Return to duty evaluations	\$ 4,000	\$ 4,400	\$ 4,840	\$ 5,324	\$ 5,856
Support of off-shift FF fitness activities	\$ 2,000	\$ 2,080	\$ 2,163	\$ 2,250	\$ 2,340
COST	\$ 21,500	\$ 96,248	\$ 77,902	\$ 108,528	\$ 83,009

MEDICAL PROGRAM ITEMS	Budget	Budget	Budget	Budget	Budget
	2008	2009	2010	2011	2012
Hearing, Vision, Spiro Evaluation	\$ -	\$ -	\$ -	\$ -	\$ -
Fire Fighter Specific Medical Evals	\$ -	\$ -	\$ -	\$ -	\$ -
IAFF/IAFC additional medical items	\$ -	\$ -	\$ -	\$ -	\$ -
Fire Fighter Specific Lab Tests	\$ -	\$ 47,000	\$ 51,230	\$ 55,841	\$ 60,866
EKG	\$ -	\$ -	\$ -	\$ -	\$ -
Cancer Screening	\$ -	\$ -	\$ -	\$ -	\$ -
Specific referral -Heart CT Scans	\$ 12,000	\$ 15,000	\$ 16,350	\$ 13,080	\$ 10,464
Fire Fighter Specific Immunization	\$ -	\$ -	\$ -	\$ -	\$ -
Injury Specific Referrals	\$ 3,000	\$ 4,000	\$ 8,000	\$ 10,000	\$ 10,000
FTE Dept. LHCP	\$ -	\$ 444,750	\$ 511,680	\$ 716,040	\$ 742,560
Staffing Costs	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Additional Lab fee assoc @ LHCP	\$ -	\$ 15,000	\$ 16,500	\$ 18,150	\$ 19,965
Facility supplies assoc @ LHCP	\$ -	\$ 50,000	\$ 52,500	\$ 55,125	\$ 57,881
Equipment cost assoc @ LHCP	\$ -	\$ 50,000	\$ 15,000	\$ 20,000	\$ 20,000
Non grant covered Medicals (30%) 2008*	\$ 226,800	\$ -	\$ -	\$ -	\$ -
Total Cost	\$ 246,800	\$ 630,750	\$ 676,260	\$ 893,236	\$ 926,737

REHAB PROGRAM ITEMS	Budget	Budget	Budget	Budget	Budget
	2008	2009	2010	2011	2012
Alternate duty in Stations develop.					
Clinical Pathways	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Medical liaison - Quality control	\$ -	\$ -	\$ 27,750	\$ 28,860	\$ 29,970
Injury prevention programs	\$ 5,000	\$ 7,000	\$ 7,260	\$ 7,571	\$ 7,874
Program criteria reviews/up-dates	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
TTE - Physical/Sports Therapist.Nutritionist	\$ -	\$ 101,250	\$ 131,625	\$ 164,025	\$ 170,100
Referred Services- specialized rehab	\$ 15,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
COST	\$ 30,000	\$ 123,250	\$ 181,655	\$ 215,456	\$ 222,944

BEHAVIORAL PROGRAM ITEMS	Budget	Budget	Budget	Budget	Budget
	2008	2009	2010	2011	2012
Awareness -Maintain a web site	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200
Awareness - Station --desk-top reference guide	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100
Beh Mod- Evaluate current programs	\$ 100	\$ 100	\$ 2,500	\$ 2,500	\$ -
Investigate incentives for wellness program	\$ -	\$ 2,500	\$ 2,500	\$ -	\$ -
Peer fitness trainers trained in basic nutrition	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500
BehMod- Modify to meet unique needs of FF	\$ 200	\$ 200	\$ 10,000	\$ 10,000	\$ 10,000
Infectious Disease- Non-point exposure support	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000
Implement incentive programs	\$ 4,000	\$ 4,000	\$ 17,040	\$ 17,040	\$ 17,040
HTE - Mental health professional	\$ -	\$ 47,250	\$ 70,875	\$ 70,875	\$ 70,875
Administer Annual Behavioral Eval (voluntary)	\$ 10,000	\$ 12,500	\$ 17,500	\$ 20,000	\$ 20,000
Referring Services --Specific follow-up based on eval	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
Nutritional Consults	\$ 6,000	\$ 3,000	\$ 2,000		
COST	\$ 24,100	\$ 73,350	\$ 126,215	\$ 124,215	\$ 121,715

FINANCE PROGRAM ITEMS	Budget	Budget	Budget	Budget	Budget
	2008	2009	2010	2011	2012
Funding information					
IAFF/IAFF Wellness-Fitness Database	\$ 800	\$ 800	\$ 900	\$ 900	\$ 900
Disability data to track cost savings	\$ 200	\$ 200	\$ 500	\$ 500	\$ 500
501c3	\$ 200	\$ 200	\$ 225	\$ 250	\$ 250
Secure funding sources	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200
Data component descriptions					
Review of Data Dictionary -additions					
Data collection objectives	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000
IAFF Information transfer process	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500
Annual report of findings	\$ 500	\$ 1,000	\$ 5,000	\$ 5,000	\$ 5,000
COST	\$ 4,400	\$ 4,900	\$ 9,325	\$ 9,350	\$ 9,350

Communication Evaluation Items	Budget	Budget	Budget	Budget	Budget
	2008	2009	2010	2011	2012
In-Web Development	\$ -	\$ 1,000	\$ 2,000	\$ 5,000	\$ 5,000
Staff Presentations (staff time)	\$ 40,000	\$ 41,600	\$ 43,264	\$ 44,995	\$ 46,794
Evaluation staffing	\$ 30,000	\$ 33,000	\$ 36,300	\$ 39,930	\$ 43,923
Newsletter	\$ 400	\$ 440	\$ 440	\$ 440	\$ 440
Local Travel costs	\$ 1,000	\$ 1,050	\$ 1,103	\$ 1,158	\$ 1,216
Web maintenance	\$ 280	\$ 320	\$ 320	\$ 320	\$ 320
Equipment/Supplies	\$ 320	\$ 360	\$ 360	\$ 360	\$ 360
Copying Costs	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
COST	\$ 73,000	\$ 78,770	\$ 84,787	\$ 93,202	\$ 99,053
Total	\$ 399,800	\$ 1,007,268	\$ 1,156,143	\$ 1,443,987	\$ 1,462,807

Exhibit 3 – Outcome Matrix

Outcome	Measures	Influencers	Yield
Medical Claims	Claim type Claim amount Paid amount Number of claims	Policy Illness Non-occupational injuries Risks Preventive exams	High – effect within two years
Pharmacy Claims	Claim type Claim amount Paid amount	Policy Illness Risks Injuries	Low – effect in one to two years
Workers Comp Claims	Injury type Paid amount Number of claims Medical only With time loss Hours lost per claim Medical cost/claim	Policy Risks Exposure hours Training Rehab	High – effect in one to two years
Long-term Disability Claims	Injury type Medical Claim Amount Salary paid Number of claims Hours lost per claim	Policy Risks Training Rehab	Low – effect in three to five years
Health-related Retirements	Number of health-related retirements Productive years lost	Policy Injuries Risks Early detection of Disease	Low – longer-term benefit
Backfill hours	Number of hours Cost of hours	Sick leave rates Vacation On-duty strength requirement Occupational injury time loss Disability time loss	High – should see changes in one to two years
Sick leave hours	Total hours	Policy Illness Risks Injuries	Low – effect in two to three years

Exhibit 4 – Additional Analyses

Over \$2.4M in savings for Injury Prevention Programs over 5 years

	2,008	2,009	2,010	2,011	2,012
Average Injury Rate	363	366	370	374	377
Cost Per Injury	\$6,879	\$7,492	\$8,160	\$8,887	\$9,679
Number of Injuries Relating to Sprains, Strains, and Muscular	232	234	237	239	241
Reduction in Injuries due to Program	15%	20%	30%	30%	30%
Injuring Prevented	35	47	71	72	72
Savings from Injury Prevention	\$239,464	\$351,214	\$579,503	\$637,454	\$701,199

Over \$2.3M in efficiency savings from centralized model of service provision for Medical and PT Services over a 5 year period

Savings on direct costs by changing to clinic model vs. per unit purchase of tests and medical visits				
Year	2009	2010	2011	2012
Item (# Medical testing and visits)	950 tests 750 visits	950 tests 2000 visits	950 tests 3000 visits	950 tests 3500 visits
Clinic Cost	\$620,250	\$667,260	\$874,961	\$903,890
Traditional Delivery	\$918,250	\$1,220,000	\$1,431,000	\$1,574,500
Savings*	\$298,000	\$552,740	\$556,039	\$670,610
Physical Therapy				
Item (# PT Visits)	2,000	2,500	3,000	3,500
Clinic Cost	\$101,250	\$131,625	\$164,025	\$170,100
Traditional Delivery	\$150,000	\$187,500	\$240,000	\$280,000
Savings*	\$48,750	\$55,875	\$75,975	\$109,900
Combined Totals	\$346,750	\$608,615	\$632,014	\$780,510

* Saving may be higher if the costs are tied to workers compensation medical visits

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