

NIOSH Fire Fighter Fatality Investigation and Prevention Program

Tim Merinar - Tom Hales

**Public Stakeholder Meeting
November 19, 2008**



**NIOSH Fire Fighter Fatality
Investigation and Prevention Program**



National Institute for Occupational Safety and Health (NIOSH)

- Federal agency created under the OSH Act of 1970
- Conducts research and makes recommendations to prevent work-related injury/illness



National Institute for Occupational Safety and Health (NIOSH)

- Part of the Centers for Disease Control and Prevention (CDC) -
- Research to practice thru recommendations
Not regulatory
- DHHS – NIOSH / DOL – OSHA



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FFFIPP Overview

- **Funded by Congress in 1998 to address the continuing national problem of occupational FF fatalities**
- **Appropriated funds to implement a FF Safety Initiative.**
- **Focus is on independent investigations of FF LODDs based on 1998 Stakeholder meeting input**



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



NIOSH

**Div of Safety
Research**

**Injury Investigations
Morgantown, WV**



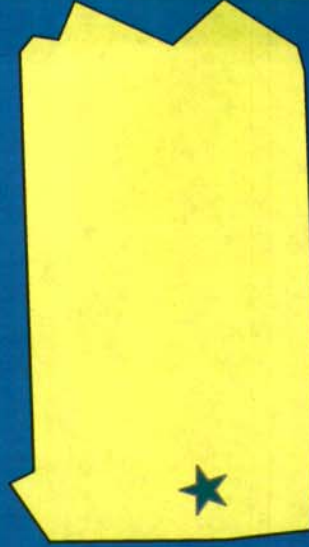
**Div of Surv,
Hazard Eval, &
Field Studies**

**CVD Investigations
Cincinnati, OH**



**National Personal
Protective
Technology Lab**

**SCBA Investigations
Pittsburgh, PA**



**NIOSH Fire Fighter Fatality
Investigation and Prevention Program**



The FFFIPP Mission

- Prevent FF deaths and injuries
- Formulate recommendations
- Facilitate recommendation implementation



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FFFIPP Goal & Objectives

Goal

- Prevent fatalities



Objectives

- Investigations
- Identify causal factors
- Recommendations
- Interventions
- Dissemination

FFFIPP Staff

- **Trauma investigations- Morgantown, WV**
 - Paul Moore, Steve Berardinelli Jr, Matt Bowyer,
Virginia Lutz, Steve Miles, Jay Tarley,
Stacy Wertman, Tim Merinar,
 - John Sines – IT support,
- **Medical investigations (primarily heart attacks)- Cincinnati, OH**
 - Tom Hales, Tommy Baldwin,
- **SCBA Evaluations – NPPTL, Pittsburgh, PA**
 - Vance Kochenderfer

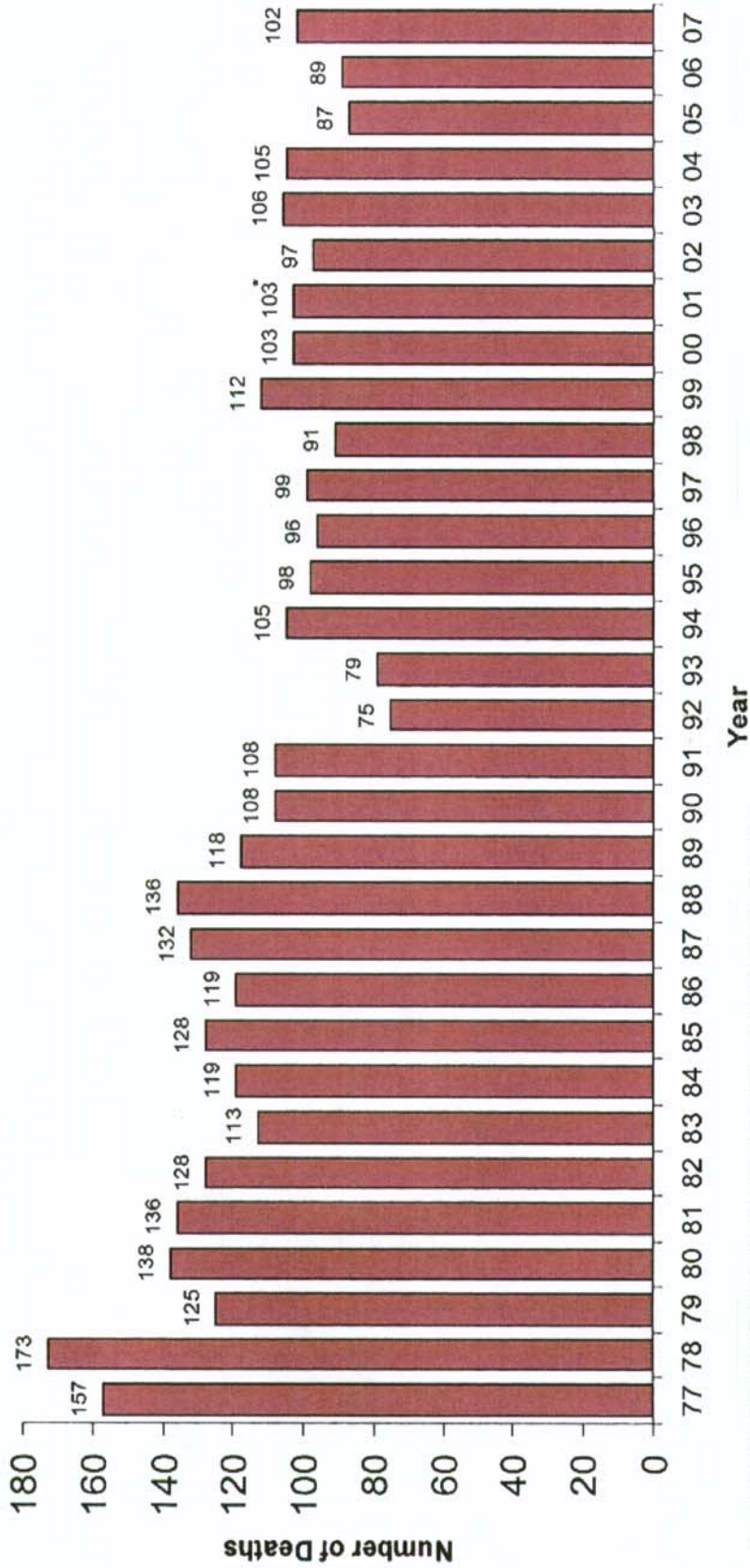


NIOSH Fire Fighter Fatality
Investigation and Prevention Program



On-Duty Firefighter Deaths - 1977-2007

Ave = 112



* excluding the 340 firefighter deaths at the World Trade Center

Source: NFPA 2007



NIOSH Fire Fighter Fatality Investigation and Prevention Program



Investigations 1998 – 2007



*NFPA



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Welcome Stakeholder Input

- Jan 1998 Mtg
- Mar 2006 Mtg
- **Nov 2008 Mtg**
- 2010 Input



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Stakeholder Input

- 2006 Stakeholder Meeting
- RTI Evaluation Report
 - **Future Directions Document**
- Program Reviews
 - IAFC SH&S Task Force
 - OIG Report



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FFFIPP Future Directions

- Investigations
- Documents
- Dissemination
- Outreach
- Research
- Evaluation
- Tech Assistance



NIOSH - Future Directions for the NIOSH Fire Fighter Fatality Investigation and Prevention Program - Windows Internet...
http://www.cdc.gov/niosh/fire/future.html

File Edit View Favorites Tools Help

NIOSH - Future Directions for the NIOSH Fire Fighter...
CDC Home CDC Search CDC Health Topics A-Z

CDC **NIOSH** National Institute for Occupational Safety and Health
SAYERS • HEALTHIER • PEOPLE
Search NIOSH | NIOSH Home | NIOSH Topics | Site Index | Databases and Information Resources | NIOSH Products | Contact Us

Future Directions for the NIOSH Fire Fighter Fatality Investigation and Prevention Program (FFFIPP)

In 2006, the National Institute for Occupational Safety (NIOSH) undertook two complementary efforts to seek data and feedback to guide future directions of the NIOSH Fire Fighter Fatality Investigation and Prevention Program (FFFIPP). NIOSH sought stakeholder input at a public meeting and through a public docket, and conducted a national survey of U.S. fire departments focusing on the use of NIOSH recommendations and information products. NIOSH is making several modifications to the FFFIPP based on stakeholder input and survey results. The intent of these modifications is to ensure that the FFFIPP meets stakeholders' needs and to increase the impact of the FFFIPP on fire fighter safety and health. This document summarizes these modifications and future directions.

The public stakeholders' meeting was held on March 22nd, 2006. A total of 37 non-NIOSH attendees participated in the meeting, and presentations were given by individuals representing the U.S. Fire Administration (USFA), the National Volunteer Fire Council (NVFC), the National Fire Protection Association (NFPA), the National Fallen Firefighters Foundation (NFFF), the National Wildlife Coordinating Group (NWWCG), the International Association of Fire Chiefs (IAFC), and the International Association of Fire Fighters (IAFF), among others. Eleven individuals submitted written comments to the docket. NIOSH received considerable positive feedback about the FFFIPP, and suggestions for improving the FFFIPP. Information about the FFFIPP Stakeholder meeting and docket comments are available on the [NIOSH Docket 00663](#) page.

In the spring of 2006, RTI International conducted an evaluation of the FFFIPP under contract to the Centers for Disease Control and Prevention (CDC) [NIOSH is part of the CDC]. The evaluation was based on a nationwide survey of 3,000 fire departments and a series of focus groups with front-line fire fighters. The evaluation served to determine the extent to which FFFIPP reports, recommendations, and other products are being utilized by the fire service for training, development of procedures, guidelines, policies and practices, and other prevention efforts. The evaluation also helped to identify enhancements that could further the FFFIPP's impact.

Below is the summary of future directions for the FFFIPP based on stakeholder input and survey results, grouped into the following areas:

- [Investigations and fatality reports](#)
- [document production](#)
- [dissemination](#)
- [outreach](#)
- [research](#)
- [evaluation](#)
- [technical assistance](#)

NIOSH management and FFFIPP staff would like to thank all those who participated in the stakeholders' meeting, submitted comments to the docket, and responded to the evaluation survey and focus groups. It is the goal of the NIOSH FFFIPP to work with partners and stakeholders to decrease the number of fire fighter injuries, illnesses, and deaths across the country and around the world, and the constructive feedback provided has helped to strengthen these efforts.

This document is also available in PDF format.
[future.pdf](#)
(3 pages, 43kb)

Get Acrobat Reader

Related Resources:
[Fire Fighter Fatality Investigation and Prevention Program](#)

Traumatic Investigations

Progress and Changes since 2006 Public Stakeholder meeting



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FFFIPP Future Directions

- **Investigations**
- Documents
- Dissemination
- Outreach
- Research
- Evaluation
- Tech Assistance

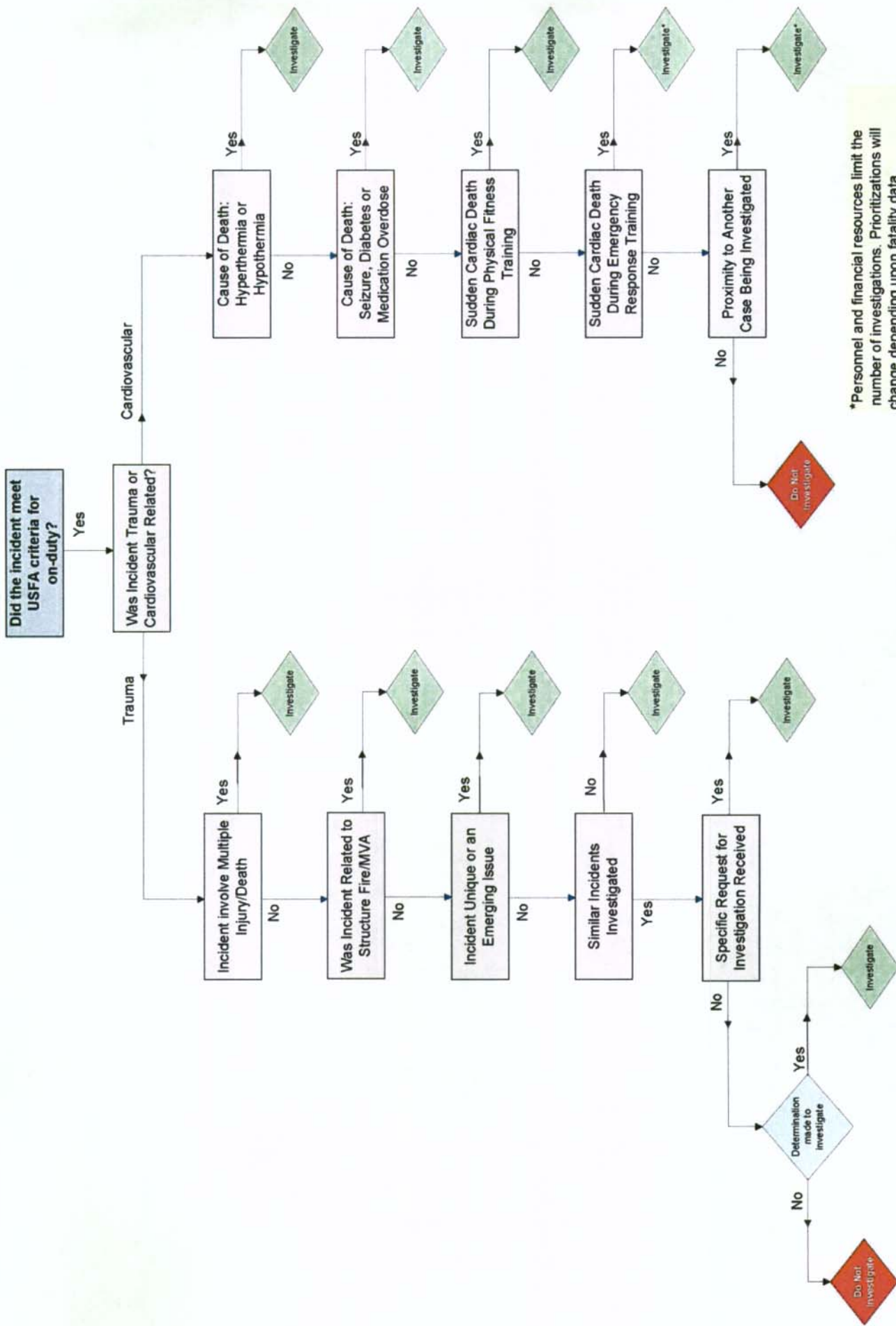


NIOSH Fire Fighter Fatality
Investigation and Prevention Program





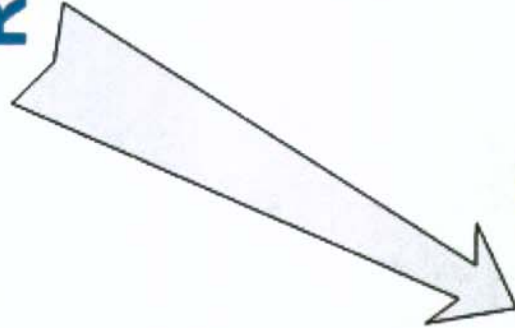
Fire Fighter Fatality Investigation and Prevention Program Prioritization Guideline – 2007*



*Personnel and financial resources limit the number of investigations. Prioritizations will change depending upon fatality data.

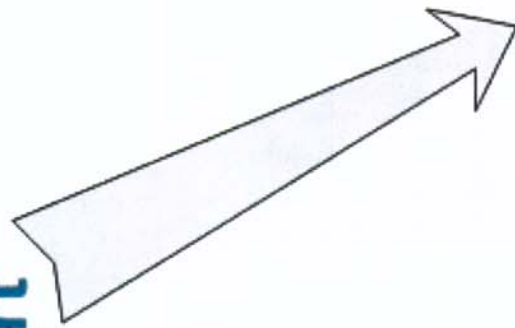
LODD

Report



Traumatic LODD

- Multiple LODD incidents
- Structure fire
- MVA
- New or Emerging Hazards



Medical LODD

- Hyper/Hypothermia
- Seizure, Diabetes, or Overdose
- Physical Fitness Training
- Responder Training



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FFFIPP Future Directions

- **Investigations**

- Training
- Safety Culture
- Fire Dynamics



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



More timely investigations

☞ 1998 – 2006 ~ 33 days

☞ During 2008 ~ 15 days

☞ FDs often request a delay



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Investigation Reports

- > 380 total reports
- Each report mailed to FD (and union) experiencing death
- Periodic mailings of selected reports to approx. 35,000 fire departments
- Available on NIOSH Webpage



NIOSH Fire Fighter Fatality Investigation and Prevention Program



Death in the line of duty...

July 1, 2004
Career Fire Fighter Dies Searching for Fire in a Restaurant/Lounge - Missouri

SUMMARY
 On February 18, 2004, a 40-year-old male career fire fighter (the victim) was fatally injured in a commercial restaurant/lounge structure fire. The victim, providing mutual aid, had been searching for the seat of the fire with two volunteer fire fighters from another department, when one of these fire fighters lost the seat on his self contained breathing apparatus (SCBA) face piece. The fire fighter immediately abandoned the nozzle position and retreated out of the building when his partner left. In the black smoke and zero visibility, the fire fighters were unaware that the victim was still inside the structure. Soon after, the Incident Commander (IC) ordered an emergency evacuation because of an imminent roof collapse, and an alarm signal was sounded. Personnel accounting indicated that a missing fire fighter (the victim) was still inside the building when the roof partially collapsed. After several search attempts, the victim was found in a face-down position with his mask and a thermal imaging camera cable entangled in a chair. His facemask was dislodged and not over his mouth. He was pronounced dead on scene.



Incident scene

The Fire Fighter Fatality Investigation and Prevention Program is conducted by the National Institute for Occupational Safety and Health (NIOSH). The purpose of the program is to determine factors that cause contribute to fire fighter deaths suffered in the line of duty, to identify the causes of these deaths, and to provide recommendations and safety strategies to develop strategies for preventing future similar incidents. The program does not seek to determine fault or place blame on fire departments or individuals. The program does not collect information on this report (specifically the case number shown in the table of information, visit the Program Website at www.cdc.gov/niosh/ffip or call toll free 1-800-351-0301).

Stakeholder Input

- **Subject Matter Expert (SME) involvement**

-  **NIOSH investigators**

-  **Consultants to NIOSH**

-  **PPE evaluations**

-  **Aerial ladder truck**

-  **Reports Peer reviewed**



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Open Investigations

- 49 Open Investigations
- 62 total LODDs
 - ☞ 33 cases involving 46 traumatic LODDs
 - ☞ 16 medical LODDs
- Investigator turnover



NIOSH Fire Fighter Fatality
Investigation and Prevention Program

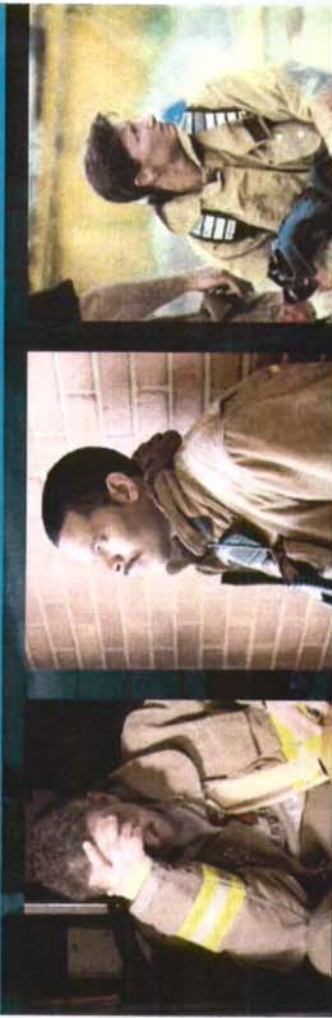


FFFIPP Future Directions

- Investigations
- **Documents**
- Dissemination
- Outreach
- Research
- Evaluation
- Tech Assistance



Fire Fighter Fatality Investigation and Prevention Program



Leading Recommendations for Preventing Fire Fighter Fatalities, 1998–2005

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health



WORKPLACE SOLUTIONS

From the National Institute for Occupational Safety and Health

Preventing Deaths and Injuries of Fire Fighters Working Above Fire-Damaged Floors

Summary

Fire fighters are at risk of falling through fire-damaged floors. Fire burning underneath floors can significantly degrade the floor system with little indication to fire fighters working above. Floors can fail within minutes of fire exposure, and new construction technology such as engineered wood floor joists may fail sooner than traditional construction methods. NIOSH recommends that fire fighters use extreme caution when entering any structure that may have fire burning beneath the floor.

concrete, and similar floor coverings that add weight and provide insulation because the floor may not feel warm.

Engineered wood I-joists represent a rising technology in the building sector; they offer several advantages over traditional construction methods. Engineered wood I-joists are typically prefabricated using sawn or structural composite lumber for the top and bottom flanges (usually 1 1/2 to 3 1/2 inches wide) and plywood or oriented strand board (OSB) sheathing for the vertical web (3/8 to 7/16 inches thick) (see Figure 1).

In typical residential construction, a standard 2" x 10" solid wood joist (see Figure 2) is replaced by an engineered wood I-joist 9 1/2 inches deep. Solid wood joists and engineered wood I-joists vary slightly in net dimension and cannot be used interchangeably in the same assembly. Engineered wood I-joists are lighter, stiffer, and will not warp, twist, or shrink like traditional framing materials. Engineered wood I-joists also reduce total construction time and labor costs by their ease of installation. Engineered wood I-joists have grown in use since the early 1990s and by 2005 were estimated to be used in



Figure 1. Engineered wood I-joist. Photo courtesy of APA-Engineered Wood Association.

more than half of all wood-frame construction [APA 2005]. Irreversible changes in the building construction industry driven by technological advancements and societal needs suggest that the use of engineered wood products will continue to grow.

The engineered wood I-joist has a different cross-sectional profile than a standard solid sawn wood joist, and in limited testing, burned more quickly. Typically, the thinner web was consumed first (see Figure 3). Limited

Workplace Solutions

Submitted for Final Clearance

Expected release by early 2009



DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health





MOSH ALERT

Preventing Deaths and Injuries of Fire Fighters When Fighting Fires in Unoccupied Structures



DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health



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Risk vs Gain Alert

Posted for peer review

Expected release spring 2009



May 2008 Safety Advisory on Improper Set-up of Aerial Ladder Waterways



SAFETY ADVISORY

Fire Fighter Fatality Investigation and Prevention Program

May 06, 2008

Improper Set-up of Aerial Ladders with a Locking Waterway May Put Fire Fighters at Risk

NIOSH recommends that all fire departments utilizing aerial ladder trucks with locking (pin-anchored, lever actuated, clamped) waterways immediately take the following actions to reduce the risk of fire fighters being struck by unsecured waterways or parts of the waterway:

- Ensure that Standard Operating Procedures (SOPs) and/or Guidelines (SOGs) on setting up self-position waterways include steps to properly position the waterway and to inspect and verify that the locking mechanism (anchoring pins), lever, clamps, etc.) are properly installed and functioning as designed before pressurizing the waterway.
- Property train and practice the correct method of securing waterways and verifying they are secured (per manufacturer's recommendations).

NIOSH is currently investigating an April 8, 2008 fire fighter line-of-duty-death that illustrates that adhering to manufacturer recommended set-up procedures for aerial ladder operations is paramount to ensuring fire fighter safety. Preliminary findings in this investigation suggest that some equipment designs do not provide secondary stops for the waterway on aerial ladders. Thus, failure to properly secure the waterway in the proper position can lead to catastrophic waterway failure and possible serious or fatal injury to fire fighters working in the area. The pin-anchored waterway design involved in this particular investigation is not limited to a single model or apparatus manufacturer. NIOSH is aware of at least 7 similar incidents that occurred in Delaware, Michigan, New Jersey, Texas, Virginia and Ontario without serious injury. Newer aerial ladder trucks may incorporate different types of anchoring mechanisms and/or a more fail-safe design but proper set up still needs to be verified before operation.

Circumstances of Incident under Investigation by NIOSH

On April 8, 2008, a volunteer Deputy Fire Chief (the Incident Commander), was killed when struck by a motorized water monitor and 30 feet of aluminum pipe that was "launched" off an elevated aerial ladder at a fire at an industrial manufacturing plant in Pennsylvania. The truck was normally transported in the "rescue mode" with the monitor pinned to the second section of ladder so that the waterway would not be in the way if the ladder was set up for rescue operations. At the incident scene, when the waterway was pressurized, the monitor and its support bracket, along with the last 30-foot section of pipe were "launched" off the aerial ladder by the force of the water pressure in the pipe. The monitor flew approximately 75 feet and fell, striking the Incident Commander on the head, killing him instantly. After the incident, the anchor pin was found on the ground, in front of the truck's cab. The waterway did not include any secondary mechanical stops to prevent the separation of the water monitor in the event the anchoring pin was not properly seated. The NIOSH Fire Fighter Fatality Investigation and Prevention Program is currently investigating this incident and a full report will be available at a later date.



Photo 1: A properly seated pin at the fly section for a stream operator is highlighted in the red circle. The hole behind it (yellow arrow) shows the location where the pin would be inserted (from the top) to keep the waterway from separating from the ladder section for use in rescue mode. NOTE: Visually inspect the pin-anchored waterway apparatus assembly to secure the waterway. The product represents a pin-anchored waterway design.

- Preliminary findings — several models without back-up safety devices and not an isolated incident
- 1 month after incident
- Recommendations for procedures and training

NIOSH

FFFIPP Future Directions

- Investigations
- Documents
- **Dissemination**
- Outreach
- Research
- Evaluation
- Tech Assistance



NIOSH Fire Fighter Fatality Investigation and Prevention Program



[Traumatic Occupational Injuries, Fire Fighter Fatality Investigation and Prevention Program - N](#) - Microsoft Internet Explorer
<http://www.cdc.gov/niosh/firehome.html>

[CDC Home](#) | [CDC Search](#) | [CDC Health Topics A-Z](#)

NIOSH National Institute for Occupational Safety and Health
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[NIOSH Safety and Health Topic:](#)

Traumatic Occupational Injuries

[Fire Fighter Fatality Investigation and Prevention Program](#)

Each year an average of 105 fire fighters die in the line of duty. To address this continuing national occupational fatality problem, NIOSH conducts independent investigations of fire fighter line of duty deaths. This web page provides access to NIOSH investigation reports and other fire fighter safety resources.

Fatality Investigation Reports
 To list all investigative reports completed for a particular state, click on the map or choose a state and/or incident year from the selection boxes and click on Submit.

State: Incident Year:

[Traumatic Occupational Injuries](#)
[Topic Index:](#)
[Traumatic Injuries Main](#)
[Fire Fighter Fatality Investigation and Prevention Program](#)
[List of All FF Reports](#)
[Program Description](#)
[Annual Report 2003 \(pdf file 400KB\)](#)
[Publications](#)
[SCBA Information](#)
[Links to other Fire Fighting-related Pages](#)

On this page...
[Fatality Investigation Reports](#)
[Recently Released Reports](#)
[Recent NIOSH Fire Fighter Safety Publications](#)

[Local Intranet](#)

Internet Resource

- All fatality investigation reports and publications
- 822,287 visits to webpage or specific investigation reports in 2007

The screenshot shows the NIOSH website interface. At the top, there is a navigation bar with the CDC logo and the NIOSH logo. Below this, there is a search bar and a list of links including 'CDC Home', 'CDC Search', 'CDC Health Topics A-Z', 'Search NIOSH', 'NIOSH Home', 'NIOSH Topics', 'Site Index', 'Databases and Information Resources', 'NIOSH Products', and 'Contact Us'. The main content area is titled 'Traumatic Occupational Injuries' and features a sub-section for 'Fire Fighter Fatality Investigation and Prevention Program'. This section includes a paragraph explaining the program's purpose, a map of the United States with state boundaries, and a legend for the number of NIOSH Fire Fighter Fatality Investigations. The map shows various states highlighted in different colors, indicating the number of investigations. Below the map, there are dropdown menus for 'State' and 'Incident Year', and buttons for 'Submit' and 'Reset'. On the right side of the page, there is a 'Local Intranet' link and a 'Topic Index' section with links to 'Traumatic Injuries Main', 'Fire Fighter Fatality Investigation and Prevention Program', 'List of All F.F. Reports', 'Program Description', 'Annual Report 2003', 'Leaf file 400158', 'Publications', 'SCBA Information', 'Links to other Fire Extinguisher-related Pages', and 'On this page...'. The browser's address bar shows the URL 'http://www.cdc.gov/niosh/ffr/home.html'.

• <http://www.cdc.gov/niosh/fire/>



NIOSH Fire Fighter Fatality Investigation and Prevention Program



Report Dissemination



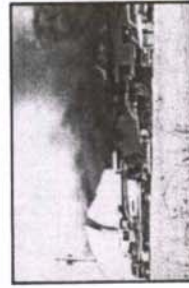
A Summary of a NIOSH fire fighter fatality investigation

Death in the line of duty...

July 1, 2004

Career Fire Fighter Dies Searching for Fire in a Restaurant/Lounge - Missouri

SUMMARY
On February 18, 2004, a 40-year-old male career fire fighter (the victim) was fatally injured in a commercial restaurant/lounge structure fire. The victim, providing mutual aid, had been searching for the seat of the fire with two volunteer fire fighters from another department, when one of these fire fighters lost the seat on his self contained breathing apparatus (SCBA) face piece. The fire fighter immediately abandoned the nozzle position and retreated out of the closest door. The backup fire fighter also retreated out of the building when his partner left. In the black smoke and zero visibility, the fire fighters were unaware that the victim was still inside the structure. Soon after, the Incident Commander (IC) ordered an emergency evacuation because of an imminent roof collapse, and an air horn signal was sounded. Personnel accounting indicated that a missing fire fighter (the victim) was still inside the building when the roof partially collapsed. After several search attempts, the victim was found in a face-down position with his mask and a thermal imaging camera cable entangled in a chair. His facemask was dislodged and not over his mouth. He was pronounced dead on scene.



Incident scene

ensure that the IC maintains the role of directing fireground operations for the duration of the incident or until the

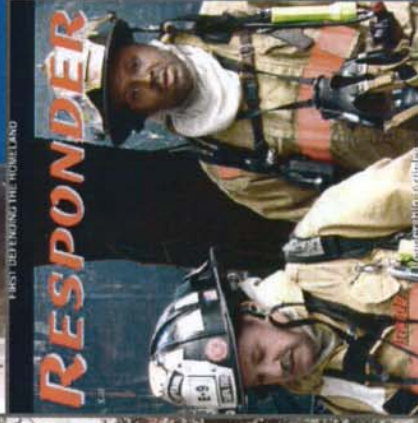
The Fire Fighter Fatality Investigation and Prevention Program is conducted by the National Institute for Occupational Safety and Health (NIOSH). The purpose of the program is to determine factors that cause or contribute to fire fighter deaths suffered in the line of duty, identify the contributing factors, and disseminate the findings to researchers and safety specialists to develop strategies for preventing future similar incidents. The program does not work to determine fault or place blame on fire departments or individual fire fighters. To request additional copies of the report, contact the NIOSH Information Office (see contact sheet), other fatality investigation reports, or further information, visit the Program Website at www.cdc.gov/niosh/workplace.html or call toll free 1-800-35-NIOSH.



NIOSH Fire Fighter Fatality Investigation and Prevention Program



Reprinting of Investigation Summaries in Fire Service Journals



Approx.
combined
circulation of
300,000



Stakeholder Input

- Identify and disseminate equipment problem information
 - Aerial Ladder Truck LODD
 - Safety Advisory posted ~ 1 month
 - Field investigation / SME participation
 - Draft Advisory with peer review
 - Expedite clearance approval process
 - **Framework set for future cases**



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FFFIPP Future Directions

- Investigations
- Documents
- Dissemination
- **Outreach**
- Research
- Evaluation
- Tech Assistance



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Outreach to Stakeholders

- NIOSH Liaison to IAFC SH&S
- NIOSH Liaison to NVFC
- Contact with FD SOA
- NFPA Committee work
 - ➔ 1500, 1852, 1981,
 - ➔ 1982 PASS issues



NIOSH Fire Fighter Fatality
Investigation and Prevention Program





WWW.IAFC.ORG/SAFETYWEEK JUNE 22-28, 2008

NATIONAL FIRE SERVICE SEAT BELT PLEDGE

NVFC HEART-HEALTHY
FIREFIGHTER PROGRAM

National Firefighter Health Week

August 18-22, 2008



www.healthy-firefighter.org



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Comment on ISO FSRS 2009 Proposal



FIRE SUPPRESSION RATING SCHEDULE



Outreach to Stakeholders

. Conferences and Presentations

- IAFC FRI 2006, 2007, 2008
- IAFF Biannual Meeting 2006 & 2008
- IAFF Redmond Symposium 2007
- NIST FIRE Conference 2006, 2007, 2008
- Northern VA Professional FOA 2008
- Colorado State Fire Chiefs (Dec 2008)



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Outreach to Stakeholders



Department of Health and Human Services
Centers for Disease Control and Prevention

National Institute for
Occupational Safety and Health

NIOSH Science Blog



As NIOSH enters the 10th year of the Fire Fighter Program we are working to better reach small and rural fire departments with the results of our fatality investigation reports and prevention recommendations. We request your assistance in helping us achieve this goal. Please see the questions at the end of this blog and provide your input in the comment section below

<http://www.cdc.gov/niosh/blog/index.htm>



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FFFIPP Future Directions

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NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FF Research

- Anthropometric study
- Boot size study
- Wildland FF Inhalation



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



FFFIPP Future Directions

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- **Evaluation**
- Tech Assistance



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Fire Fighter Fatality Investigation and Prevention Program Evaluation

Executive Summary

June 2008

Prepared for the

National Institute for Occupational Safety and Health

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The findings and conclusions in this report are those of the authors, and do not necessarily represent the views of the National Institute for Occupational Safety and Health.

*RTI International is a trade name of Research Triangle Institute.

RTI Report

The NIOSH logo is displayed in white on a dark blue background. It consists of the word "NIOSH" in a bold, sans-serif font, with a stylized graphic element to the left of the letters "I" and "O" that resembles a flame or a protective shield.

FFFIPP Future Directions

- Investigations
- Documents
- Dissemination
- Outreach
- Research
- Evaluation
- **Tech Assistance**

CDC



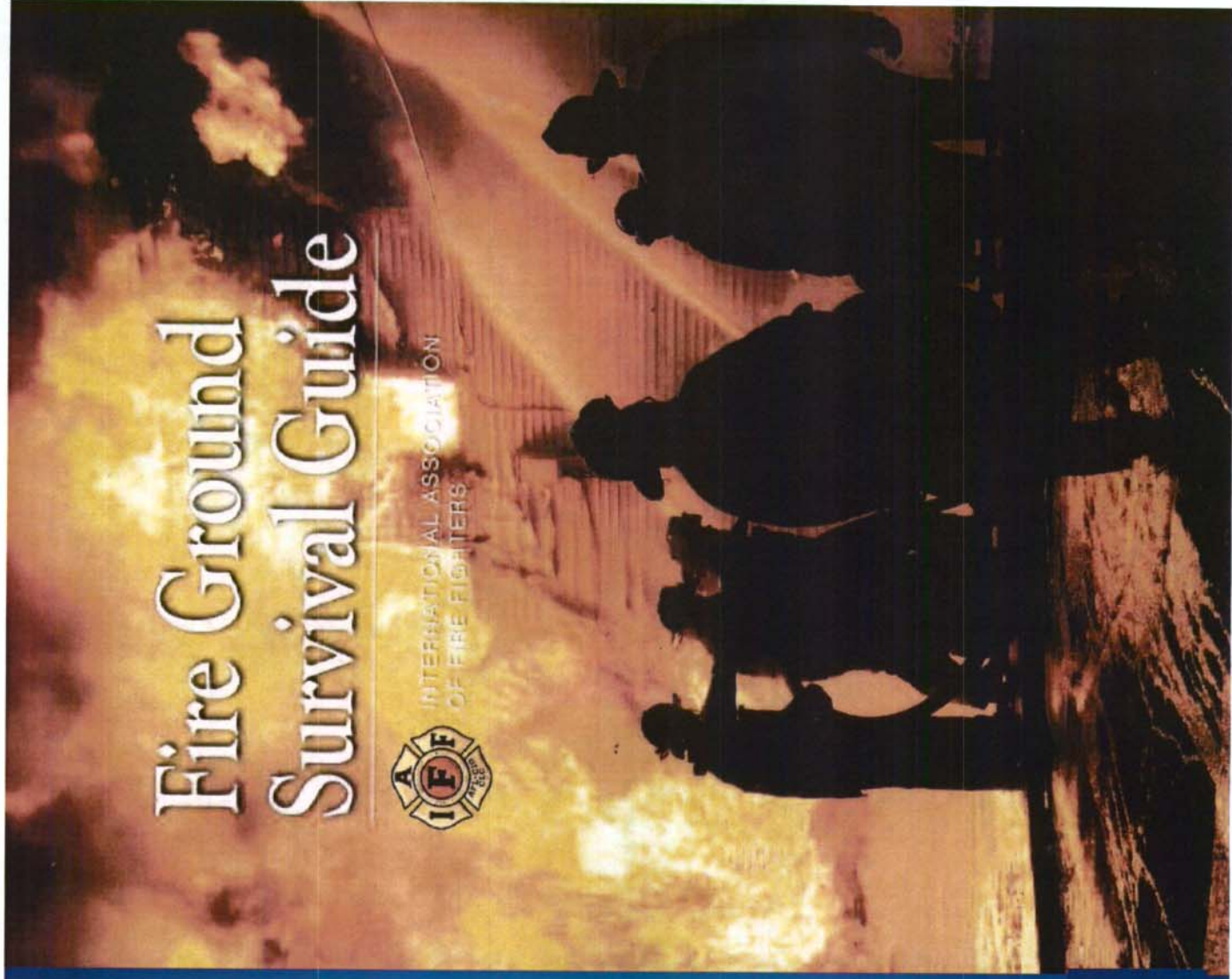
Fire Ground Survival Guide



INTERNATIONAL ASSOCIATION
OF FIRE FIGHTERS

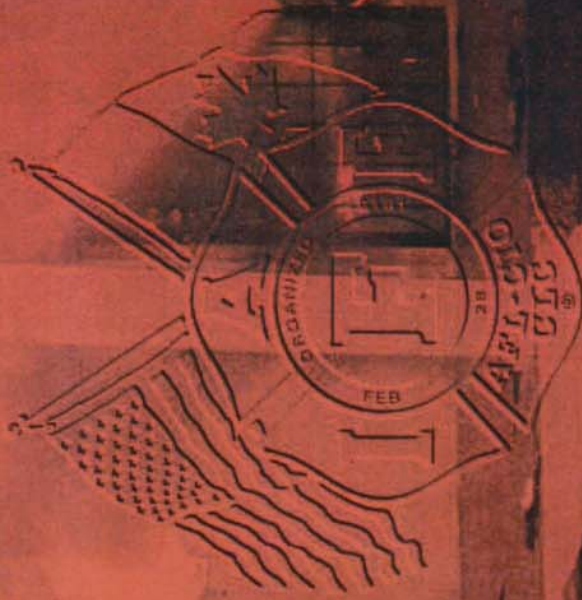
IAFF Fire Ground Survival Guide

March 2008
Presentation at the
NFA EFO Graduate
Symposium



**IAFC / IAFF LODD
Investigation
Manual**

**Fire Fighter Line-of-Duty
Death & Injury
Investigations**



**NIOSH Fire Fighter Fatality
Investigation and Prevention Program**



Technical Assistance to Stakeholders

 Review DHS/USFA Fire Grant Proposals

 DHS Advanced First Responder Locator Working Group.



NIOSH Fire Fighter Fatality Investigation and Prevention Program



Tim Merinar, MS
Fire Fighter Fatality Investigation and
Prevention Program
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NIOSH, Division of Safety Research

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NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Dr. Thomas Hales

NIOSH National Institute for
Occupational Safety and Health



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



NIOSH FF Program: Changes in the Cardiovascular Disease (CVD) Component

Thomas Hales, MD, MPH

Tommy Baldwin, CSP



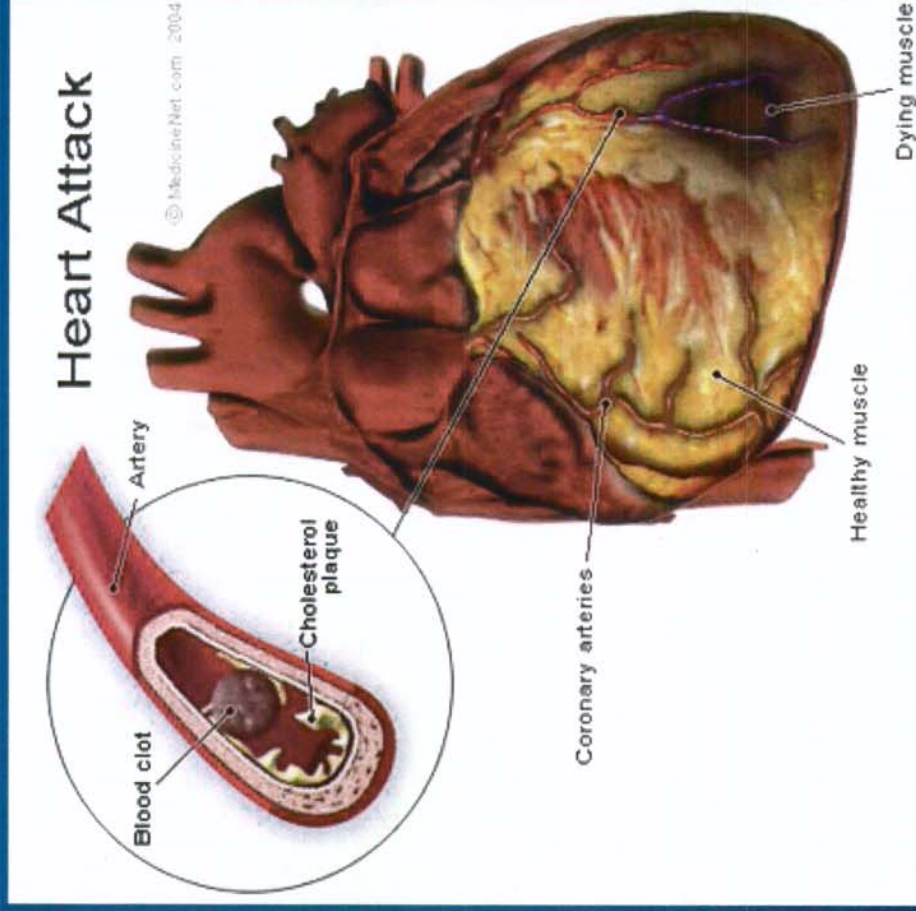
**NIOSH Fire Fighter Fatality
Investigation and Prevention Program**



2006 Stakeholder Meeting Future Directions

- Investigations
- Documents
- Dissemination
- Outreach
- Research
- Evaluation

Technical Assistance
NIOSH Fire Fighter Fatality Investigation and Prevention Program

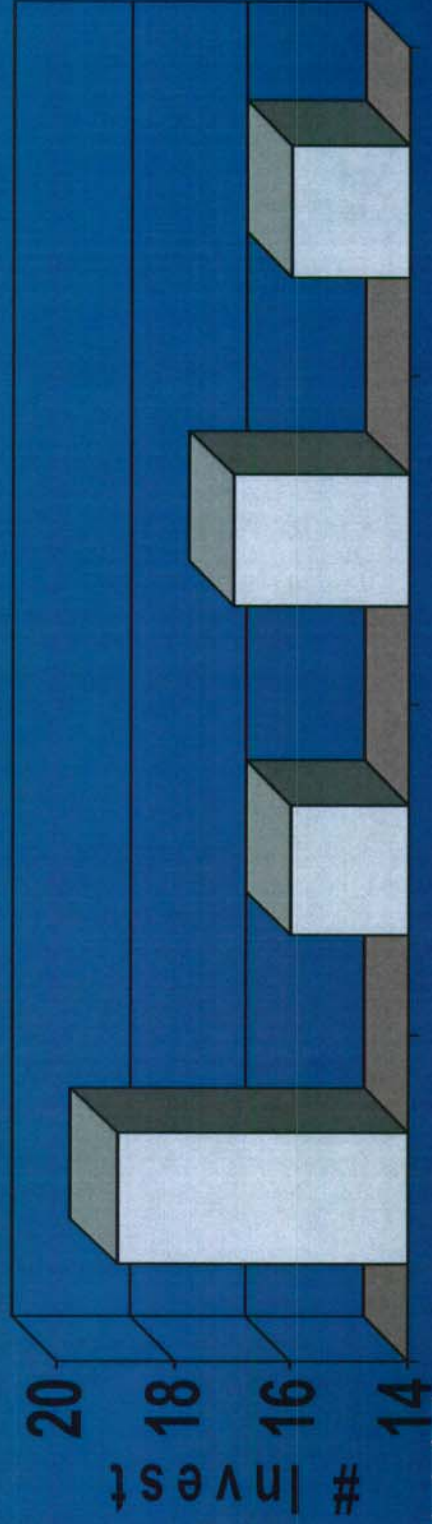


NIOSH

Cardiac Investigations & Reports

- Main focus
- Current level

Why? Level funding X 10 years



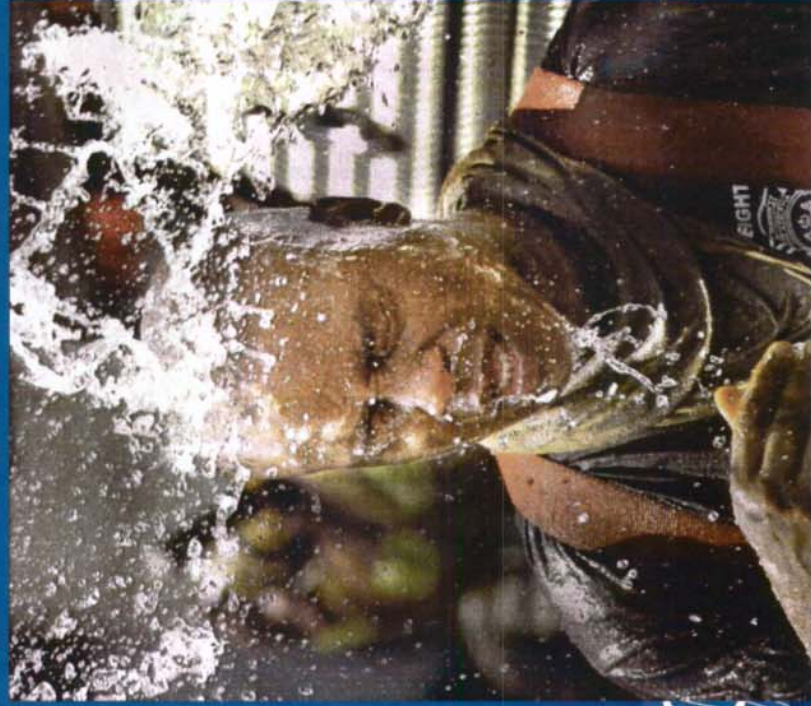
CDC

<2006 NIOSH Firefighter Fatality 2007 Investigation and Prevention Program

2008 NIOSH

Cardiac Investigations & Reports

- Transparent prioritization process
 - Hypo- & Hyper-thermia
 - Seizures, Diabetes, or medications
 - Training
 - Emergency response
 - Physical fitness

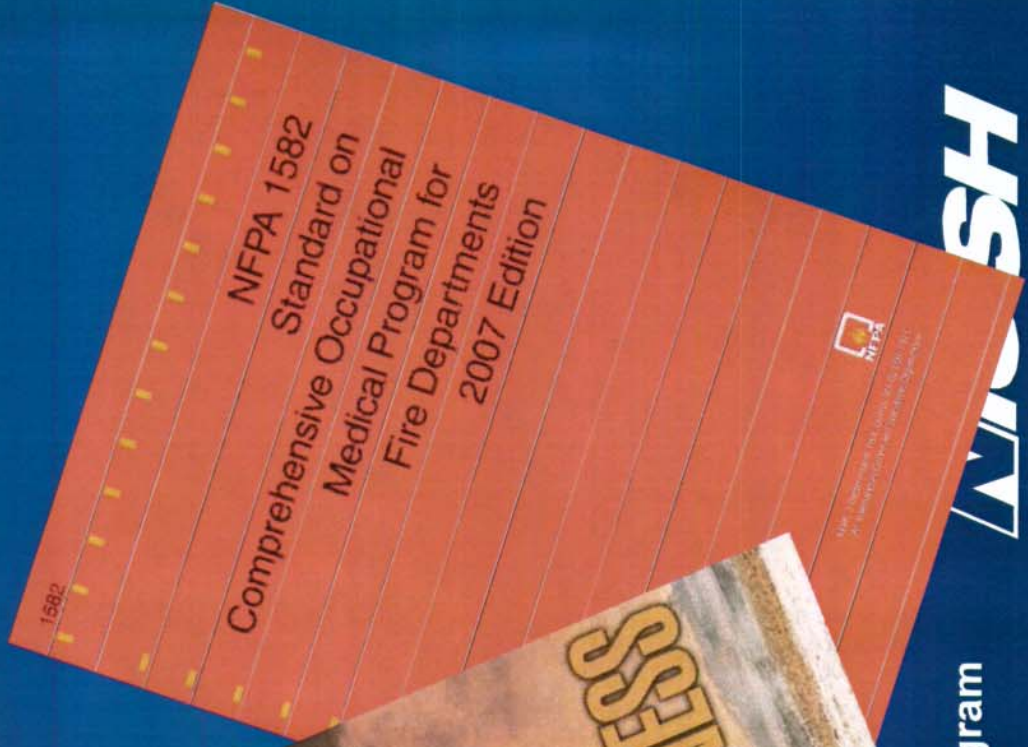
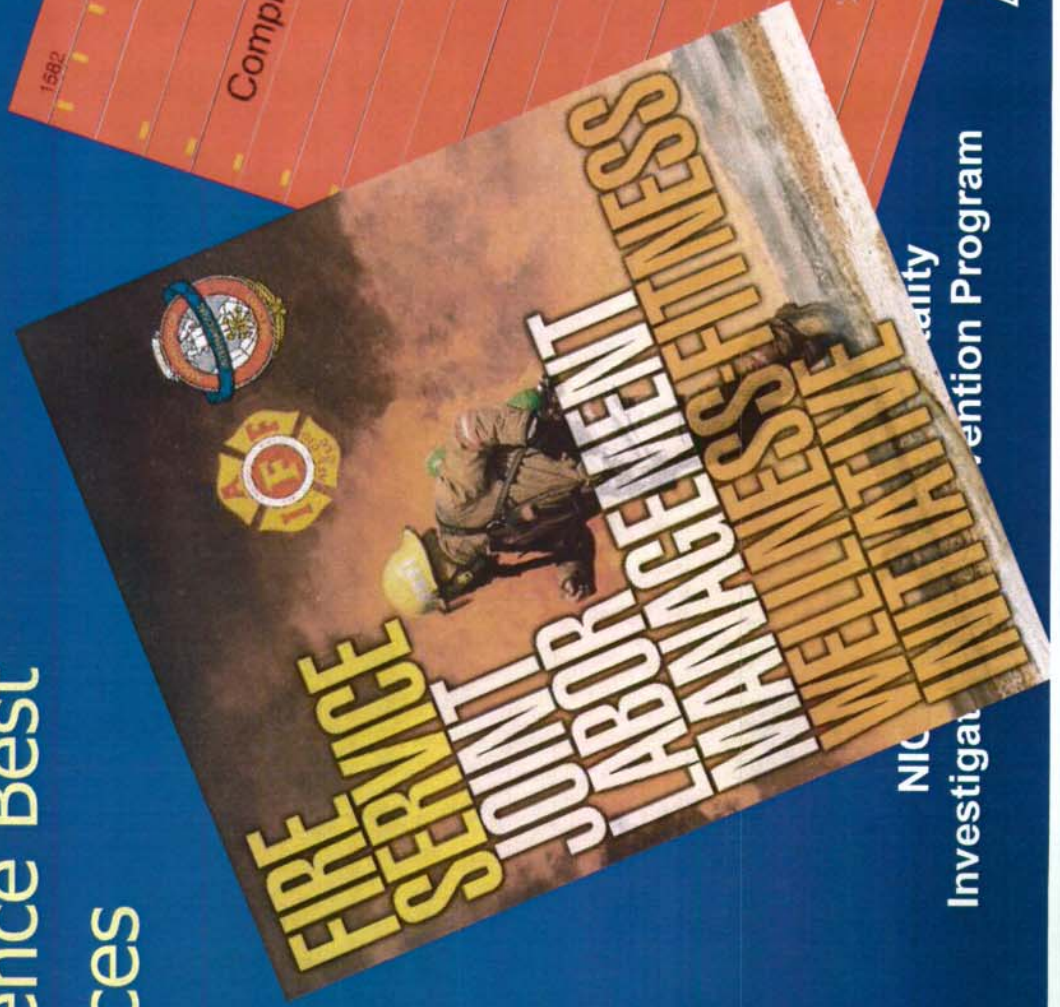


Fighter Fatality
Prevention Program

MOSH

Cardiac Investigations & Reports

- Reference Best Practices



NIC
Investigat
Safety
vention Program



Cardiac Investigations & Reports

- Non-fatal
- ~1000 on-duty non-fatal cardiac events
- 1 investigated



NIOSH Fire Fighter Fatality
Investigation and Prevention Pro



Health Hazard
Evaluation
Program



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Cardiac Investigations & Reports

- Timely reports
 - Site visit:
 - 6 months

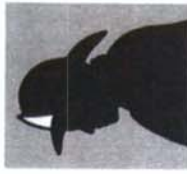


NIOSH F
Investigation and Prevention Program



Investigations

- Timely reports
 - Site visit:
 - 6 months
 - Report
 - 4 months



F2008-31 Fire Fighter Fatality Investigation Team Report Date: October 2008

Deputy Fire Chief Suffers Sudden Cardiac Arrest About One Hour After Conducting a Fire Prevention Inspection - California.

SUMMARY: On June 26, 2008, the Deputy Fire Chief reported to duty at 0800 hours. About three hours later he performed a fire prevention inspection of a local apartment building. Before returning to headquarters he stopped by one of the fire stations to visit with fellow fire fighters. While sitting at the kitchen table, the Deputy Chief collapsed. Despite immediate advance life support measures in the fire station, ambulance, and hospital emergency department, the Deputy Chief died. An autopsy performed by a forensic pathologist in the Office of the County Coroner concluded "left ventricular cardiac hypertrophy (years)" was the cause of death. The NIOSH investigator concluded that the Deputy Chief's sudden cardiac death was most likely due to a heart arrhythmia associated with high blood pressure, left ventricular hypertrophy, and an enlarged heart; a conclusion consistent with the County Coroner's autopsy report. The evidence does not suggest that the fire prevention inspection conducted by the Deputy Chief about an hour before his cardiac arrest triggered his heart arrhythmia.

The NIOSH investigator offers the following recommendations to reduce the risk of on-duty heart attacks and sudden cardiac deaths in this and other fire departments across the country. It is unlikely, however, that these recommendations could have prevented the Deputy Chief's sudden cardiac death.

- *Ensure all uniformed members of the Fire Protection District receive annual medical and fitness evaluations.*
- *Limit the number of consecutive shifts a fire fighter can work.*



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Investigations

- Timely reports

- Site visit:

- 6 months

- Report

- 4 months

- Disseminate

- 6 months



**NIOSH Fire Fighter
Investigation and Preven**



NIOSH
Fire Fighter Fatality Investigation
and Prevention Program

Death in the line of duty...

Fire Chief Suffers Sudden Cardiac Death While Returning to the Fire Station After a Structure Fire – Georgia

November 7, 2005

SUMMARY

On December 13, 2004, a 56-year-old male career Fire Chief responded to three fire calls, including two residential and one commercial fire. After the last fire, the Chief returned to the scene to "cordon off" the scene. As he was driving the rescue truck back to the fire station, he suddenly collapsed. The truck left the roadway, struck a culvert, and came to a stop. Witnesses called 911 and removed the Chief from the truck. Despite cardiopulmonary resuscitation (CPR) and advanced life support (ALS) performed by bystanders, crew members, ambulance service paramedics, and hospital emergency department (ED) personnel, the Chief died. The death certificate, completed by the Deputy Coroner, listed "cardiorespiratory arrest" due to "ASCVD" (atherosclerotic cardiovascular disease) as the cause of death. No autopsy was performed. The NIOSH investigator concluded the physical stress of responding to three structure fires, assisting with on-scene operations, and the Chief's underlying atherosclerotic cardiovascular disease all contributed to his sudden cardiac death.

NIOSH investigators offer the following recommendations to prevent similar incidents or to address general safety and health issues:

Provide pre-placement and annual medical evaluations to ALL fire fighters to determine their medical ability to perform duties without presenting a significant risk to the safety and health of themselves or others.

Consider including exercise stress tests (EST) for male fire fighters over the age of 45 years with two or more risk factors for coronary artery disease (CAD) as part of the annual medical evaluation.

Phase in a mandatory wellness/fitness program for fire fighters to reduce risk factors for cardiovascular disease and improve cardiovascular capacity.

Ensure that fire fighters are cleared for duty by a physician knowledgeable about the physical demands of fire fighting, the personal protective equipment used by fire fighters, and the various components of NFPA 1582. Standard on Comprehensive Occupational Medicine Program for Fire Departments.

Perform an annual physical performance (physical ability) evaluation to ensure fire fighters are physically capable of performing the essential job tasks of structural fire fighting.

Use a secondary (technological) test to confirm appropriate placement of the endotracheal (ET) tube during emergency intubations.

Perform an autopsy on all on-duty fire fighter fatalities.

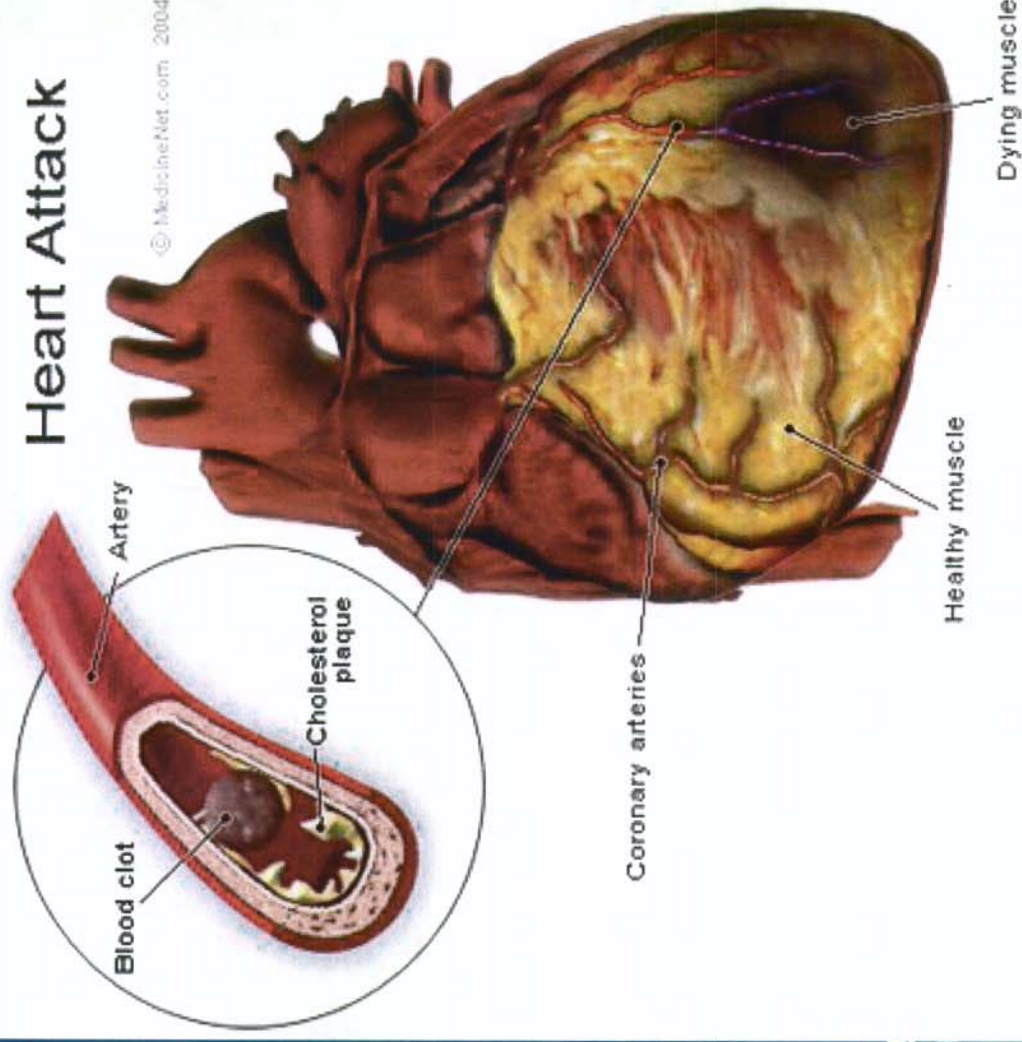
Provide fire fighters with medical evaluations and clearance to wear self-contained breathing apparatus (SCBA).

Consider annual respirator fit testing.

The Fire Fighter Fatality Investigation and Prevention Program is conducted by the National Institute for Occupational Safety and Health (NIOSH). The purpose of the program is to determine factors that cause or contribute to fire fighter deaths suffered in the line of duty, identification of causal and contributing factors enable researchers and safety specialists to develop strategies for preventing future similar incidents. The program does not seek to determine fault or place blame on fire departments or individual fire fighters. To request additional copies of this report (except the case number shown in the book cover), other facility investigation reports, or fact sheets, visit the Program Website at www.cdc.gov/niosh or call toll free 1-800-351-NIOSH.

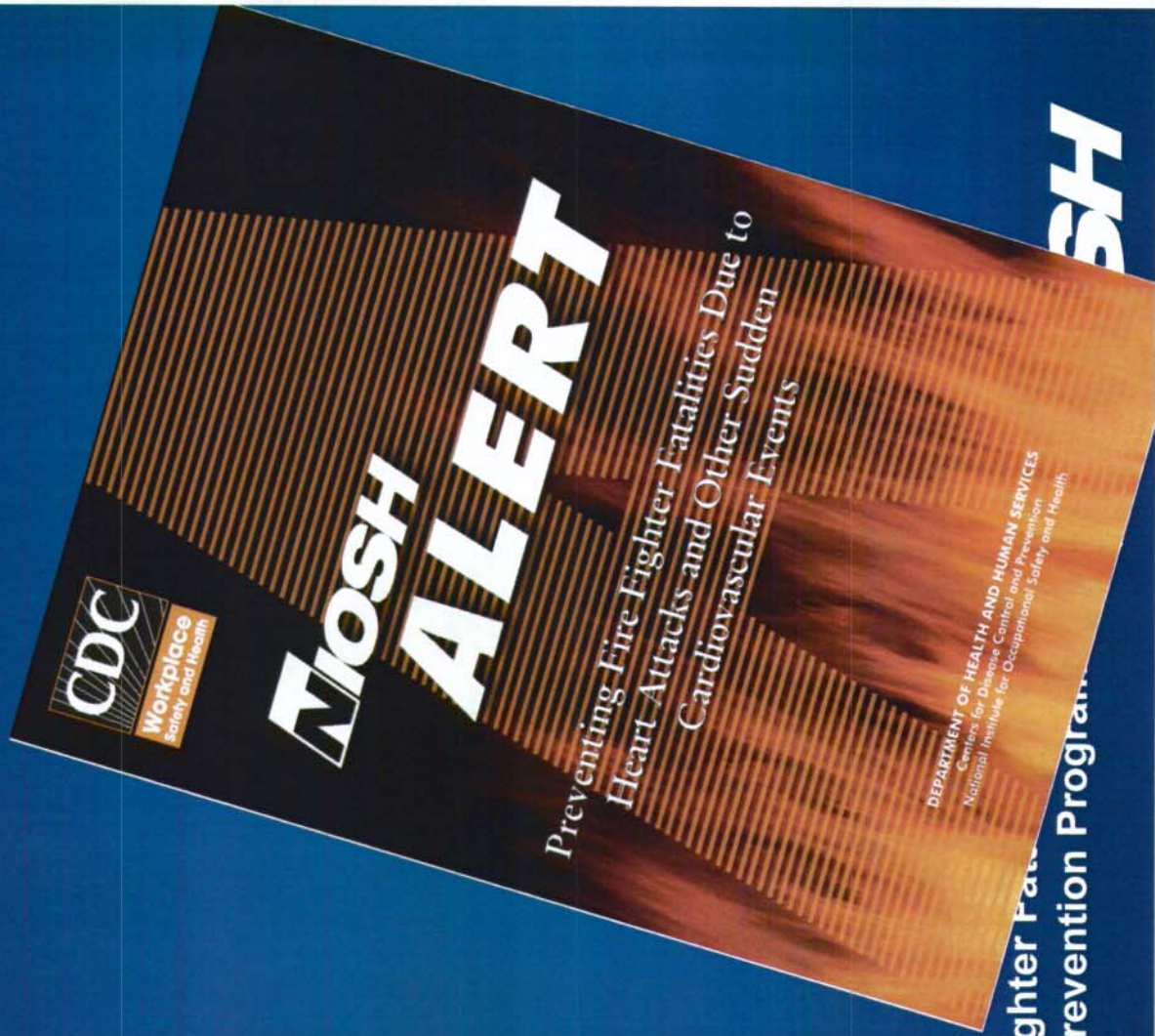
2006 Stakeholder Meeting Future Directions

- Investigations
- Documents
- Dissemination
- Outreach
- Research
- Evaluation
-  NIOSH Fire Fire Investigation and P



Documents

- NIOSH
— Alerts



NIOSH Fire Fighter Fatalities
Investigation and Prevention Program

SH

Documents

- NIOSH
- Alerts
- Technical document



NIOSH Fire Fighter
Investigation and Preve

Fire Fighter Fatality Investigation and Prevention Program



Leading Recommendations for Preventing
Fire Fighter Fatalities, 1998–2005

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health



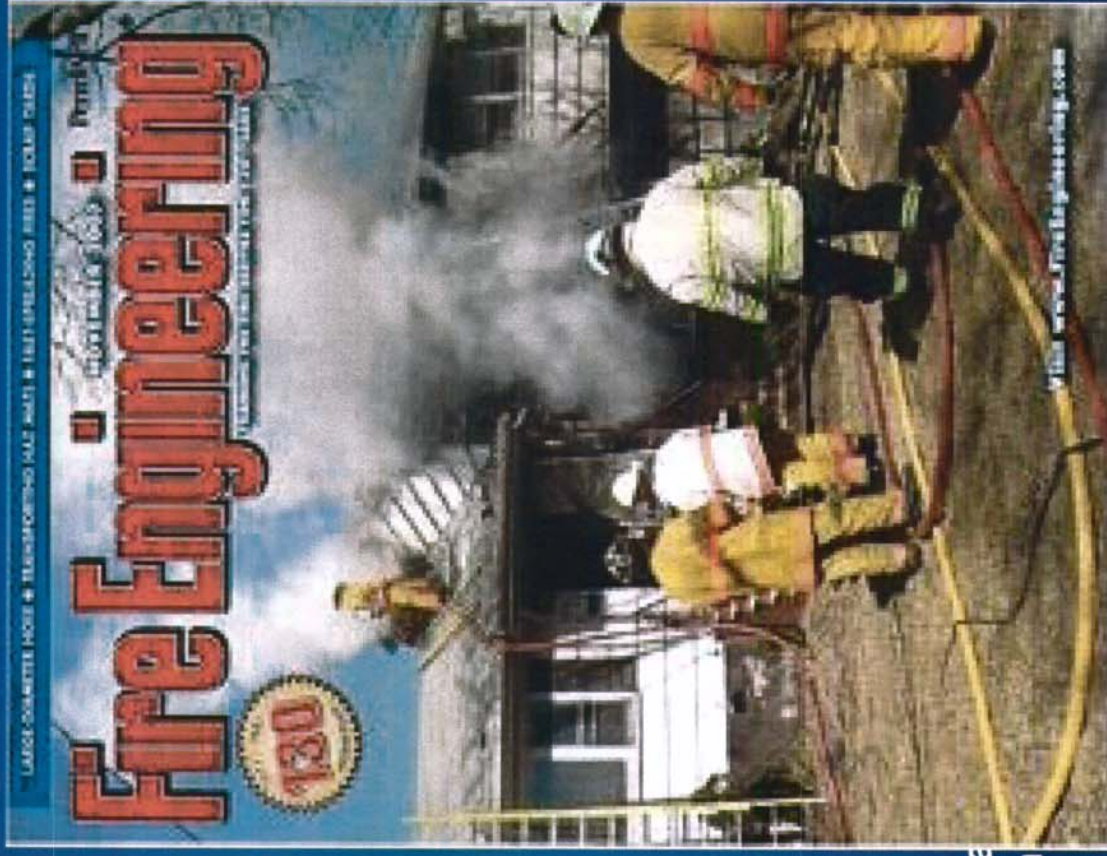
CDC
Workplace
Safety and Health



Documents

- NIOSH
 - Alerts
 - Technical Documents

- Trade Journals



NIOSH Fire Fighter Fatal
Investigation and Prevention

Documents

- NIOSH
 - Alerts
 - Technical Documents
- Trade Journals
- Blog
 - NIOSH
 - PERI

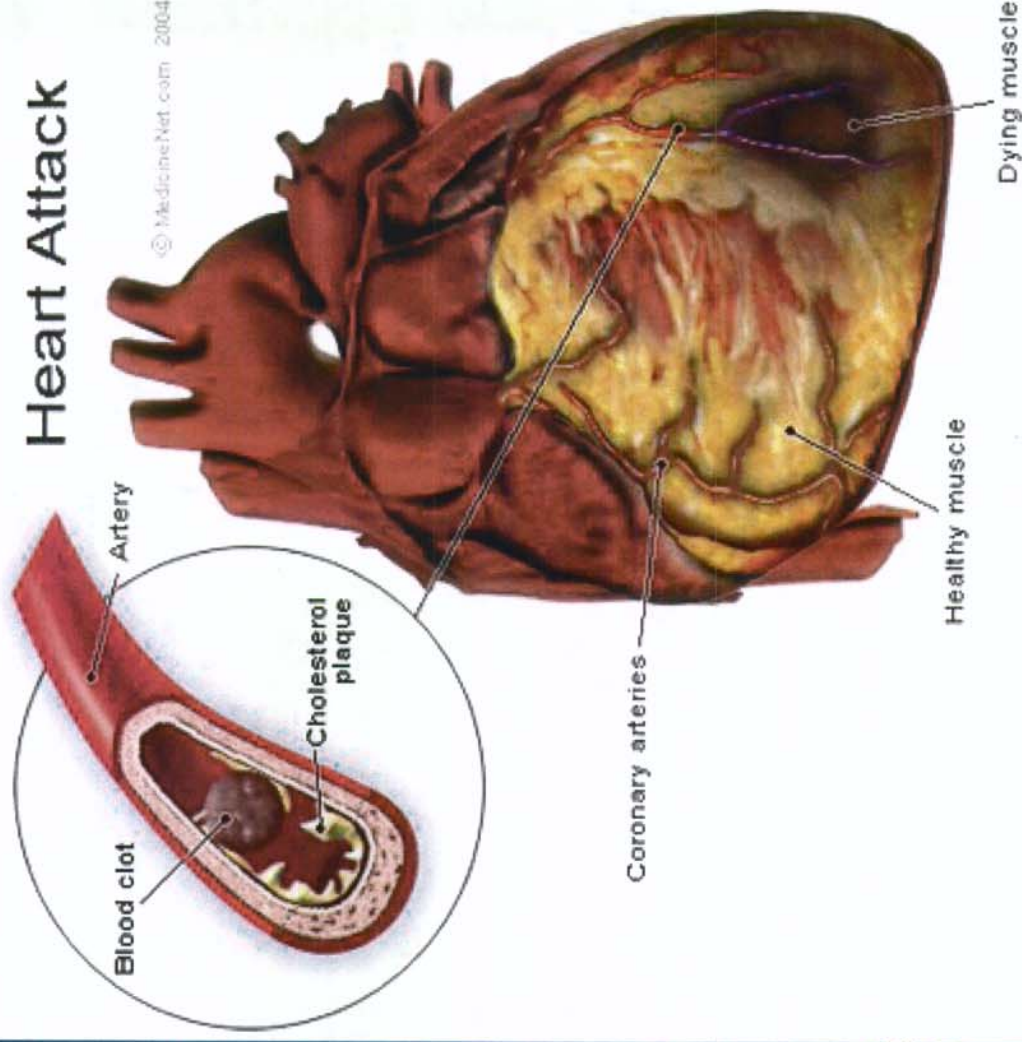


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Investigation and Prevention Program



2006 Stakeholder Meeting Future Directions

- Investigations
- Documents
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- Evaluation
-  **ASST** Investigation and P NIOSH Fire Fi



Outreach

- Presentations
 - NFPA
 - IAFF Redmond
 - IAFC
 - CFSI
 - TRADE – National Fire Academy
- NVFC
 - Wellness and fitness programs



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Outreach

- NFPA – Technical Committee
1581 – Infection Control
1582 – Occup Med Prgm
1584 – Rehabilitation

- IAFF HazMat/WMD
Advisory Board

- FF Cancer Support
Network



NIOSH Fire Fighter Fatality
Investigation and Prevention Program



Outreach

- Attended Conferences/Mtgs
 - FDIC
 - NFFF
 - Life Safety Summits

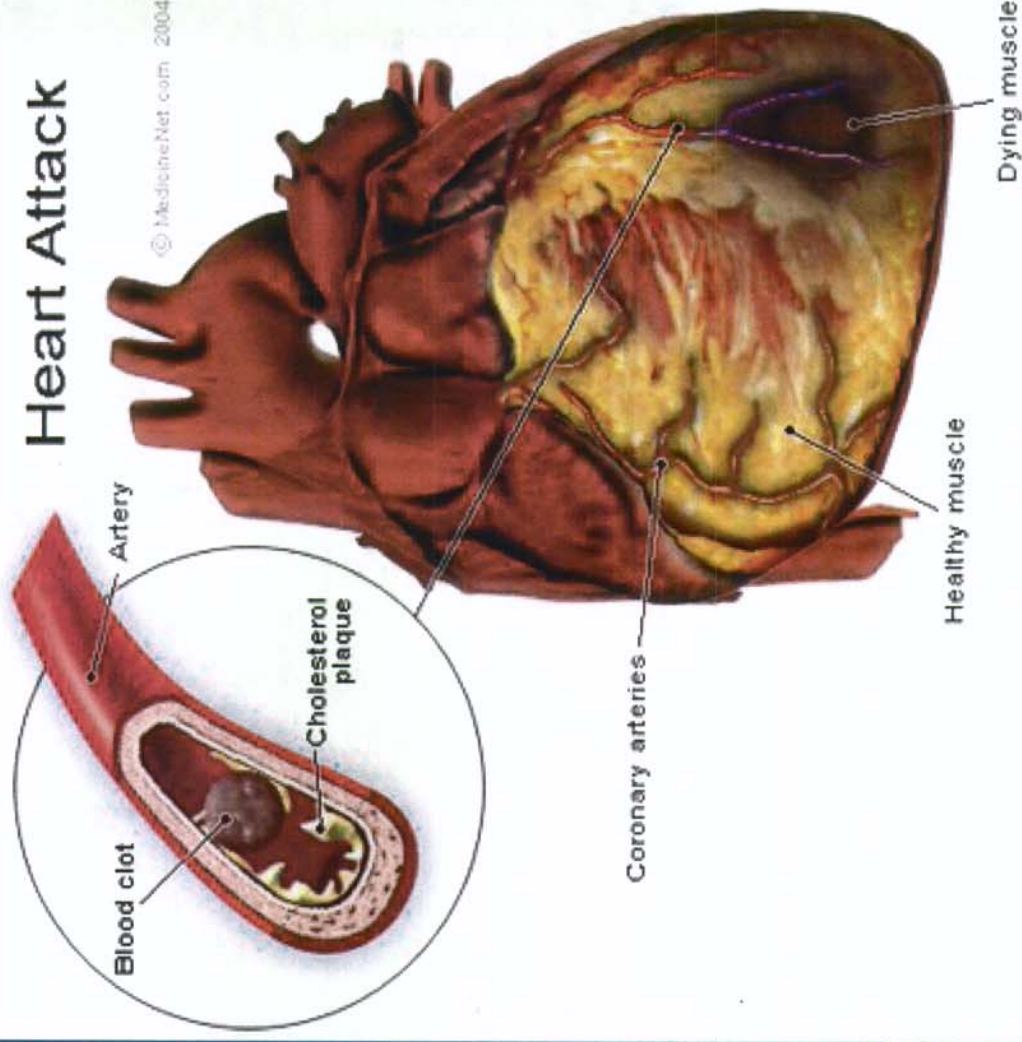


NIOSH Fire Fighter Fatality
Investigation and Prevention Program



2006 Stakeholder Meeting Future Directions

- Investigations
- Documents
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- Evaluation
-  NIOSH Fire Fire Investigation and P



Research

- Leverage resources to conduct research

- External to NIOSH

DHS Fire Act Grants-

Firefighter Safety Research and Development Activity

- reviewers



NIOSH Fire Fighter
Investigation and Prevention

Research - Internal

NIOSH NORA

Cancer and heart disease study

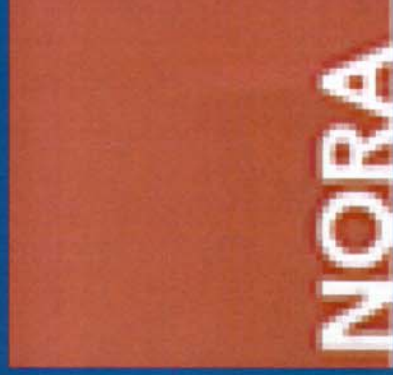
NIOSH HHE program

- Cyanide – Providence FD
- Exposures during motor vehicle fire suppression
- CO exposure during water rescue with Jet boats

 Navy materials extraction

NIOSH Fire Fighter Fatality

NIOSH Fire Fighter Fatality

A banner for the NIOSH Health Hazard Evaluation Program. On the left is the NIOSH logo (National Institute for Occupational Safety and Health). To its right is the text "Health Hazard Evaluation Program". Below the text are three small photographs: a person in a white protective suit, a person in a dark uniform, and a person in a white protective suit. On the right side of the banner is the CDC logo (U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health).

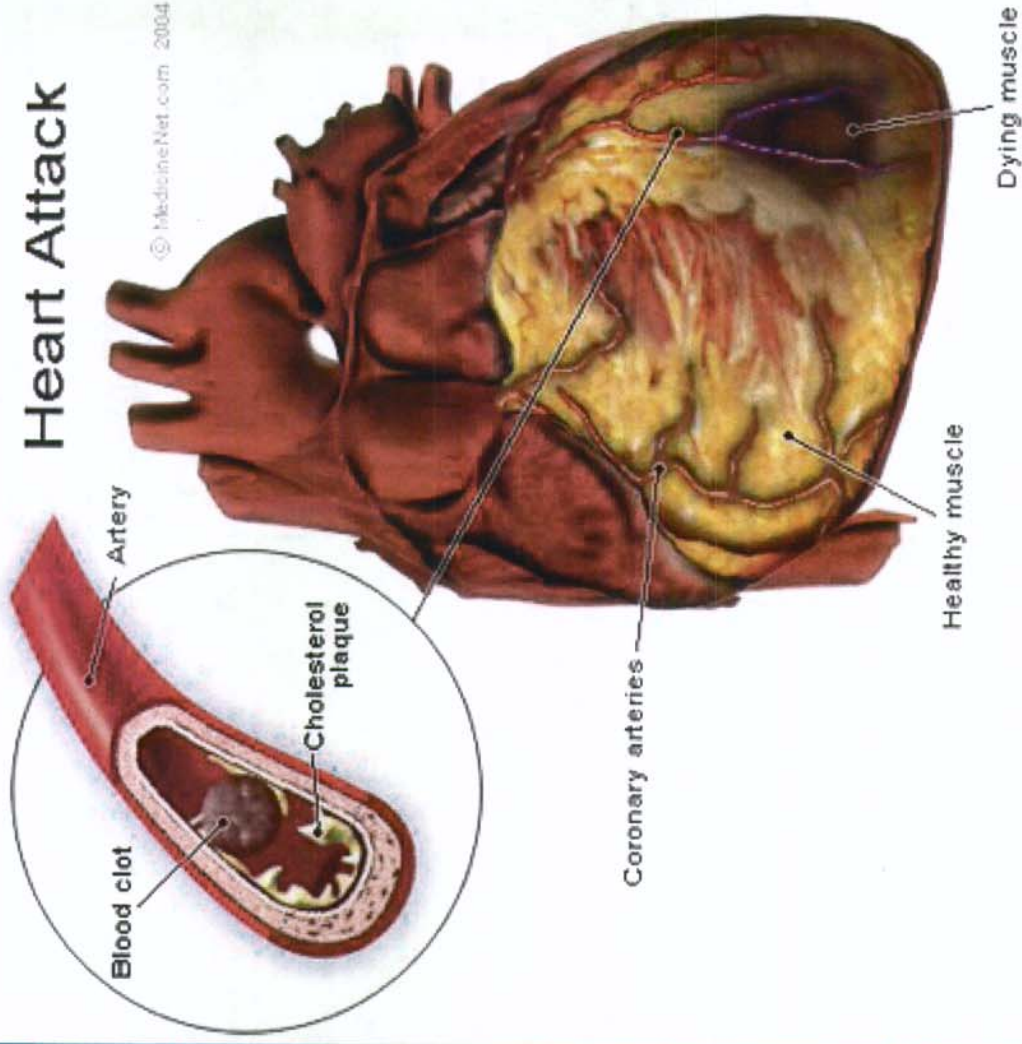
2006 Stakeholder Meeting Future Directions

- Investigations
- Documents
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- Evaluation

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NIOSH Fire Fire
Investigation and P

Heart Attack



Pilot Surveys to Assess Impact of the NIOSH FF Program

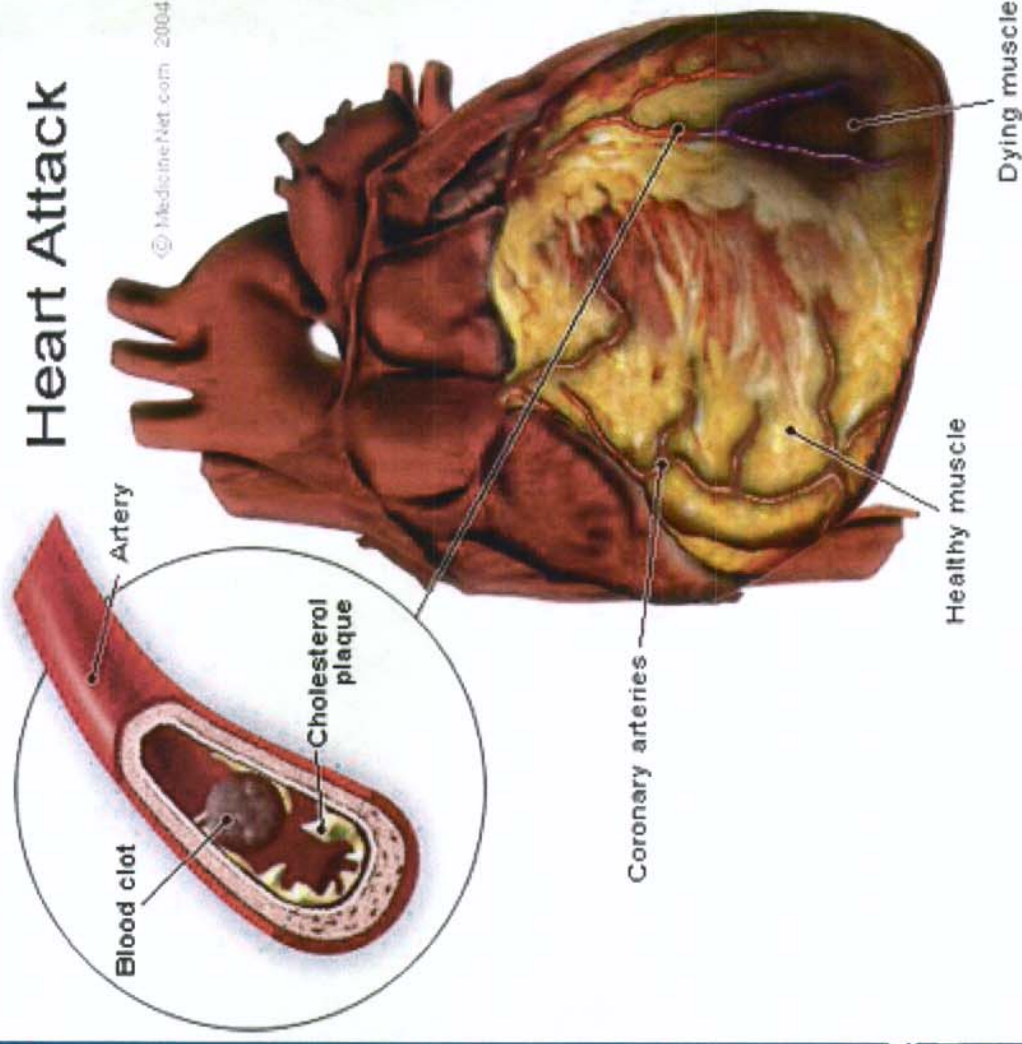
- Report
- 1-year After Report



NIOSH Fire Fighter
Investigation and Prever

2006 Stakeholder Meeting Future Directions

- Investigations
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- Outreach
- Research
- Evaluation
-  NIOSH Fire Fighting Investigation and Prevention



Technical Assistance

- Info to FD not getting an investigation

All FD with CVD Fatality get a telephone call

Share resources at that time



NIOSH Fire Fighting Community
Investigation and Prevention Program





The findings and conclusions in this presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination or policy.



NIOSH Fire Fighter Fatality Investigation and Prevention Program

