

Cardiovascular Health and Wellbeing Study Tour



Jeff Green August 2009

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Executive Summary

Introduction

Firstly I would like to thank the Emergency Services Foundation for the opportunity to undertake this study tour which has proven to both expand my knowledge in the chosen area plus identify a range of initiatives that have already been able to be introduced into my organisation.

Emergency service activities can be physically demanding and can therefore increase the risks to a member's health. Tragically, fatalities within emergency service personnel continue to occur with a high percentage of these deaths relating to cardiovascular events or other health issues (e.g. asthma attacks). These health related fatalities outnumber deaths from vehicle accidents, fire entrapments (e.g. burnover), falls within fire services. Within CFA cardiovascular deaths constitute approximately 34% of the total line of duty deaths within CFA, which is similar to other agencies where records are maintained.

The study tour commenced in early August 2008 at the International Association of Fire Chief's (IACF) Conference in Denver and was aimed at identifying the latest treatment and strategies used within emergency services to reduce the risks of cardiovascular deaths and other related key health issues.

There are in excess of 33,000 fire departments in America with the size and structure of these departments varying significantly to CFA. Fire departments tend to be smaller and volunteer fire brigades tend to operate independently to career services.

In determining the fire services to be visited, contact was made with the International Association of Fire Chief (IAFC) who supported a number of my initial proposals and recommended a number of other services with effective wellbeing programs.

The objectives of the study tour were to:

Review, analyse and evaluate treatments and strategies to;

- improve the health and wellbeing of CFA members
- reduce the cardiovascular health risks that historically have related to approximately 34% of all fatalities within CFA between 1990 - 2006 and a high percentage of deaths/serious conditions within other emergency services and
- report on findings and recommended strategies that maybe implemented to reduce the risk and frequency of cardiovascular deaths and illnesses

Conclusions / Findings

Firefighter Injury Records

Within Australia there is an unfortunate lack of national firefighter fatality, injury or incident records as no federal government agency or industry-based organisation such as AFAC has established a database or related processes. As a result analysis of this injury data cannot occur to identify trends or issues requiring further investigations, development of broader preventative strategies and monitoring their effectiveness.

In addition while there is an Australian Standard for injury / incident coding¹ this is not adopted by all fire services as many utilise their states Workers Compensation coding. This compensation coding is also not consistent across Australia nor do the states compensation agencies actively share this data.

In regards to the proactive wellbeing programs and capturing of firefighter fatality or injury records the United States is generally further advanced than Australia. This is reflected in the various organisations focused on firefighter safety and injury recording programs including;

- National Institute for Occupational Safety and Health
- National Fire Protection Association²
- National Fallen Firefighters Foundation³
- National Firefighter Near – Miss Reporting System⁴
- United States Fire Administration⁵

Clearly while anecdotally Australia may appear to have proportionally lower rates of firefighter fatalities, injuries or incidents than many countries and particularly the United States this cannot be readily established nor can the effectiveness of any nationally adopted preventative strategy be analysed.

The establishment within Australia of related initiatives similar to what is operating in United States should be considered as a key platform to identifying and monitoring injury trends or the success of any preventative programs

Wellbeing Programs

Within Australia AFAC have previously developed health and fitness guidelines⁶ for monitoring firefighters. These guidelines tend to focus on testing for fitness for duty as against establishing the type of preventative tests / checks or monitoring that are recommended to be implemented for firefighters.

The majority of services visited have programs in place that are based on comprehensive health and fitness requirements developed by recognized health professionals and medical facilities aimed at identifying potential health issues plus implementing ongoing health monitoring.

Leading US fire services have previously identified the key health risks to their personnel, which in many cases is via national firefighter fatality data and related research. In addition the relationship with the firefighter's industrial body appears cooperative and extremely supportive in regard to introducing strategies to monitor a firefighter's health. This is highlighted by the joint initiative reflected in the national Wellbeing and Fitness Initiative program that recommends this program is mandatory. In addition in a number of services the industrial body financially contributes to the program such as the significant financial contribution made to establish the Wellness program within Orange County Fire Authority.

¹ AS 1885.1 Workplace Injury and Disease Recording Standard

² <http://www.nfpa.org/>

³ <http://www.firehero.org/>

⁴ <http://www.firefighternearmiss.com/>

⁵ <http://www.usfa.dhs.gov/fireservice/fatalities/>

⁶ AFAC Guidelines for Health and Fitness Monitoring of Australasian Fire and Emergency Service Workers 2002

In Australia a number of fire services have implemented a range of health and fitness initiatives but they do vary and have normally been developed with their services Medical Officer.

It is considered Australian Fire Services and their firefighters would clearly benefit from working cooperatively to develop a national health and wellbeing guideline. It would be appropriate to consider the programs already in place in the USA and New Zealand if this initiative was to be undertaken.

Many Australian voluntary fire services would be unlikely to be able to fund a program such as the WFI program for all its volunteers. However key components of a wellbeing program could be introduced based on a risk – benefit analysis on specific health issues within the service. In addition sourcing potential grants such as occurs in the US would either limited the funding required or expand the number of volunteers that participate in a program.

As a result of this study tour a range of identified initiatives and strategies have already been introduced into CFA's staff and volunteer wellbeing programs. The improvements have proved, successful and received positive feedback. The learning's have been particularly beneficial in expanding the volunteer program.

International Association of Fire Chiefs Conference 2008

The IAFC⁷ conference is an annual event similar to the AFAC conference, which covers various topics and hosts an extensive trade show. At this conference there were a large number of safety related topics including a number that focused on health and wellbeing. A number of meetings were held with representatives of identified agencies of interest including the National Institute for Occupational Safety, National Volunteer Fire Council and the Fire Service Joint Labour Management Wellness – Fitness Initiative

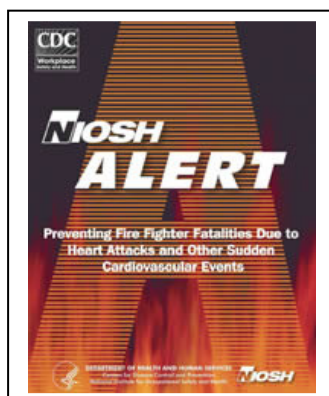
National Institute for Occupational Safety and Health (NIOSH)

NIOSH⁸ is the federal agency with the United States who is responsible for research and providing recommendations to prevent work related injury or illness. Due to the high incidences of firefighter's fatalities NIOSH has established a specific section that investigates all firefighter fatalities.

This section incorporates medical specialists such as Dr Thomas Hales, MD, Senior Medical Epidemiologist whose role is to review details of each death including autopsy reports, the firefighter's medical history and the fire departments medical / wellbeing programs.

Following their investigations into firefighter line of duty deaths from cardiovascular disease (CVD) NIOSH has produced a range of recommendations⁹ to reduce the related risks, which are summarized below;

- Ensure physicians conducting medicals are knowledgeable about physical demands of firefighting and related medical guidelines
- Ensure medical clearance for use of self contained breathing apparatus
- Ensure firefighters have the physical and medical capabilities to undertake the role
- Provide mandatory annual medical assessments
- Develop a comprehensive wellness/fitness program for firefighters
- Provide automatic defibrillators
- Control exposure to carbon monoxide and other contaminants
- Provide light weight PPC
- Provide on-scene rehabilitation to monitor firefighters health

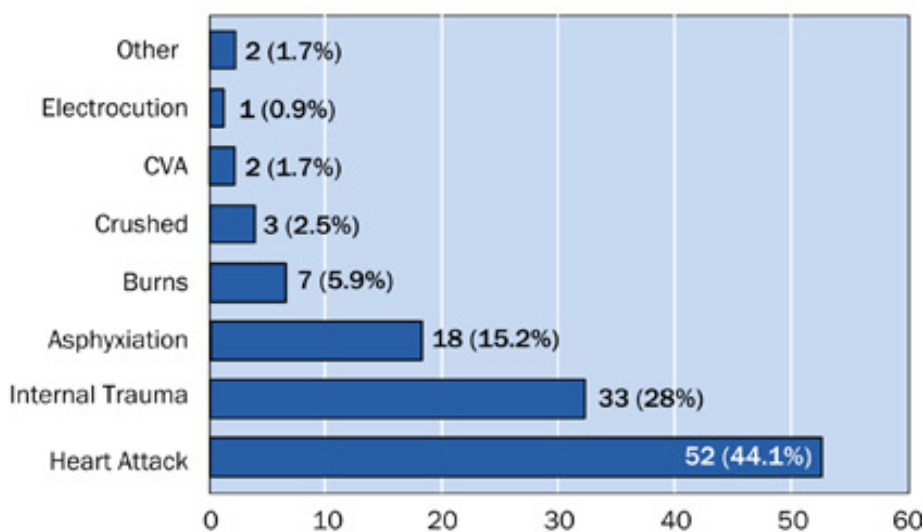


⁷ <http://www.iafc.org/>

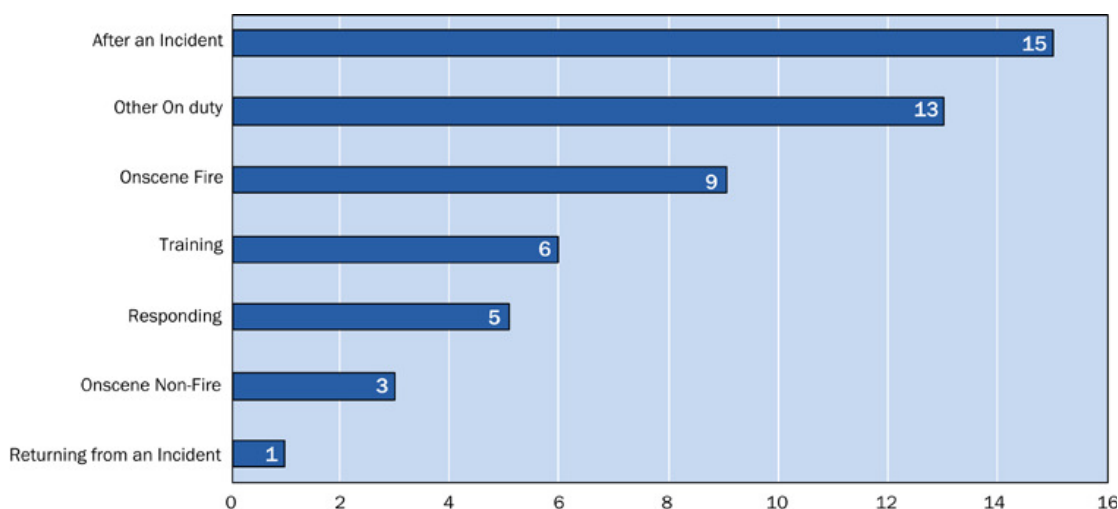
⁸ <http://www.cdc.gov/niosh/>

⁹ NIOSH Alert Preventing Firefighter Fatalities Due to Heart Attacks and Other Sudden Cardiovascular Events June 2007

As part of their research NIOSH produce an annual analysis of the causes of firefighter fatalities, which at the time of this report relates to the 2007 period. The following graphs provide this breakdown on the cause of death and the activities being performed at the time.



Graph - Fatalities by Nature of Fatal Injury (2007).¹⁰ (CVA refers to a stroke)



Graph - Heart Attacks by Type of Duty (2007)¹¹

The research has also identified potential contributing factors to firefighters suffering from a cardiovascular event which include effects of components of smoke, physical demands from the work environment or heat stress.

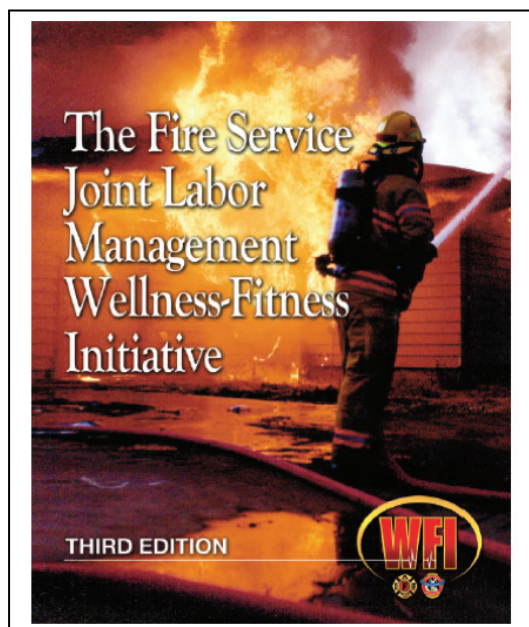
The type of data and information provided by NIOSH is unfortunately not captured in Australia for firefighter fatalities or injuries via one centralized source (e.g. AFAC) which limits the benefits that could be obtained from sharing and analyzing this Australian data.

Australian agencies may maintain their own data but this is not readily shared or recorded utilizing standardized coding or database.

¹⁰ US Fire Administration – Firefighter Fatalities in United States in 2007 (June 2008)

¹¹ US Fire Administration – Firefighter Fatalities in United States in 2007 (June 2008)

The Fire Service Joint Labour Management Wellness – Fitness Initiative (WFI)



This program originated in 1996 through the establishment of a partnership between the International Association of Fire Chiefs (IAFC) and the International Association of Firefighters (IAFF) within the USA and Canada. The focus was to improve the health and quality of life of firefighters and reduce the frequency of health related deaths.

Ten fire services together with the firefighters union (IAFF) were instrumental in developing the content and principles of the Wellness/Fitness Initiative. Technical guidance was provided by various fire services physicians and the John Hopkins School of Hygiene and Public Health.

These ten fire services fully committed to the implementation of this initiative and instigated mandatory participation of all uniformed personnel, which was supported by the IAFF. Three of these fire services were visited during the study tour.

This initiative is focused on improving the health and fitness of firefighters in a non-punitive method. Under this initiative all medical and fitness information is deemed confidential with basically only information relating to a firefighter's fitness for duty and any work restrictions provided to the employer.

From 1996 many other US fire services have progressively adopted various components of the program. In addition the program has been reviewed on three occasions with the latest version being released in 2008.

The documented program is extremely comprehensive with the latest version providing direction and guidance in the following areas;

- Medical
- Fitness

- Injury and Medical Rehabilitation
- Behavioral Health (e.g. Critical Incident Stress Management)
- Cost Justification
- Data Collection and Reporting
- Implementation Strategies

Medical

The component of this document is extremely comprehensive covering examinations of issues such as;

- Cardiovascular
- Gastrointestinal
- Rectal
- Testicular
- Vision
- Audiometric
- Lymph system
- Neurological
- Pulmonary
- Colonoscopy (firefighters over 40)
- Fecal Occult Blood Test
- Musculoskeletal
- Skin
- Full blood analysis

In regards to cardiovascular health the medical component specifically includes;

- Blood pressure checks
- Blood analysis for total cholesterol, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL) and Total Cholesterol/HDL ratio.
- Annual resting Electro Cardiogram (ECG) test
- Annual Aerobic/Cardiopulmonary Maximal Treadmill or Stairmill test

Fitness

This component provides guidance in medical clearance requirement; establishment of fitness trainers, selection of station based equipment or contacted fitness centres, key programs relating firefighting duties, nutritional requirements and recruit programs.

Cost Justification

In the latest version of the document it provides an analysis of the economic investment and returns achieved through the implementation of this program. This analysis was undertaken on the ten fire departments that created and implemented this program.

This process involved obtaining aggregate data on worker's compensation claims, lost work hours and total incurred costs prior to and following the introduction of the wellness initiative. Of the ten fire services, eight had sufficient data to be accessed but only four had data from pre to post implementation to enable full analysis.

This report indicates that fire services that have implemented this program have a lower rate of claims and costs and a simultaneous reduction in lost hours and claims cost average¹².

The following four tables and graphs¹³ display the;

¹² The Fire Service Joint Labor Management Wellness-Fitness Initiative (3rd ed) 2008

¹³ The Fire Service Joint Labor Management Wellness-Fitness Initiative (3rd ed) 2008

- participation rates with this program,
- cost comparisons pre and post the implementation of the program
- claims costs and claims frequency and
- fire service funding commitments to prevention/maintenance of equipment compared to employees

Table 1: Participating fire department sites

FIRE DEPARTMENT	UNIFORMED PERSONNEL	WFI PARTICIPATION RATE IN 1997	WFI PARTICIPATION RATE IN 2004
Austin, TX	1032	CONTROL	CONTROL
Calgary, ALB	983	CONTROL	CONTROL
Fairfax County, VA	1280	65%	85%
Indianapolis, IN	780	70%	95%
Los Angeles County, CA	3013	10%	50%
Miami-Dade County, FL	1900	CONTROL	CONTROL
Phoenix, AZ	1588	70%	90%
Seattle, WA	1005	CONTROL	CONTROL

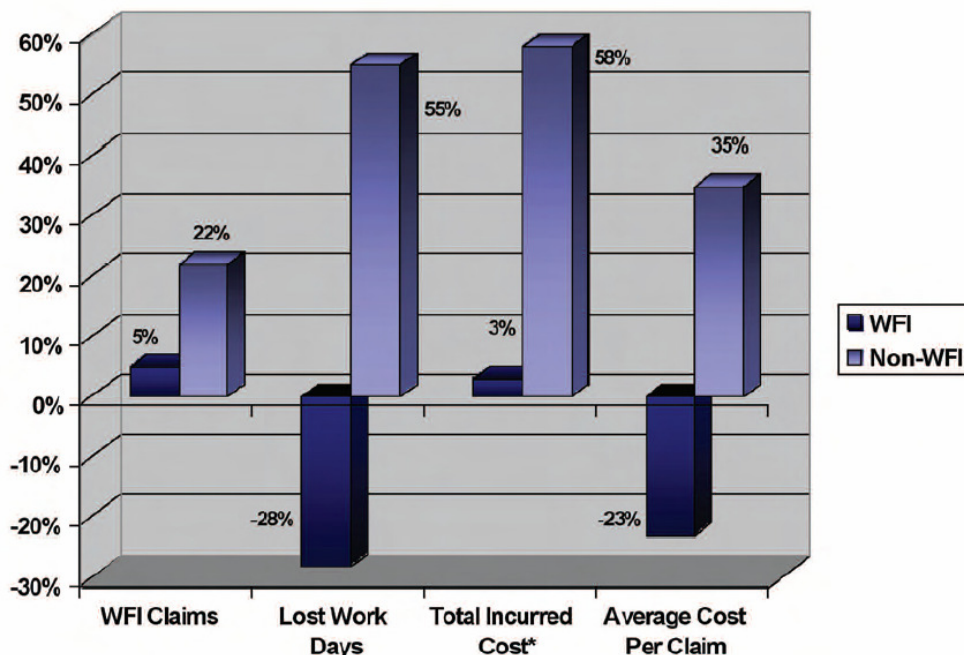
Table 2: Mean Occupational Claims, Loss Work Days, Total Incurred Costs, and Average Cost Per Claim For WFI and Non-WFI departments.

	Implementing WFI				Not Implementing WFI				
	Claim Date	WFI Claims	Lost Work Days	Total Incurred Cost*	Average Cost Per Claim	Non-WFI Claims	Lost Works Days	Total Incurred Cost *	Average Cost Per Claim
PRE	1991	401	4,213	\$1,582,424	\$7,645	344	3,689	\$2,243,993	\$6,699
	1992	407	4,753	\$1,951,752	\$7,571	339	3,899	\$2,155,654	\$6,553
	1993	429	5,759	\$2,418,216	\$7,626	347	3,431	\$2,402,384	\$6,900
	1994	436	6,085	\$3,576,916	\$8,146	359	3,220	\$2,385,562	\$6,697
	1995	438	6,326	\$3,600,762	\$8,247	342	4,441	\$2,702,118	\$7,279
	1996	434	6,895	\$4,236,084	\$8,321	372	4,189	\$2,764,044	\$6,724
	1997	488	6,580	\$4,329,490	\$9,299	256	3,878	\$2,401,968	\$7,060
	Totals	3,033	40,611	\$21,695,644	\$56,855	2,359	26,747	\$17,055,723	\$47,912
POST	1998	386	3,351	\$2,458,116	\$6,233	371	3,515	\$2,536,780	\$7,278
	1999	400	3,834	\$2,627,379	\$6,177	387	4,672	\$3,104,697	\$8,167
	2000	435	4,716	\$2,891,569	\$6,391	442	5,823	\$3,476,799	\$8,517
	2001	452	4,847	\$3,075,238	\$6,115	464	6,404	\$3,806,243	\$8,856
	2002	498	4,725	\$3,688,406	\$7,176	428	6,335	\$4,080,519	\$10,054
	2003	531	4,702	\$3,871,945	\$7,061	449	7,208	\$4,919,355	\$11,146
	2004	508	5,496	\$3,663,493	\$7,073	482	7,431	\$5,067,383	\$10,590
	Totals	3,210	31,671	\$22,276,145	\$46,225	3,023	41,388	\$26,991,776	\$64,608
Percent Change	5%**	-28%	3%**	-23%	22%	55%	58%	35%	

*All costs are adjusted to 2001 U.S. dollars

(Note: WFI is the common abbreviation for the Joint Labor Management Wellness-Fitness Initiative)

Figure 1: Percent change in Claims, Lost hours, Costs and Average claim cost between WFI and Non WFI departments 7 years pre and post implementation.



	Apparatus	Fire Fighter
Maintenance/Prevention	70%	3%
Repair/Treatment	30%	97%
Total	100%	100%

Table 3: Percent Cost of Maintenance (Prevention) and Repair (Treatment)

For the above table (3) compares the fire services funding allocations to maintaining or repairing the various types of firefighting equipment such as their firefighting appliances, breathing apparatus or pumps to the funds allocated to “maintaining / repairing” their firefighters. In regard to firefighters this would take into consideration health and wellbeing programs and compensation costs for work related injuries. Clearly this review highlights the disparity of funding allocation for preventive strategies for a fire services key resource, firefighters.

National Volunteer Fire Council (NVFC)

The NVFC is the representative body of American volunteer firefighters and is located near Washington DC. They maintain close links with the Government and various senators who are strong supporters. This allows the NVFC to lobby for funding and initiatives to help volunteers.

Typically volunteer fire services in the USA operate individually or in smaller groupings and are generally funded by county's with limited access to wellness and fitness programs unless offered by the county's themselves.

Due to the high percentage of volunteers who die as a result of a cardiovascular event¹⁴ the NVFC established a working group of leading American organisations to provide guidance in the development of these wellbeing programs. These organisations include;

- American Dietetic Association
- American Heart Association
- International Association of Fire Chiefs
- L&T Health and Fitness P/L (specialist consultants)
- Medical Reserve Corps
- National Fallen Firefighters Foundation
- National Fire Protection Association
- National Heart, Lung and Blood Institute
- The National Institute for Occupational Safety and Health (NIOSH)
- United States Fire Administration

With the input of these organisations the NVFC has developed a comprehensive website¹⁵ titled Heart Health Firefighter.

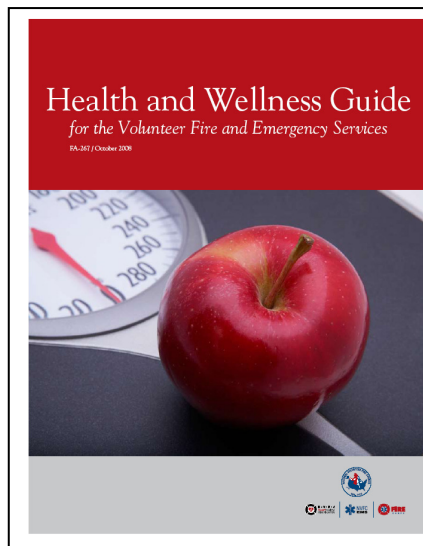
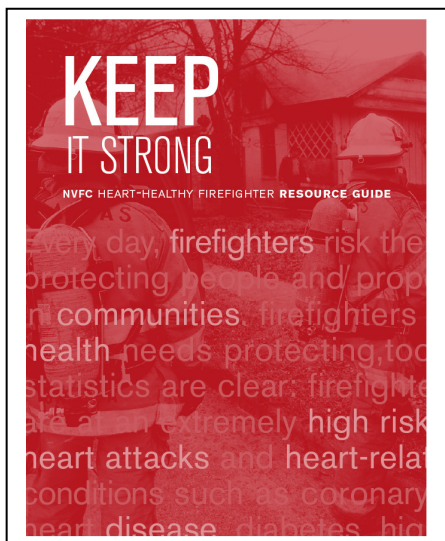


¹⁴ NIOSH Alert Preventing Firefighter Fatalities Due to Heart Attacks and Other Sudden Cardiovascular Events June 2007

¹⁵ <http://www.healthy-firefighter.org/>

The site incorporates an extensive range of information to assist volunteers and departments in reducing cardiovascular risk covering;

- Heart basics – *information on how the heart works, cholesterol, hypertension*
- Nutrition – *recommended nutrition, food pyramid, recipes, cookbooks*
- Lifestyle – *issues that can impact on health, (smoking, stress)*
- Fitness – *calories intake and fitness challenges*
- Success stories



Examples of Publications Available

At the time of my visit the NVFC was about to trial a Health and Fitness Advocate program that involved nominated representatives from approximately 20 volunteer brigades attending a training course delivered by specialist health and wellbeing consultants. Following this training the volunteer advocates were to return to promote health and fitness initiatives within their brigades.

In addition, the NVFC provides free health checks at major events such the International Association of Fire Chief's annual conference. These checks involved a health questionnaire, height/weight measurement, blood pressure check, full cholesterol and glucose tests with the results provided in a personal health report incorporating potential risks and suggestions actions.



Examples of Volunteer Brigades

North Las Vegas Fire Service (NLVFD)

This service is one of four fire departments that cover the Las Vegas area and is staffed by approximately 153 operational personnel. Prior to 2002 NLVFD and the local union jointly submitted an application for a federal grant to assist in funding the formalization of a Wellness and Fitness program utilizing the IAFF/IAFC Wellbeing Program.

This application was successful and resulted in the NLVD engaging the services of Nth Las Vegas University's Centre for Health Promotion to form a partnership. Through the guidance of the university a program has been introduced based on the IAFF/IAFC Wellbeing Program but with some creative enhancements aimed at maximizing participation and utilizing technology.

The program commenced with a number of firefighters volunteering to become Peer Fitness Trainers (PFT), which involved them, being trained by the university both in person and through remote learning methods.

A needs analysis incorporating an extensive questionnaire was conducted across all level of NLVFD with all parties encouraged to make suggestions. Senior management, PFT's and the local union reviewed the results, which allowed the program goals and objectives to be refined. The questionnaire has since been introduced annually and can be completed online via their intranet site.

Initially, the fitness testing was undertaken twice during the first year to enable goal setting and has since moved to an annual process. This testing incorporated body composition, cardiovascular endurance, muscular strength and flexibility. Individuals are provided with confidential personalised reports comparing their results to the national norms.

The PFT's then meet with each firefighter to establish programs and strategies to address their specific needs.

Each firefighter is also offered a computerized analysis of their diet with guidance provided to improve their lifestyle habits, plus a dietician also providing on site education. As part of the promotion and encouragement of the firefighters to improve their diets competitions are held with firefighters cooking station meals. Each meal is analyzed for taste and nutritional value with small gift certificates provided to the winning "cook".

Electronic cookbooks are provided on the intranet site to assist in firefighters selecting healthy choices.

Another initiative has been the expansion of the wellness and fitness program to incorporate spouse/partners into key areas. This has included free consultations and assessments by fitness trainers and physical therapists. The program was moving to offer online access to personal results.

Through grants, the NLVFD with significant support from the university is expanding the online services to enable access to firefighter specific health and wellbeing information, resources and analysis.

During discussions with Professor Regin from the university, CFA was offered access to its online health and wellbeing promotional program, which is being trialed by NLVFD for "one dollar". This program is aimed at involving not only the firefighters but their families in tracking their health behaviors as it covers issues such as lifestyle, diet and exercise.

There are plans to further expand this program to include other university experts and include the services of undergraduate student volunteers plus further expansion of the online services.

In 2008, over 80% of the firefighters participated in the program with the university determining the firefighters had;

- lower than national averages in being overweight/obese
- greater aerobic, upper body and abdominal muscle endurance than the national average
- 66% rated in the “best” category against cardiovascular disease
- 81% were within the 10% of their recommended weight
- 76% of participants had good to excellent hamstring/lower back flexibility

At this stage the program does not include cardiovascular risks assessments covering;

- cholesterol or blood pressure testing
- smoking and alcohol habits.



Typical Fire Stations



Los Angeles County Fire Department



Typical LACFD Station

Currently this service is comprised of approximately 4,767 career personnel with 2,559 career firefighters and 159 fire stations. Like many US fire services they also undertake paramedic duties that involve the majority of their emergency responses.

In 1996 the fire service was one of the ten US fire services involved in the development of a national program titled the Wellness and Fitness Initiative, which LA County branded as "Fitness for Life".

Over this time the program has evolved and recently as part of an agreement with the local union to increase the firefighter's participation in the voluntary program staff were offered an annual 3% bonus to participate in the program over a three year period.

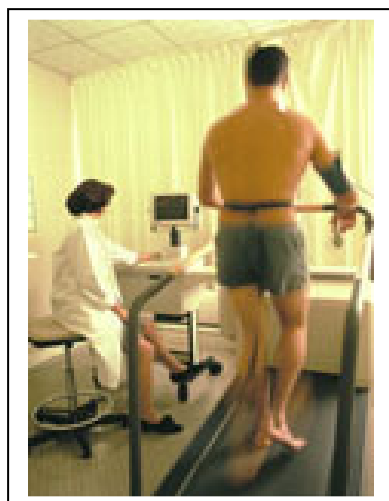
On reviewing their program the focus on cardiovascular health was considered a highlight of the study tour, which is described in detail in the following chapters.

A number of medical clinics have been contracted in the LA County area for the participants to choose from. Participants must schedule and attend an annual medical assessment within their birth month plus complete 12 hours of continuing health education.

The medical assessment process is comprehensive and includes the following stages.

1. The participant completes a Healthy History Questionnaire, which is reviewed by the examining physician.
2. The physician then undertakes a range of resting measurements covering height, weight, body composition, pulmonary function, hearing and vision.
3. Fitness tests for muscular strength and endurance, trunk flexibility
4. Laboratory test includes
 - a. blood counts to assess potential anemia/immune disorders,
 - b. cholesterol (total, HDL and LDL)
 - c. glucose, liver and kidney function and
 - d. urine breakdown.

5. The assessment then moves to a cardiovascular review. This process involves strict protocols and stages based on the individual's risk factors and results. It commences with a rested baseline assessment being obtained where the participant is connected to a multi-lead ECG. The program then moves to maximal treadmill stress test that involves the participant being connected to the ECG and progressing to maximum excursion on a treadmill for between five to twenty minutes dependent on the participant's level of conditioning.

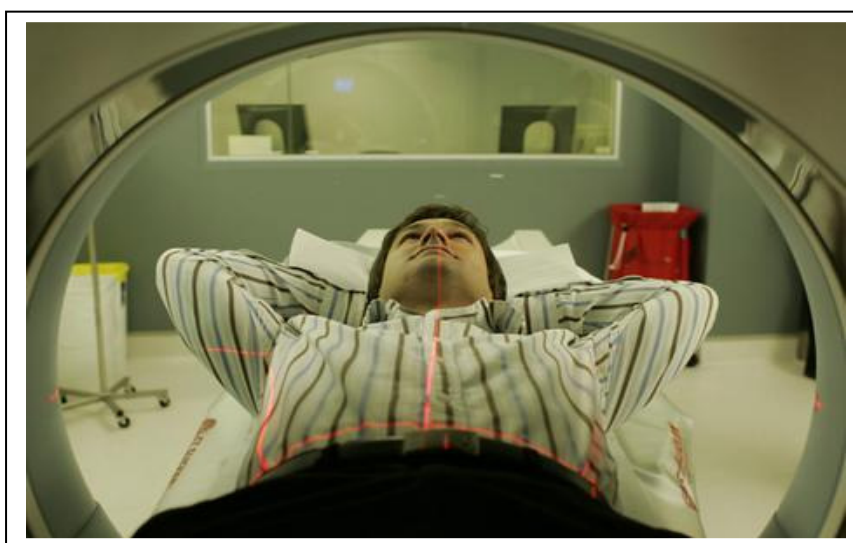


Example of a treadmill test

The participant's welfare is monitored throughout the test and on completion if the physician believes the results require further evaluation they are immediately forwarded to Harbor-ULCA Division of Cardiology where the reviewing Cardiologist must provide feedback within two hours. If they identify issues requiring further assessment an appointment maybe made for the same day dependent on the results.

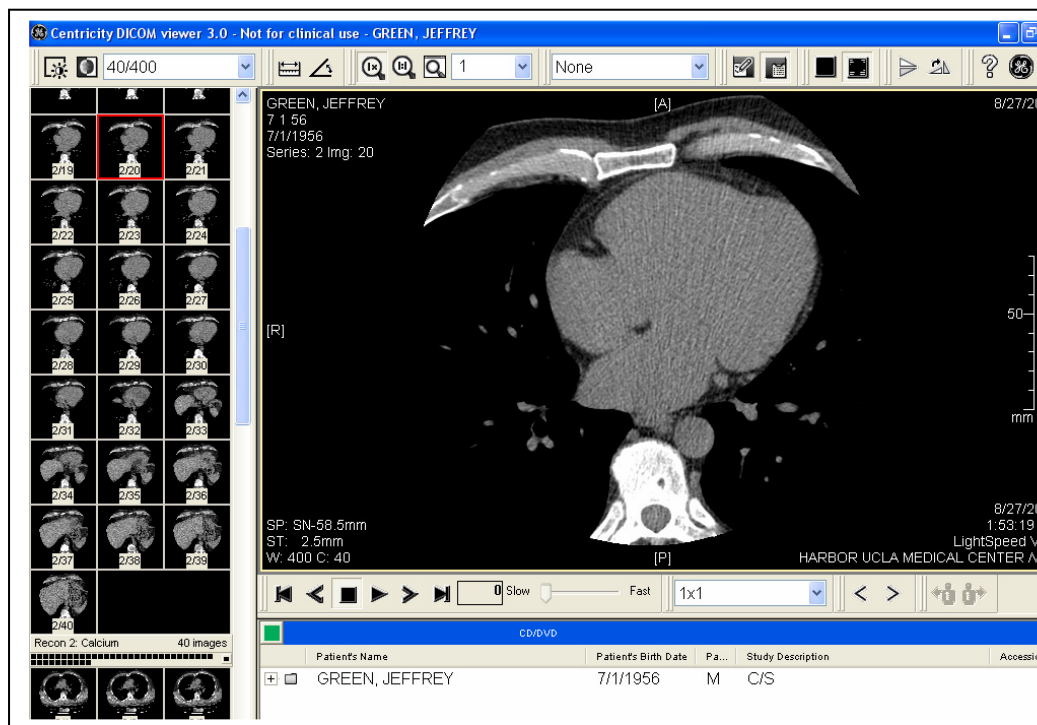
A range of further tests are available which normally commences with an Electron Beam Computed Tomography (EBT) which is a safe, relatively quick and cost effective test that identifies the presences of calcium in the coronary arteries.

This test takes approximately 10 minutes with the results reviewed on the same day.



CT scan.

The author was taken to Harbor-ULCA Medical Centre and observed this test being undertaken then was offered this test which resulted in approximately 120 images taken one of which is shown in the following image, which fortunately shows no calcium build up.



CT Test Result

Approximately 25% of participants screened have been identified as having some degree of calcium in their arteries resulting in further testing.

Based on the results of the EBT the Cardiologist may request a CT Angiography, which provides a 3 dimensional view of the heart and arteries. A dye is injected into the participants arm and this scan shows the journey of the dye through the arteries highlighting any blockages.

A further test is also available where the Cardiologist may request an Echocardiogram, which is an ultrasound of the heart.

If a potential issue is identified then the participant is referred to a specialist medical clinic where the participant undergoes a 3D heart scan. Again the results are immediately forwarded the Cardiologist who must provide feedback within two hours. Where an issue is identified the participant then undergoes a full body scan after which if required the participant is then admitted to a hospital for treatment within two days. The fire service has made formal arrangement with these medical services to ensure their members are provided a priority service.

Based on the results of these tests the individual may be reviewed by a Cardiologist where the individual may require corrective surgery such as having stents inserted clearing the blockages in the arteries.

Participation in the Harbor-ULCA specialist cardiovascular program is voluntary, but individuals whose prior tests identify a potential issue and do not wish to utilise the contracted medical service must be evaluated by their own Cardiologist and the result provided to the fire services medical unit.

Results

The results of the voluntary program have been reviewed by the fire service and are summarised below.

Members ¹⁶	Total eligible	Complete	Incomplete	Retired/Declines	Percentage Complete
Firefighters	2859	2386	237	16	83%
Chief Officers	111	98	2	7	88%
Permanent Lifeguards	170	138			81%
Recurrent Lifeguards	646	171	411 (both groups)	28 (both groups)	26%

Table reflects participation for fiscal year 1st July 2006 to 30th June 2007

Item ¹⁷	Scans Reviewed / Results	Cost per Exam (US)
Treadmill results sent to Harbor for review	171	\$50
Number of EBT scans	160	\$300
Number of CF Angios	50	\$900
Number of EKG (reads)	8	\$20
Number of Stress Echos	7	\$650
Number of Employees with Significant Heart Disease	5	
Employees with Temporary Restrictions	4	
Employee Permanent Work Related Restrictions	1	

Table reflects aggregate data for fiscal year 1st July 2006 to 30th June 2007

Approximately 5% of participants ECG results require further investigation.

This program is fully funded by the fire service except the hospital treatment, which is normally covered, by the fire service's compensation scheme as California's career firefighters are covered for cardiovascular events through presumptive compensation legislation. This presumptive legislation has been adopted by many American states and automatically assumes a specific illness is work related.

A review of compensation claims that relate to health and fitness occurred in 2008 with the following results;

Worker Compensation Claims ¹⁸	2002	2006	% diff
Sprains	810	575	29%
Cardiac	18	6	50%
Physical Fitness Activities	197	153	22.5%

Information regarding the details of each claim, including costs were not provided to enable full analysis of this information but initially the reduction in claims is a significant and positive trend.

¹⁶ LA County Fire Department Fitness for Life Module 5 July 2007

¹⁷ LA County Fire Department Fitness for Life Module 5 July 2007

¹⁸ LA County Fire Department Measurements of Success



Fire Academy Gym



Station Gym

Orange County Fire Authority (OCFA)



Orange County Fire Authority Headquarters

OCFA introduced their Wellness and Fitness program (WEFIT) in 2003 as a result of a decision by the Fire Chief Officer following the loss of 1 percent of its workforce over an eight-year period with many potentially preventable deaths¹⁹.

The program was developed with the local union and was based on components of the IAFC/IAFF Wellness-Fitness Initiative program. Their program incorporates the following core functions;

- joint partnership between management and the union
- dedicated program resources
- fitness evaluations and programming
- injury rehabilitation
- exercise facilities
- medical assessments
- immunization
- disease screening
- nutritional education
- heart rate monitors and
- health related data collection and evaluation

This program was coordinated by Captain Mike Contreras, who is supported by;

- Exercise physiologist
- Peer fitness trainers
- University based health clinic
- WEFIT Oversight Committee

The Board of the OCFA endorsed the introduction of a wellness program for a two year trial but only if the funding was a shared arrangement with the local union and a federal grant. This funding arrangement was considered critical to ensure the commitment of all parties and involved the following funding breakdown;

¹⁹ OCFA Firefighter Wellness & Fitness Program booklet www.ocfa.org

- OCFA - \$579,912
- Union - \$579,912
- Federal Grant - \$476,600

The union is fully supportive of the WEFIT program as the OCFA union president indicated their firefighters on average only live eight years into retirement, which is a figure they plan to change. The average age of firefighters retiring is 55.

The program is fully integrated into each recruit course to ensure the strategies are taught at the commencement of employment. While the majority of stations are equipped with exercise equipment some older stations do not have the physical space and gym memberships are provided.

While the program is voluntary participation levels exceed 90% by firefighters.

Medical exams and fitness tests can take up to three hours to complete and are scheduled during shift duty to enable personnel to attend. The program is extensive and includes audiometric tests, eye exams, pulmonary test, skin cancer screening, blood tests strength and endurance tests and cardiovascular treadmill tests.

In addition a broad immunization program is incorporated including hepatitis A and B, measles, mumps chicken pox and influenza vaccinations.

As part of the continual promotion of the program good new stories are regularly shared through newsletters and other forums. It was pleasing to note the apparent comfort firefighters had in sharing their personal medical conditions identified during the comprehensive testing and the treatment provided. This included major heart surgery.

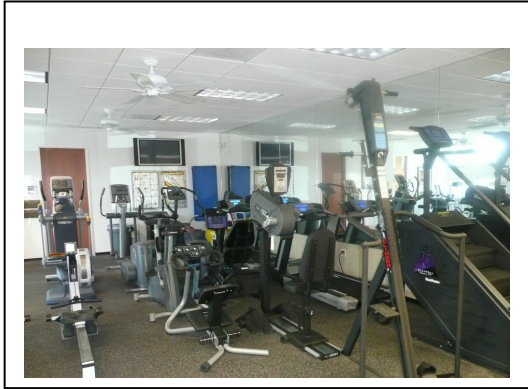
Measurement and evaluation of the program occurs at each stage to enable improvements to be made. While an individual's results are confidential the annual testing and programming can be evaluated to determine if improvements in health are occurring and risk factors reduced.

The WEFIT program has proven successful due to the joint aim of improving the health and fitness of firefighters but also maintaining confidentiality of the firefighters personal medical records. The benefits of this program have also been expanded to local schools with firefighters showing the children the benefits of the proper exercise and nutrition.

Results of this program from 2004 to 2008 indicate progressive improvements in cardiovascular risk areas. The table below provides an overview of these results.

Health Data Reported ²⁰	2004 %	2005 %	2006 %	2007 %	2008 %
Physician referrals	37	10	19	12	9
Above normal weight measurement – body fat measurement (24%)	47	42	39	344	32
Elevated blood pressure on exam (systolic 130 or diastolic 85mm/Hg)	29	22	15	15	15
Hypertensive, taking medication	8	7	8	8	7
Personal history of heart disease	< 1	0	2	0	0
High total cholesterol (200mg/dl)	51	54	46	50	44

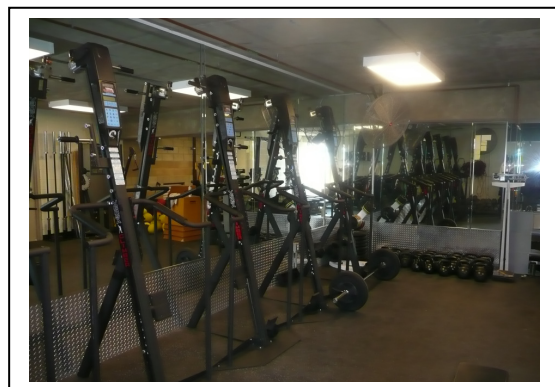
²⁰ UCI/Center for Occupational and Environmental Health report of OCFA



OCFA Headquarters Gymnasium



OCFA Headquarters Gymnasium



OCFA Recruit Training and Gymnasium

Sacramento Fire Service



Typical Sacramento Fire Station

Sacramento is the capital of California and is protected by the Sacramento Fire Service that is comprised of approximately 630 employees and 25 stations.

Unlike the majority of fire services visited a “specialist coach” coordinates Sacramento’s wellbeing programs. This coach has a Masters in exercise science and is a qualified Olympic Coach compared to most services that utilized a senior operational officer to undertake this function.

At the time of the visit Sacramento’s wellness program was being restricted due to the fire services funding limitations. They had adopted components of the IAFC/IAFF Wellness Program with key medical checks including cholesterol tests being included but these have been temporarily suspended.

The coach’s role was focused on the development and provision of fitness programs to firefighters. He works closely with firefighters to improve their overall health and fitness through personalized programs to meet their specific needs. The coach also provides assistance to firefighters who may have sustained non-work related injuries.

Sacramento utilise the intranet to enable firefighters to access various health and fitness information including programmed exercise video clips. These are from the American Council on Exercise and enable the user to actually view the technique required for each exercise.

Other initiatives include the provision of nutrition education, health surveys, monthly newsletters and regular station visits.



Academy Gymnasium



Fire Station Gymnasium

New York Fire Department (NYFD)

The NYFD is comprised of approximately 11,400 firefighters, 2,800 paramedics and 1200 civilian employees and was one of the original ten services that were involved in the development of the Fire Service Joint Labour Management Wellness – Fitness Initiative.

The health and wellbeing program is mandatory with firefighters provided time off from their shifts to undertake the medical assessments. If any critical results are identified, such as high blood pressure they are taken off line from their shifts with no loss of pay or rank.

As with many other American states, NYFD firefighters are covered by presumptive legislation, which automatically provides compensation coverage for certain medical conditions such as cardiovascular disease. This is based on the assumption that these medical conditions are related to firefighting.

The NYFD has an extensive dedicated medical centre comprised of 25 Medical Officers, plus a large support staff including nurses and administrative staff. Within their facility they provide vaccination programs, audiometric testing facilities, vision tests, blood testing, CT scans, ECG's and respiratory tests.

While the amount of resources at this medical centre initially seemed extraordinary it was determined that these facilities also provide the ongoing monitoring for personnel involved in the 9/11 emergency response and recovery programs. This monitoring is extensive due to the potential exposure of personnel to a broad range of hazards but particularly respiratory risks such as asbestos. The federal government has provided significant funding to provide ongoing support to current and retired members involved in this incident.

NYFD provide the broad range of health checks as described in the Fire Service Joint Labour Management Wellness and Fitness Initiative program.

Random drug tests are also carried out on firefighters during their career. All fire houses (stations) are fitted with gymnasiums, which are self funded and are supported by Peer Fitness Trainers.



Typical Fire Houses

Fairfax County Fire and Rescue Department

Fairfax is a combined service and is comprised of approximated 1,390 uniformed staff, 270 operational volunteers and 137 civilians. They attend approximately 92,000 annual incidents with 60% being emergency medical responses.

They were also one of the original 10 fire services involved in the establishment of the joint IAFC/IAFF initiative and provide this program to their personnel with it being coordinated by Captain Robert A Konczal.

Their program is mandatory for staff and volunteers which incorporate the broad range of assessments set out under the joint initiative with the frequency generally being annual but can be adjusted to suit age or risk profiles. The program is summarized below²¹.

Medical

- Health questionnaire and immunization status update.
- Comprehensive physical examination, including:
 - Height, weight and body mass index (BMI)
 - Blood pressure and pulse
 - Vision screening
 - Dipstick urinalysis
 - PPD skin test
 - Laboratory testing:
 - Complete blood count, including platelets
 - Chemistry profile
 - Lipid profile (*every 4 years*)
 - Chest X-ray - age and risk adjusted,
 - Audiometry
 - Pulmonary function test / Spirometry (Forced Vital Capacity, Forced Expiratory Volume 1.0)
 - Cardiac stress test (*age and risk adjusted*)

Fitness

The annual physical fitness evaluation for fire and rescue personnel will include measures representing five basic dimensions of physical fitness, as described below:

- Aerobic capacity/cardio respiratory endurance.
- Muscular strength.
- Muscular endurance.
- Flexibility.
- Body composition.

These assessments are undertaken by the services dedicated medical centre which is staffed by three doctors plus associated support staff including an exercise physiologist. Dr Don Stewart who is in charge of the medical centre was also a key contributor to the development of the IFAC/IAFF initiative and was about to evaluate this initiative through the analysis of the data provided by participating services.

²¹ Fairfax County Fire and Rescue Occupational Health and Safety Plan July 1997

This medical centre was originally established to service the fire department but due to its success other county emergency service personnel, such as the police, also utilise it. In addition to the assessments other services are provided such as immunizations, physical therapy, respirator fit-testing, treatment of minor injuries and education.

The centre has extensive facilities including x-ray, vision testing, audiometric booths and offers physiotherapy.

Fairfax is self insured for compensation, which would have benefits from the proactive health programs and the provision of the medical centre.

The funding requirements for this medical centre is approximately \$2.5 million per year but what percentage is directly related to the fire service was not provided but it's anticipated it would be the major user.

It is planned that the health services are further expanded to include technology based programs for staff / volunteers that include nutrition and exercises which are categorised into levels such as beginners to advanced.

For the past 20-30 years Fairfax have had in place a no smoking policy for operational personnel that extends to 24/7 coverage. Firefighters must sign an agreement they will not smoke for the duration of their employment with the service and if they are identified as smoking either during work hours or outside of their shift they face disciplinary action and possible termination. Discussions indicated this position is well accepted and is supported by the union based on the known risks from smoking and the coverage of firefighters under the presumptive compensation legislation.



Medical Clinic X-ray and Audiometric Testing Booth



Specialist Appliances

Montgomery County Fire and Rescue Service

The service is a combined organisation comprised of 33 fire stations including EMS with approximately 1300 staff and similar number of volunteers. As with many other US services their wellness program is mandatory for both staff and volunteers and adopts the principles of the joint IFAC/IAFF program.

To deliver the program a medical centre staffed by two doctors has been contracted which only services the County's fire, police and correction services personnel. This centre undertakes the key medical and fitness testing for the members generally in line with the relevant sections of the IFAC/IAFF program previously described in this report.



Medical Room at Clinic



Fitness Assessment Area

In addition to the medical staff an exercise physiologist is available who undertakes approximately 900 formal fitness assessments per year such as the treadmill tests. To assist staff to maintain their fitness levels 3 hrs is allocated per 24hr shift for fitness related activities.

While the health program is mandatory the volunteer members have negotiated within their enterprise agreement a variation in the treadmill test from 15 minutes in duration for staff to 9 minutes for volunteers. The fitness testing is not mandatory for volunteers. While it is understood the duties are similar this change was based on negotiations.

In addition, the volunteer association has an agreement their members will not be pressed to the maximum during this treadmill test.

All stations are fitted with gymnasiums, which are supported by 60 Peer Fitness Trainers whose role is to assist individuals with programs and correct techniques.

Drug and alcohol testing is being implemented but is currently mandatory following any vehicle accident through the fire service.

The program is coordinated by Battalion Chief Mike Close and Captain Tony Coleman.

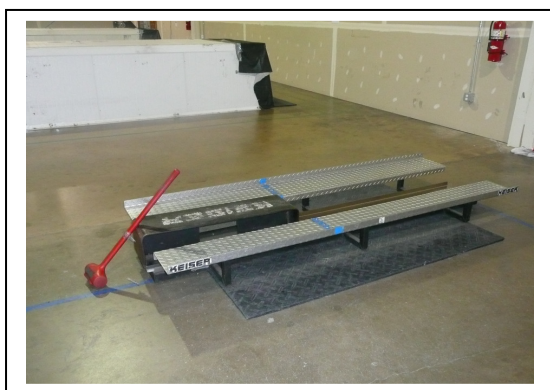
Candidate Physical Ability Test

Sacramento and Fairfax fire services like a number of other services also conduct recruit training program titled CPAT, which stands for Candidate Physical Ability Test. This program is endorsed by IAFC/IAFF and allows candidates to complete a range of basic medical, physical and skills tests that if passed will “accredit” the candidate as suitable for entry into a fire service’s internal recruit programs.

While not all US fire services use the CPAT process candidates who have this accreditation are generally well accepted when applying for positions at a large proportion of fire services.

The CPAT program incorporates the following activities with candidates wearing a weighted vest to simulate the use of breathing apparatus²²;

- Stair Climb (climbing stairs while carrying an additional 25 lb. simulated hose pack)
- Ladder Raise and Extension (placing a ground ladder at the fire scene and extending the ladder to the roof or a window)
- Hose Drag (stretching uncharged hoselines, advancing lines)
- Equipment Carry (removing and carrying equipment from fire apparatus to fireground)
- Forcible Entry (penetrating a locked door, breaching a wall) and
- Search (crawling through dark unpredictable areas to search for victims)
- Rescue Drag (removing victim or partner from a fire building)
- Ceiling Pull (locating fire and checking for fire extension)

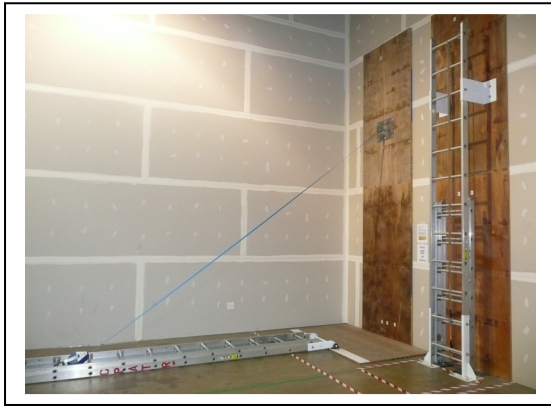


Sledge Hammer Simulation



CPAT Recruit Training

²² The IAFF/IAFC Fire Service Joint Labor Management Candidate Physical Ability Test



Ladder Test



Simulated Forced Entry



Weight Vests for Simulated B/A Use



Hydraulic Ceiling Hook Test

New Zealand Fire Service

The NZFS is comprised of approximately 2,100 employees and approximately 7500 urban volunteers deployed across the North and South islands at 436 fire stations.

A health-screening program was introduced in 2002 and subsequently reviewed in 2006. As a result an enhanced Health Screening and FireFit program has been progressively implemented for staff and volunteer personnel.

All personal details are kept confidential except where a serious risk exists to the individual that could be prevented by the provider;

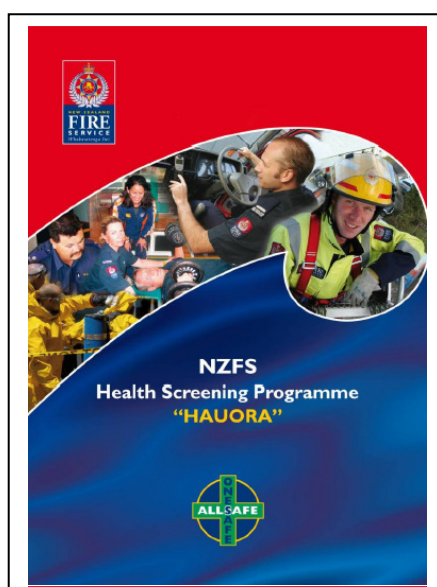
- disclosing to the individual the issues of concern
- providing them sufficient time for them to discuss the issue with their treating doctor and
- subsequently informing the NZFS Medical Officer if concerns still remain without identifying the individual unless the provider has serious concerns for the health of the individual.

To enable the success of this program to be monitored statistical information is provided to enable trends and areas of concern to be reviewed.

Health Screening

External contracted providers deliver this program at approximately 156 locations across both the North and South Islands. In addition testing is also offered at brigade training nights via provider's occupational health nurses.

This test is an annual event with participants encouraged to fast for more accurate blood test results.



The following is an extract of the screening tests²³ undertaken

- **Test 1: Cardiovascular Screening**
Height, weight, BMI, abdominal circumference, smoking status, exercise status, diet, alcohol consumption, blood pressure, ethnicity and gender will be recorded and updated yearly.
- **Test 2: Audiometry**
Baseline audiometry is performed for all paid fire fighting and Communication centre personnel prior to joining the NZFS. Baseline audiometry for volunteer personnel will be offered within the first year of service as part of the Health Screening Program.
- **Test 3: Spirometry**
Baseline spirometry will be offered to all personnel in their first year of employment as part of the Health Screening Program. The provider will offer spirometry testing to all personnel on alternate years of service as part of the Health Screening Program.
- **Test 4: Vision**
Both paid and volunteer applicants have their near distance and colour vision assessed by the examining doctor prior to entry to the NZFS. Fire fighters and other heavy goods vehicle drivers have their vision assessed every 10 years by their normal medical practitioners in accordance with licensing recommendations from the Land Transport Safety Authority. Near and distance vision will be assessed on alternate years for those over 40. A screening test for macular degeneration will be done on alternate years in those over 50.
- **Test 5: Depression**
There will be a short three-question screening test for depression done yearly.
- **Test 6: Fatigue**
The 10 question Epworth Sleep questionnaire will screen for fatigue and will be assessed yearly.
- **Test 7: Intercurrent Disease**
Enter Read Codes for Intercurrent Diagnoses of Following Conditions:
 - Cancer: Site.
 - Heart Disease.
 - Diabetes: Type.
- **Test 8: Immune Status**
 - Hep B
 - Hep A
 - Tetanus
- **Test 9: Women's Health**
If aged over 45-enrolled in Breast Screen, Cervical Screening: up to date.

The various health tests are undertaken and once the results are obtained participants are provided with an individualized report, which includes their cardiovascular risk assessment.

The computerized cardiovascular risk assessment tool "PREDICT" was developed to meet the New Zealand Cardiovascular Guidelines 2005²⁴ and therefore provide participants with their personal risk levels of cardiovascular disease based on their individual results. This assessment forms a key focus of the screening program due to the increased risks presented by the physical demands of firefighting and known high cause of fatalities.

All tests are based on national or other relevant medical standards.

The health program also incorporates the specific needs to meet the beliefs of the Maori participants.

²³ NZFS Health Screening Programme "HAUOA" September 2008

²⁴ New Zealand Cardiovascular Guidelines Handbook: Developed for Primary Care Practitioners, June 2005

FireFit

This program aims at improving the overall physical fitness of participants through general and specific conditioning activities and is overseen by NZFS specialist exercise professionals.

Participants are provided with support through self-passed training diaries and video. The video provides guidance to assist staff pass their bi-annual fitness test for which staff receive a payment.

The program covers;

- cardiovascular training that includes aerobic activities such as skipping, running and cycling (etc)
- resistance training to improve strength and flexibility which a key requirements in firefighting and
- nutritional guidance.

All staff stations are equipped with a gymnasium containing a variety of equipment.

Results

The program is regularly monitored with reports provided detailing participation levels at each region by staff and volunteers. In addition reports are provided on results from each component of the health tests. These report enable targeted education or other initiatives on key areas of risk such as smoking.

The following is a summary of participants and key health findings of the program at 1/7/2008²⁵.

Staff	Volunteers	Total
1273	3900	5173

Significant Findings (Staff – Volunteers)

Noise

- Notifiable hearing loss 96 cases (25 S – 71V)

Asthma

- Mild 146 cases (19S – 127V)
- Moderate 16 cases (1S – 15V)
- Sever 1 case (S)

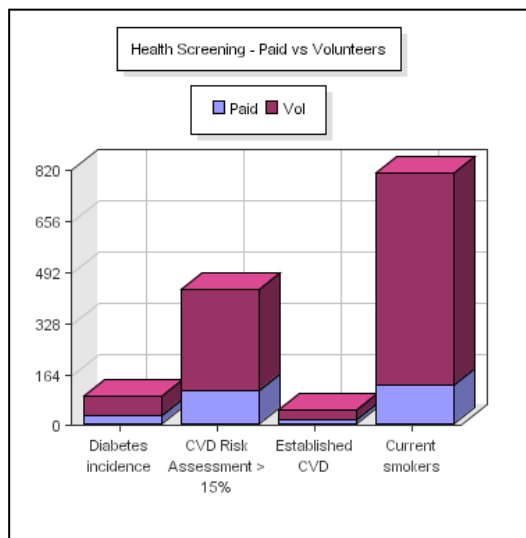
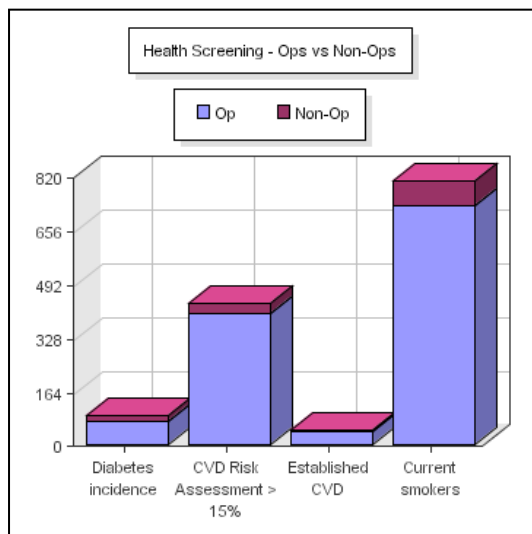
Heart Disease

- Established CVD 47 cases (14S – 33V)
- CVD Risk > 15% 433 cases (107S – 326)

Smokers 734 identified (128 S – 682 V)

GP Referrals 262 cases (71 S – 218V)

²⁵ NZFS Health Screening Programme Review 17 September 2008



Graphs displaying health-screening results incorporating CVD risks²⁶

The NZFS program is considered to have a range of strategies that could be effectively implemented within Australian Fire Service such as CFA to compliment its current staff program and the expansion of the current volunteer initiatives.

²⁶ NZFS Management Report Since Program Launch 2008

Acknowledgements

International Association of Fire Chief's - Victoria Lee, Program Manager

National Institute for Occupational Safety and Health - Dr Thomas Hales, MD, MPH Senior Medical Epidemiologist NIOSH, CDC

National Volunteer Fire Council - Maggie Wilson Director of Health and Safety

North Las Vegas Fire Service - Professor Regin (Nth Las Vegas University's Centre for Health Promotion)

L.A. County Fire Department - Captain Kevin Klar Fitness for Life Coordinator

Orange County Fire Authority – Captain Michael Contreras Wellbeing Coordinator

Sacramento Fire Department - John Hofman, CSCS, MS Physical Fitness Coach

City of Sacramento - Barbara Brenner Loss Prevention Manager

Fairfax County Fire and Rescue Department - Fire Chief Ronald L. Mastin, Captain Robert A Konczal Wellbeing Coordinator, Dr. Donald Stewart

Montgomery County Fire and Rescue Service - Captain Coleman, Dr. Joanne Roberts, Exercise Physiologist Dr. Martin Rosenthal

New York Fire Department - Chief Medical Officer, Dr Kerry Kelly

New Zealand Fire Service - National Manager Safety and Wellbeing, Julian Hughes

Emergency Services Foundation Victoria