



# HEALTH AND SAFETY

FIRE CHIEF DEVELOPMENT PROGRAM

PREPARED BY R. ANDY DEXTER AAS, NRP, LP, EMS-I, FSCEO



## COURSE AGENDA

### ■ Program Development

- Risk Management
- Laws, Regulations, & Standards
- SOPs, OGs, Policies

### ■ Roles & Responsibilities

- Health & Safety Officer (HSO)
- Incident Safety Officer (ISO)
- Health & Safety Committee

### ■ Incident & Injury Investigations

- Near Miss Reporting
- LODD Investigations

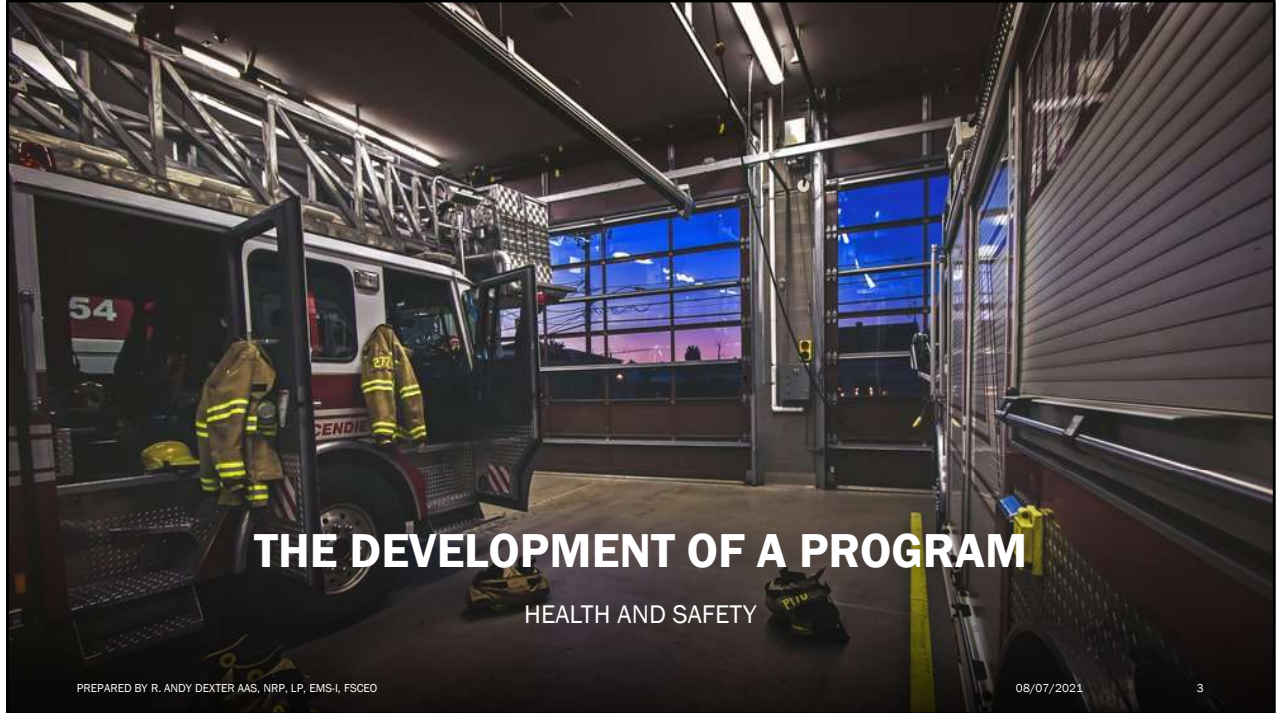
### ■ Exposure Control Program

- Toxicology
- Infection Control Program

### ■ Wellness/Fitness Program

- Incident Rehabilitation Program
- Medical Physical
- Physical Fitness Program
- Mental Resilience Program

### ■ Training & Education



# THE DEVELOPMENT OF A PROGRAM

## HEALTH AND SAFETY

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3



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## DETERMINING THE NEED

- The Mission of the Fire Department
- The Values of the Fire Department
- The Culture of the Fire Department
- The most important resource

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4



## REGULATIONS

- **Occupational Safety and Health Administration**
  - General Duty Clause
  - 29 CFR 1910.146 – Permit-Required Confined Space
  - 29 CFR 1910.134 – Respiratory Protection
  - 29 CFR 1910.120 – Hazardous Waste Operations and Emergency Response (HAZWOPER)
  - 29 CFR 1910.156 – Fire Brigades
  - 29 CFR 1910.1030 – Occupational Exposure to Bloodborne Pathogens
  - 29 CFR 1910.1200 – Hazardous Communications

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5



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## CONSENSUS STANDARD

### National Fire Protection Association

- NFPA 1500: *Standard on Fire Department Occupational Safety and Health Program*
- Adopted in 1987
- Framework for the development of a comprehensive health and safety program
- Almost all NFPA standards refer to or are cited in NFPA 1500

Considered a Standard of Care if not adopted into law

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6



NFPA 1906 NFPA 1670 NFPA 1403 NFPA 1994

NFPA 473 NFPA 472 NFPA 101 NFPA 1975 NFPA 1971

NFPA 600

NFPA 1002

NFPA 1003

NFPA 1006

NFPA 1021

NFPA 1051

NFPA 1071

NFPA 1221

NFPA 1404

NFPA 1561

NFPA 1581

NFPA 1582

NFPA 1583 NFPA 1999 NFPA 1976 NFPA 1001 NFPA 1977

NFPA 1992 NFPA 1982 NFPA 1991 NFPA 1911

NFPA 1983 NFPA 1981 NFPA 1851

NFPA 1964

NFPA 1962

NFPA 1961

NFPA 1936

NFPA 1932

NFPA 1931

NFPA 1925

NFPA 1915

NFPA 1914

NFPA 1912

NFPA 1901

NFPA 10

**NFPA 1500:**  
*Standard on Fire  
Department  
Occupational  
Safety and Health*





YouTube URL: <https://www.youtube.com/watch?v=ICqPGkto3Yo&t=9s> (3.10 minutes)





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## EASTERN AIRLINES FLIGHT 401

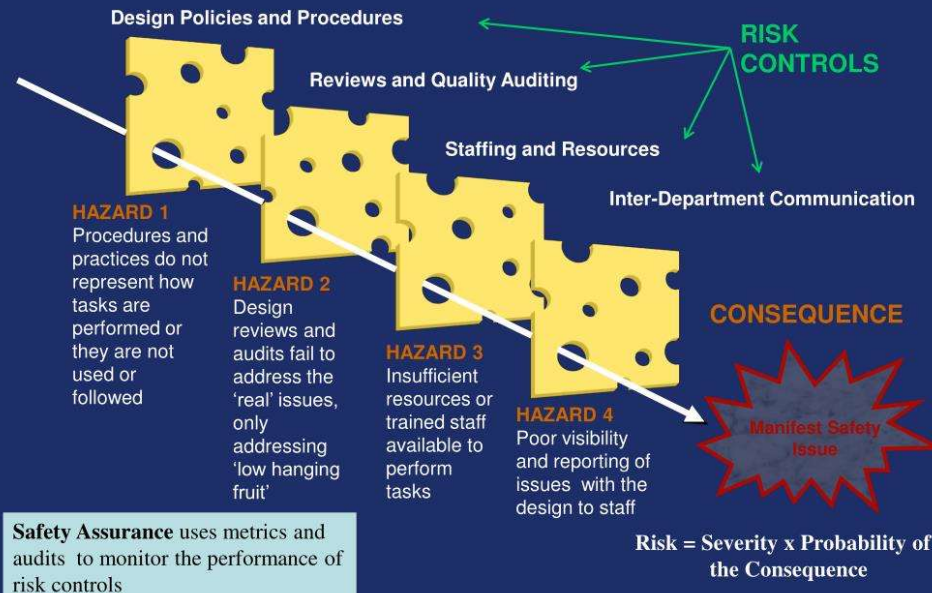
**Eastern Air Lines Flight 401** was a Lockheed L-1011-1 TriStar jet that crashed into the Florida Everglades at 11:42pm December 29, 1972, causing 101 fatalities. There were 75 survivors. The crash occurred as a result of the entire flight crew becoming preoccupied with a burnt-out landing gear indicator light and failing to notice the autopilot had inadvertently been disconnected. As a result, the aircraft gradually lost altitude and eventually crashed while the flight crew was distracted with the indicator problem. It was the first crash of a wide-body aircraft and at the time, the second deadliest single-aircraft disaster in the United States

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9



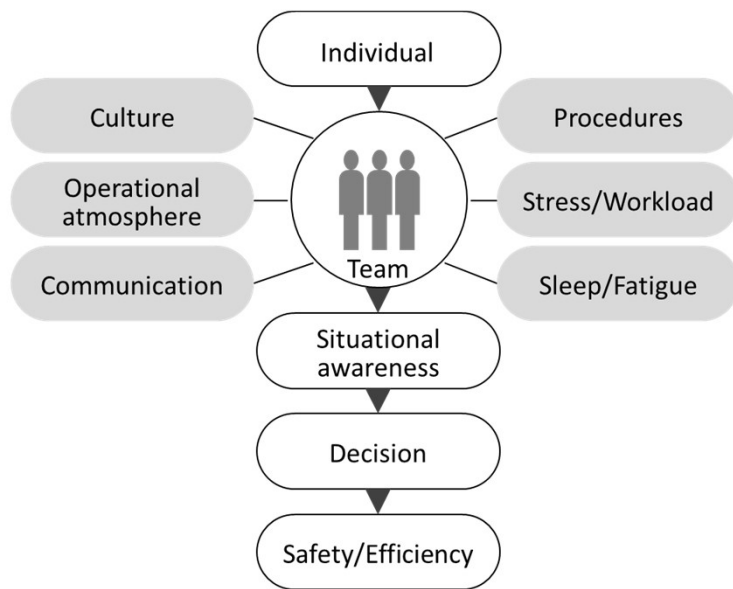
## "Swiss Cheese" Model of Organizational Failure





## CREW RESOURCE MANAGEMENT

- A behavioral modification training system developed by aviation to reduce accident rates
  - Reduce human error = Prevention of Tragedy
  - Twelve Human Factors which contribute to tragedy
    1. Lack of Communications
    2. Complacency
    3. Lack of Knowledge
    4. Distraction
    5. Lack of Teamwork
    6. Fatigue
    7. Lack of Resources
    8. Pressure
    9. Lack of Assertiveness
    10. Stress
    11. Lack of Awareness
    12. Norms





## CREW RESOURCE MANAGEMENT

### Six-Point Model

- Communication Skills
- Teamwork
- Task Allocation
- Critical Decision Making
- Situational Awareness
- Debriefing

### Situational Awareness Loss Factors

- Ambiguity
- Distraction
- Fixation
- Overload
- Complacency
- Improper Procedure
- Unresolved Discrepancy
- “Nobody fighting the fire”

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13



## NORMALIZATION OF DEVIANCE

- Term used by the American sociologist Diane Vaughan to describe the process in which deviance from correct or proper behavior becomes normalized in a corporate culture.
- Vaughan defines this as a process where a clearly unsafe practice comes to be considered normal if it does not immediately cause a catastrophe: "a long incubation period [before a final disaster] with early warning signs that were either misinterpreted, ignored or missed completely".

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14

YouTube Video URL: <https://www.youtube.com/watch?v=tC0qkVf5SmE> (13.03 minutes)



## DEPARTMENT DOCUMENTS

### Standard Operating Procedures

- A standard operating procedure is a document containing step-by-step instructions to guide employees on how to perform a technical, repetitive process within an organization. Think of it as a playbook for how to get a task done.
- SOPs are written for a set of people who will perform the task

### Operational Guidelines

- An operational guideline is a document containing a piece of advice on how to act in a given situation. It is recommended but Not a Mandatory Control.
- OGs are written for a set of people who will perform the task





## DEPARTMENT DOCUMENTS

### Policy

- Policy is a law, regulation, procedure, administrative action, incentive, or voluntary practice of governments and other institutions.

#### **GUIDELINE**

[provides additional, recommended guidance]

#### **PROCEDURE**

[establishes proper steps to take]

#### **STANDARD**

[assigns quantifiable measures]

#### **POLICY**

[identifies issue & scope]



### Consensus Standard

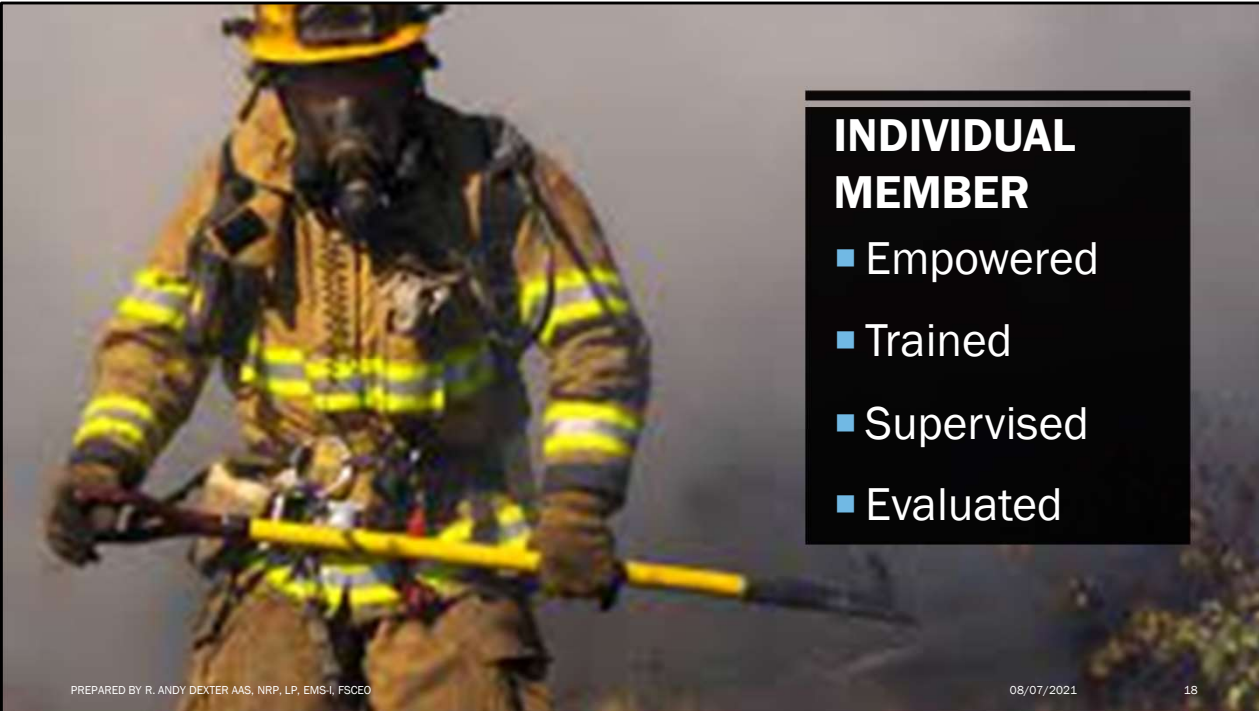
- Consensus standards are developed in cooperation with all parties with an interest in participating in the development or use of the standard. To achieve consensus, all views and objections must be considered, and a demonstrated effort must be made toward resolution. Standards are developed from many different sources—trade associations, professional societies, standards producers, consortia, companies and government agencies. Collectively, these different entities are referred to as a Standards Developing Organizations (SDO).



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17



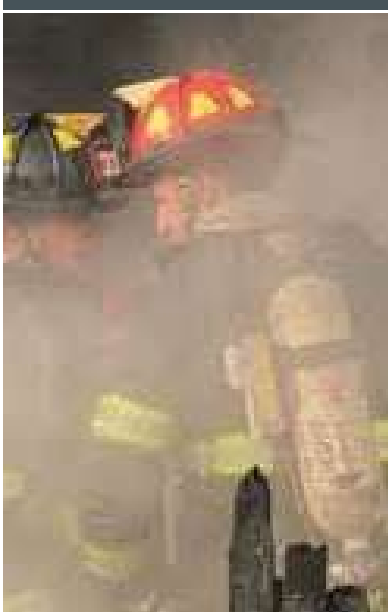
**INDIVIDUAL  
MEMBER**

- Empowered
- Trained
- Supervised
- Evaluated

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18



## COMPANY OFFICER

### Empower

- The individual

### Train

- Policies, SOGs, SOPs, OGs
- Safe Work Practices
- Safety Culture

### Supervise

### Evaluate

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19

*NFPA 1021: Standard for Fire Officer Professional Qualifications*

## THE DEPARTMENT

- Empower
  - The individual
- Train
  - Policies, SOGs, SOP, OG
  - Safe Work Practices
  - Safety Culture
- Supervise
- Evaluate



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20



## INCIDENT SAFETY OFFICER



-  Risk evaluation
-  Resource evaluation
-  Hazard identification and communication
-  Action plan review
-  Safety briefings
-  Collapse zoning
-  Accident investigation
-  Postincident Analysis

NFPA 1521: *Standard for Fire Department Officer*





## HEALTH & SAFETY OFFICER

|             |  |
|-------------|--|
| Ensure      | Ensure safety training and education                             |
| Manage      | Manage the accident- or loss-prevention program                  |
| Investigate | Investigate accidents or incidents                               |
| Maintain    | Maintain records management and data analysis                    |
| Review      | Review equipment specifications and assist in acceptance testing |
| Ensure      | Ensure compliancy  |
| Comply      | Comply with health-maintenance requirements                      |



*NFPA 1521: Standard for Fire Department Officer*

*NFPA 1500: Standard on Fire Department Occupational Safety and Health*

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22



## HEALTH & SAFETY OFFICER

- Serve as internal and external liaison
- Act as infection-control officer
- Develop a critical incident stress management plan
- Conduct postincident analysis
- Address workplace violence
- Leadership advocacy



*NFPA 1521: Standard for Fire Department Officer*

*NFPA 1500: Standard on Fire Department Occupational Safety and Health*



## OCCUPATIONAL SAFETY & HEALTH COMMITTEE

- Established committee to evaluate and make recommendations
  - Policies
  - Procedures
  - SOPs, SOGs, OGs
  - Consensus Standards
  - Laws, Ordinances, Statutes
  - Review injury/illness, Inspection, and Incident reports
  - Complaints
  - Sources of danger
- Membership
  - Health & Safety Officer
  - Incident Safety Officer
  - Membership Representatives

*NFPA 1500: Standard on Fire Department Occupational Safety and Health*



## FIRE CHIEF



Ultimately Responsible

Empower

- The individual

Develop & Train

- Policies, SOGs, SOPs, OGs
- Safe Work Practices
- Safety Culture

Supervise

Evaluate

*NFPA 1021: Standard for Fire Officer Professional Qualifications*

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25





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## INVESTIGATION PURPOSE

- Goal should always be to identify the cause of the situation
- The investigation should identify
  - areas for improvement,
  - needs for training,
  - needs for documentation (SOP, OG, Policy or revision of an existing document)
- Discipline
  - Proper discipline involves functional training
  - Punitive posture should be the last resort and not the priority

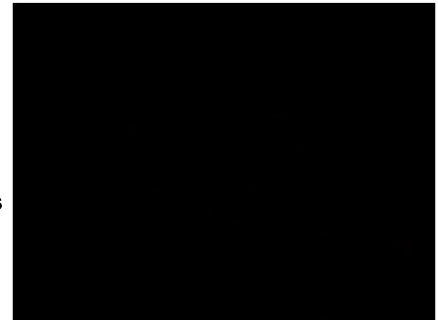
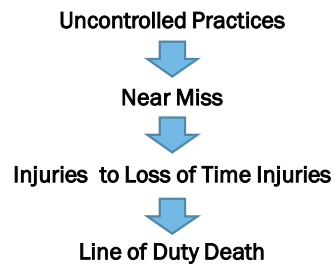
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27



## NEAR MISS / INJURIES / WORKER'S COMP / LODD

- Documentation Required
  - Regardless of Severity
- Trend Data to create control practices



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28

YouTube URL: Phoenix Fire Department Near Miss 2011 (17.28 minutes)



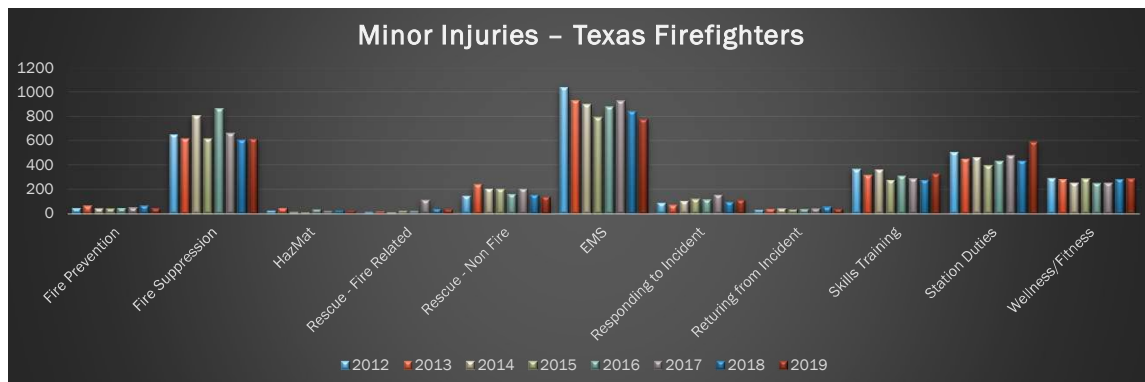
## RESOURCES

- Texas Commission on Fire Protection
  - <https://www.tcfp.texas.gov/services/injury-reports>
- Firefighter Near Miss Reporting
  - <http://www.firefighternearmiss.com/>
- CDC / NIOSH Firefighter Fatality Investigation and Prevention Program
  - <https://www.cdc.gov/niosh/fire/firelink.html>
- Firefighter Close Calls
  - <https://www.firefighterclosecalls.com/>
- Underwriters Laboratories
  - <https://ul.org/what-we-do/fire-safety/study-firefighter-line-duty-injuries-and-near-misses-0>
- Situational Awareness Matters – Dr. Richard Gassaway
  - <https://www.samatters.com/>





## REPORTED INJURIES FROM TCFP TEXAS ADMINISTRATIVE CODE §435.23



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30

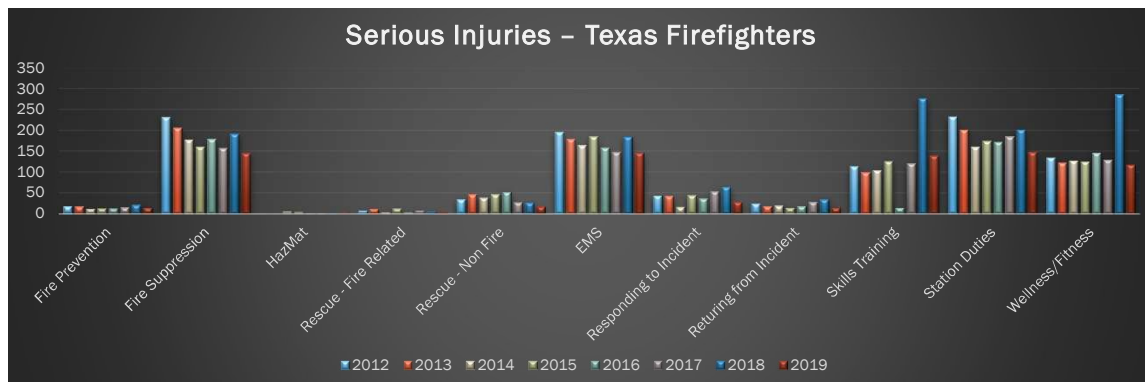
Minor injuries are injuries that result in the firefighter missing less than one full duty period.

Serious injuries are those that require the firefighter to miss more than one full duty period.

Critical injuries are those that require the firefighter to miss more than one full duty period and is hospitalized.



## REPORTED INJURIES FROM TCFP TEXAS ADMINISTRATIVE CODE §435.23



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31

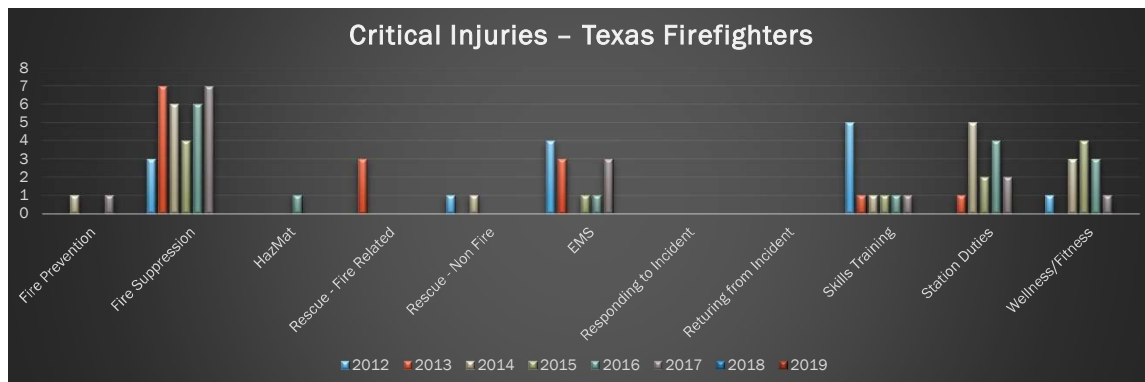
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32

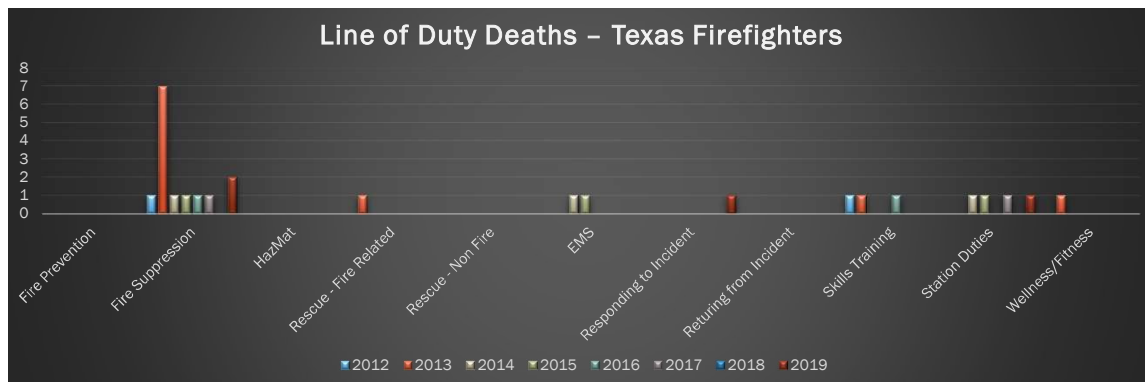
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33

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## NIOSH & TEXAS FIRE MARSHAL LODD INVESTIGATIONS

- Will visit the incident site to gather information, take pictures, and get measurements.
- Will review documents and records which can include:
  - Department standard operating procedures
  - Dispatch records
  - Training records for the fallen firefighter, incident commander, and officers
  - The fire fighter's medical records
  - Coroner/medical examiner's reports
  - Death certificates
  - Blueprints of the structure

- Police reports
- Photos
- Video



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34



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## NIOSH & TEXAS FIRE MARSHAL LODD INVESTIGATIONS

- Will interview fire department personnel and firefighters who were on the scene at the time of the incident. Interviews are voluntary and witness statements are not made under oath or reviewed by the witness.
- May work closely with other investigating agencies. The necessary subject matter expertise will be utilized.
- For cases that could be due to respirator or personal protective clothing performance, requests for the equipment or clothing be sent to the NIOSH National Personal Protective Technology Laboratory for evaluation.

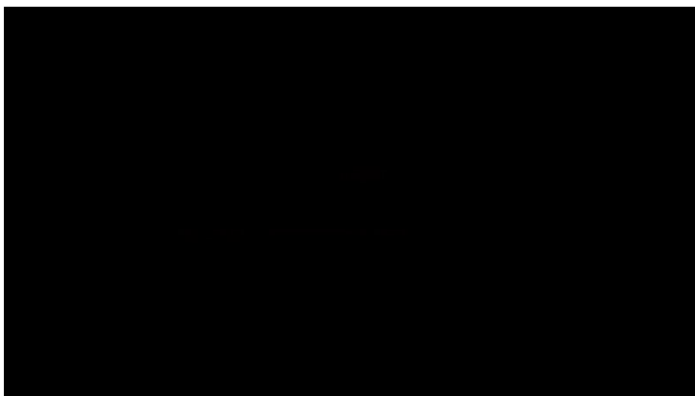
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35



## ACCIDENT & INCIDENT INVESTIGATIONS

- Objective and Structured
- Used to identify failures in the system
  - Identify problem
  - Identify / Create control practice
  - Educate / Train
  - Evaluate



YouTube URL: [https://www.youtube.com/watch?v=FDhjS\\_LE-cs](https://www.youtube.com/watch?v=FDhjS_LE-cs) (20.13 minutes)





# EXPOSURE CONTROL PROGRAM

HEALTH AND SAFETY

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37



## SMOKE

- While firefighters perform a dangerous job, to begin with, the danger doesn't necessarily recede once they've exited the fireground. Research has shown that fires, and particularly house fires, contain known harmful contaminants that play a crucial role in developing cancer. During any given fire, Personal Protective Equipment (PPE) is exposed to a plethora of these carcinogens, which leaves the firefighter vulnerable to skin absorption and/or inhalation following the incident. Moreover, these carcinogens can and will stay active until the turnout gear is properly laundered.

PHOTO BY R. ANDERSON/AMERICAN FIRE

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38

<https://www.truenorthgear.com/news/ppe-decontamination-how-the-decon-bag-helps-to-lower-firefighter-exposure-to-harmful-carcinogens>



## SUN LIGHT

- Firefighters may have a higher risk of skin cancer than the general public, a new study finds.
- The study analyzed information from about 2,400 firefighters in South Florida. Participants answered questions about whether they had past skin-cancer diagnoses, as well as what kind of sun protection (including sunscreen) they used and whether they had been screened for skin cancer or had other skin cancer risk factors (such as sunburns).
- Overall, 109 firefighters (4.5 percent) reported having a diagnosis of skin cancer at some point, including 17, or 0.7 percent, who were diagnosed with melanoma. That's higher than the rate of melanoma among Florida adults in the general population, which is only 0.01 percent, the researchers said. (Melanoma is the deadliest form of skin cancer.)
- What's more, firefighters tended to be diagnosed with melanoma at younger ages than adults in the general population: The median age of melanoma diagnosis was 42 years old among firefighters, compared with 64 years old in the general U.S. population.

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39

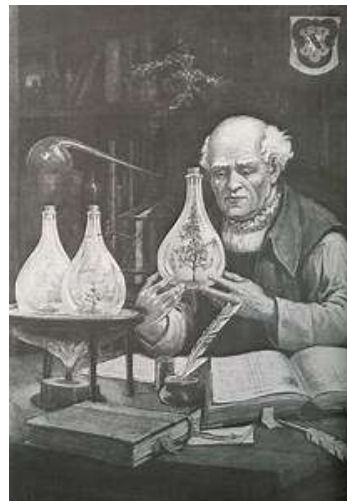
<https://www.livescience.com/61181-firefighters-skin-cancer-risk.html>



# TOXICOLOGY

## ■ Toxicology

- Toxicology is a field of science that helps us understand the harmful effects that chemicals, substances, or situations, can have on people, animals, and the environment.
- The dose makes the Poison (Paracelsus)
  - “All substances are poisons; there are none which is not a poison. The right dose differentiates a poison and a remedy.”



*Paracelsus*  
(c. 1493–1541), Swiss physician  
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# THE DOSE

- The dose of a chemical or physical agent is the amount of that agent that comes into contact with a living organism or some part of a living organism.
- Dose really represents the amount of agent per unit of body weight.
- A heavier person may require a greater dose to achieve the same effect that a lesser dose would have on a lighter person.
- The time course and duration of the dose administration or exposure are important variables
  - A single large dose given all at once is likely to have quite a different impact than the same total dose given in small amounts over a long period of time.
- Effects are also dependent upon
  - Age
  - Gender
  - Underlying disease
  - Nutritional status
  - History of previous illness

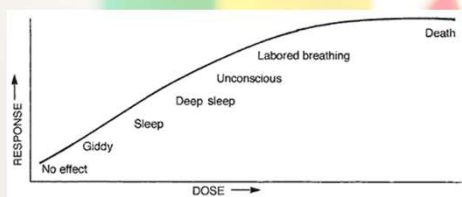
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41



**VARIABLES WHICH  
MUST BE TAKEN INTO  
CONSIDERATION IN  
MAKING A FULL  
DETERMINATION OF  
THE CONSEQUENCES  
OF THE DOSE:**



- Dose Amount
- Dose Frequency
- Dose Duration
- Subject Variability (Natural)
  - Age
  - Gender
  - Body Weight
  - Ethnic background
  - Genetics

- Subject (Health Status)
  - Pre-Existing Health Conditions which may affect the susceptibility to an agent
- Rout of Exposure
  - Ingestion
  - Inhalation
  - Absorption
  - Injection
- The toxicity of an agent does not depend on its source (synthetic or naturally occurring).

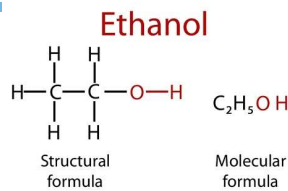
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42



# DOSE & EFFECT



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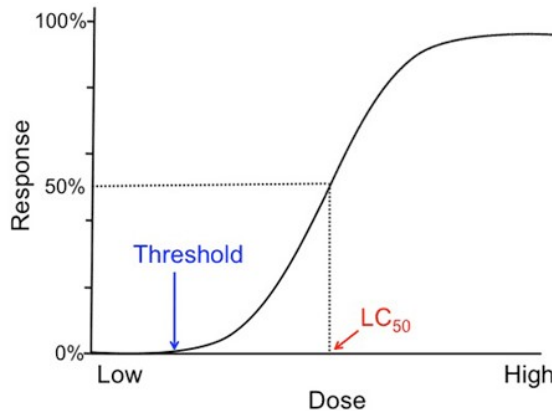
|      |   |
|------|---|
| .02- | Slight euphoria & loss of shyness, mild relaxation. No loss of co-ordination.   |
| .03  |   |
| .04- | Feeling of well-being, relaxation, lower inhibitions. Euphoria.   |
| .06  |   |
| .07- | Continuing euphoria. Some impairment of balance, speech, vision, reaction time.   |
| .09  | Reduced judgement, caution & self control.  |
| .10- | Loss of good judgement. Significant impairment of motor co-ordination. Slurred Speech. Euphoria.                              |
| .12  |   |
| .13- | Lack of physical control, gross motor impairment. Increasing dysphoria (anxiety & restlessness). Severely impaired judgement. |
| .15  |   |
| .16- | Dysphoria, confusion. Possible nausea.  |
| .19  |   |
| .20  | May need help to stand or walk. Possible loss of memory, nausea & vomiting.   |
| .25  | Severe impairment of mental, physical & sensory function.   |
| .30  | Stupor. Possible loss of consciousness.   |
| .40  | Onset of coma. Possible death due to respiratory arrest.  |

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43

Alcohol affects individuals differently. Your blood alcohol level may be affected by your age, gender, physical condition, amount of food consumed and any drugs or medication. In addition, different drinks may contain different amounts of alcohol, so it's important to know how much and the concentration of alcohol you consume. For purposes of this guide, "one drink" is equal to 1.5 oz. of 80 proof liquor, 12 oz. of regular beer, or 5 oz. of table wine. A woman drinking an equal amount of alcohol in the same period of time as a man of an equivalent weight may have a higher blood alcohol level than that man. Some states have set .08% Blood Alcohol Concentration (BAC) as the legal limit for Driving Under the Influence. For commercial drivers, a BAC of .04% can result in a DUI conviction nationwide.





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44

## DOSE & EFFECT

- Target tissue, target organs, or generically as target site
  - Example – nervous tissue is a target site for pesticides
  - Toxicants can affect structures inside the cell or processes in the cell.
- Mean Lethal Dose:
  - LD<sub>50</sub> (lethal dose, 50%)
  - LC<sub>50</sub> (lethal concentration, 50%)
- Acute (or short-term)
- Chronic (or long-term)









In [toxicology](#), the **median lethal dose**, LD<sub>50</sub> (abbreviation for "[lethal dose](#), 50%"), **LC<sub>50</sub>** (lethal concentration, 50%) or **LCt<sub>50</sub>** is a measure of the [lethal dose](#) of a [toxin](#), [radiation](#), or [pathogen](#).<sup>[1]</sup> The value of LD<sub>50</sub> for a substance is the [dose](#) required to kill half the members of a tested population after a specified test duration. LD<sub>50</sub> figures are frequently used as a general indicator of a substance's [acute toxicity](#). A lower LD<sub>50</sub> is indicative of increased toxicity.

### Acute Illness

- (1) Any illness that develops quickly, is intense or severe and lasts a relatively short period of time.
- (2) Any condition—e.g., infection, trauma, fracture—with a [short](#) (often less than 1 month) clinical course. Acute illnesses usually respond to therapy; a return to a state of complete—pre-morbid—health is the norm. Segen's Medical Dictionary. © 2012 Farlex, Inc. All rights reserved.

**Chronic disease:** A disease that persists for a long time. A chronic disease is one lasting 3 months or more, by the definition of the U.S. National Center for Health Statistics. Chronic diseases generally cannot be prevented by [vaccines](#) or cured by medication, nor do they just disappear.



| Substance   |  Non-toxic or beneficial dose |  Toxic dose |  Lethal dose |
|---|--|--|---|
| <b>Alcohol</b><br>                     | 0.05%  | 0.1%<br>(Ethanol blood levels)   | 0.5%  |
| <b>Carbon monoxide</b><br>             | < 10%  | 20-30%<br>(% Hemoglobin bound)   | > 60%   |
| <b>Secobarbital</b><br>(sleep aid)<br> | 0.1 mg/dL  | 0.7 mg/dL<br>(Blood levels)  | > 1 mg/dL   |
| <b>Aspirin</b><br>                     | 0.65 g<br>(2 tablets)  | 9.75 g<br>(30 tablets)<br>(Acute Oral Dose)  | 34 g<br>(105 tablets)   |
| <b>Ibuprofen</b><br>                   | 400 mg<br>(2 tablets)  | 1,400 mg<br>(7 tablets)<br>(Acute Oral Dose)   | 12,000 mg<br>(60 tablets)   |



## LONG TERM/CUMULATIVE DOSE EFFECTS

- Cumulative Exposure:
  - The total amount of a substance or radiation that a person is exposed to over time. Cumulative exposure to a harmful substance or radiation may increase the risk of certain diseases or conditions.
  - Cumulative exposure is a term used in the insurance industry that relates to situations where damages have been sustained over time, such as in the case of gradual exposure to pollutants or other sources of illness.
  - Cumulative exposure can make it difficult to determine whether the insurance company is at fault for damages, since the timing and source of the exposure is often unclear.

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08/07/2021

46

<https://www.cancer.gov/publications/dictionaries/cancer-terms/def/cumulative-exposure>  
<https://www.investopedia.com/terms/c/cumulative-exposure.asp>



## STATISTICS

- Firefighters are at a 9% greater risk of being diagnosed with cancer than people who are not firefighters
- Firefighters have a 14% higher risk of dying from cancer than the general US population.



# Firefighters face cancer rates substantially greater than most Americans

Testicular cancer - 2.02 times greater  
Multiple myeloma - 1.53 times greater  
Non-Hodgkin's lymphoma - 1.51 times greater  
Skin cancer - 1.39 times greater  
Brain cancer - 1.31 times greater  
Malignant melanoma - 1.31 times greater  
Prostate cancer - 1.28 times greater  
Colon cancer - 1.21 times greater  
Leukemia - 1.14 times greater

**The most likely causes are the chemicals emitted from regular household products when they burn.**

Source: Firefighter Cancer Support Network | facebook.com/benspraguebangor | @bensprague

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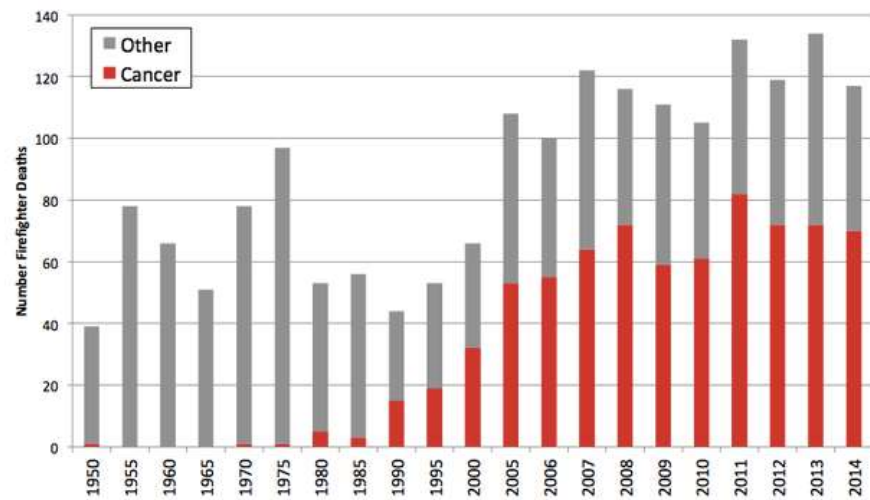
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47

<http://www.firefighterclosecalls.com/wp-content/uploads/2017/06/FF-Cancer-Fact-Sheet.pdf>



## RISE IN FIREFIGHTER CANCER DEATHS SINCE



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48

<https://www.theatlantic.com/health/archive/2015/09/our-toxic-homes/404722/>



## CONDITIONS FOR ABSORPTION

- Firefighters are prone to absorb the contaminants as heat increases the chance of absorption.
- For every five degrees the average body heat reaches, there's a 400% increase in skin absorption
  - Groin absorbs 300% more
  - Jaw absorbs 93% more
  - Forehead absorbs 43% more
  - Back absorbs 12% more

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<https://www.poughkeepsiejournal.com/story/news/local/2019/11/20/firefighters-face-cancer-risk-new-york-takes-safety-steps/1703728001/>





Always wear your PPE and SCBA on fires (structure, vehicle or any other fire where applicable), including during overhaul.

Prior to leaving the fire scene, perform a gross decontamination to remove potentially toxic contaminants from your turnouts and gear.

Rinse and wipe off hands, arms, face, neck, etc. immediately after the fire.

### **WHAT CAN WE DO TO PROTECT OURSELVES**

After the fire, store turnout gear in a compartment **OUTSIDE** of the passenger cab to avoid unnecessarily inhaling off-gassing carcinogens.

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50

<http://www.modernfirefighter.com/cancer-the-unseen-firefighter-killer/>





## WHAT CAN WE DO TO PROTECT OURSELVES

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- If available, a second (clean) set of turnouts should be used upon returning to the station, and the contaminated turnouts should be thoroughly cleaned. If a second set of turnouts is not available and/or thoroughly cleaning turnouts is not an immediate option, care should be taken to clean as much of the contaminants off as possible, and turnouts should be hung in a well-ventilated area away from crew or apparatus passenger compartment until proper cleaning is possible.
- After returning to the station and outfitting your equipment, crew members should thoroughly shower to remove carcinogens from skin and hair, and then they should change into clean cloths

08/07/2021

51

<http://www.modernfirefighter.com/cancer-the-unseen-firefighter-killer/>



## WHAT CAN WE DO TO PROTECT OURSELVES

- Immediately clean contaminated clothing and gear at the station. Do not throw your contaminated clothing on your bed or in your locker where it will contaminate your bedding, other clothing or off-gas in the crew quarters. Do NOT take contaminated materials, clothing or gear home where you will further expose yourself and your family to the carcinogens from the fire.
- Do not wear or bring turnouts (dirty or clean) into living or sleeping areas. The days of stowing bunker pants next to the bed should be a thing of the past as the practice contaminates the living space and exposes crew members to off-gassing toxins while they sleep.


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52

<http://www.modernfirefighter.com/cancer-the-unseen-firefighter-killer/>

wfaa.com



# WHAT CAN WE DO TO PROTECT OURSELVES

- Document your exposures in either a PERS (Personal Exposure Reporting System) or a personal binder. At minimum, keep track of the date and time, run ID #, crew present, exposure or materials burning, duration of exposure, etc. Even though many departments are accepting a “presumptive” illness claim with cancer, we often have to “prove” we were exposed at work.

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08/07/2021 53

<http://www.modernfirefighter.com/cancer-the-unseen-firefighter-killer/>



## MANDATORY SHOWERS WITH DOCUMENTATION



DECON




IT'S NOT JUST FOR HAZ MAT!



**FIREFIGHTER CANCER  
IS REAL!**

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54



## DOCUMENTATION THE EXPOSURE

Add to Log

Start Date

11/20/2017

📅

Yesterday | Now | Today | Tomorrow

End Date

11/20/2017

📅

Yesterday | Now | Today | Tomorrow

Activity Code

SHOWER - Decon Safety Shower

▼

Notes

Apparatus

Select an Apparatus: ▼

Check Spelling

Personnel

List

☒ Me

Highlight

Cancel

Add

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55

YouTube URL: <https://www.youtube.com/watch?v=UFzP1rQJWSQ> (5.19 minutes)



## DECONTAMINATE



### SCBA and Cylinders

Wear glove during decontamination of  
SCBA, Mask, and Cylinders

Filling SCBA Cylinders at Cascade



### Tools and Equipment

All tools which entered the Hazard Area:

- Radios
- Flashlights



### Hoses

Use roller and gloves to handle  
contaminated hoses

Decon before reloading





## DECONTAMINATE



### Apparatus Interior

Detail the interior, riding seats, equipment, mics, etc.



### Bunker Gear

Must be trained/certified to wash bunker gear.



### Uniform

Wash Uniform or clothing worn during the incident response.

Change into fresh/clean clothing post shower





## FIRE GROUND DECONTAMINATION PROCESS

- A designated area for the cleaning is marked with cones and located away from the fire or "hot zone," which may be at a training or a structure fire. Equipment used in the process includes clean garbage bags, a 15-inch garden hose and nozzle, a 1-and-a-half-inch hose adapter, spray bottle with a teaspoon of Dawn dish soap, a small soft-bristled brush and car wash brush.
- It's a two-person process. The firefighter with the least air in their self-contained breathing apparatus is cleaned first.
- The firefighter is hosed off with low pressure water to remove bulk contaminants, while avoiding direct water contact with gear near the neck and wrist.
- With the spray bottle, the firefighter's gear including helmet, gloves and boots will be sprayed with the solution and then brushed down.
- The rinse process continues until the soap is gone.
- Repeat the process for the other firefighter.
- Both firefighters can then disconnect from air supply and place gear into a sealed container for transport.
- Wipes are also necessary to clean off remaining contaminants such as hands, neck and face. They cannot contain aloe, alcohol or lotion as they open up pores, allowing for contamination.

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58

<https://www.poughkeepsiejournal.com/story/news/local/2019/11/20/firefighters-face-cancer-risk-new-york-takes-safety-steps/1703728001/>

# WASH YOUR GEAR



## A DIRTY HOOD IS A CANCER RISK



- Face and Neck are areas of dermal exposure
- Hoods are potential carriers of harmful fire products
- Hoods are in direct contact with the skin
- Wash your hoods after every fire

DEXTER AAS, NRP, LP, EMS-I, FSCEO



Left to right:

Soap & H<sub>2</sub>O

New hood

Used & washed

Used not

washed

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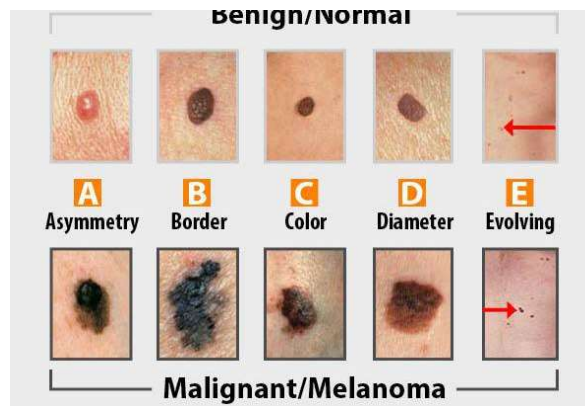
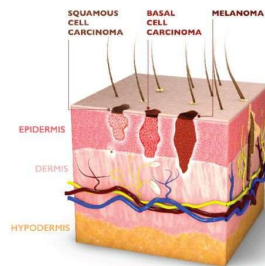
59



## SKIN CANCER

### TYPE OF SKIN CANCER

THERE ARE THREE MAJOR TYPES





## WHAT CAN I DO TO REDUCE MY RISK OF SKIN CANCER?

- Most skin cancers are caused by too much exposure to ultraviolet (UV) rays. UV rays come from the sun, tanning beds, and sunlamps. UV rays can damage skin cells.
- To lower your risk of getting skin cancer, you can protect your skin from UV rays from the sun and from artificial sources like tanning beds and sunlamps.
- Protection from UV rays is important all year, not just during the summer. UV rays can reach you on cloudy and cool days, and they reflect off of surfaces like water, cement, sand, and snow. In the continental United States, UV rays are strongest from 10 a.m. to 4 p.m. daylight saving time (9 a.m. to 3 p.m. standard time).
- The UV Index forecasts the strength of UV rays each day. If the UV index is 3 or higher in your area, protect your skin from too much exposure to the sun. CDC recommends easy ways to protect your skin when the UV index is 3 or higher—
  - Stay in the shade.
  - Wear clothing that covers your arms and legs.
  - Wear a hat with a wide brim to shade your face, head, ears, and neck.
  - Wear sunglasses that wrap around and block both UVA and UVB rays.
  - Use a broad spectrum sunscreen with a sun protection factor (SPF) of 15 or higher.

PREPARED BY: RANDI DENTON, MS, MPH, ELSA, ELSA  
08/07/2021 61

[https://www.cdc.gov/cancer/skin/basic\\_info/prevention.htm](https://www.cdc.gov/cancer/skin/basic_info/prevention.htm)



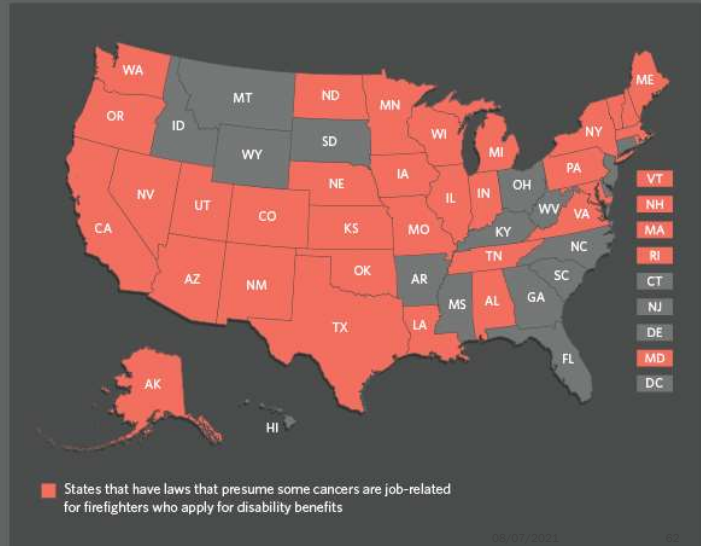
## UPDATED SUPPORT



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### Firefighter Cancer Laws

At least 33 states have some type of law that presumes certain types of cancer are a job-related illness for firefighters who apply for disability benefits. Arkansas has a law that provides death benefits to the family, but only if it is recommended by a state-appointed review panel.



YouTube URL: <https://www.youtube.com/watch?v=EZMpPP3Q4uI> (9.16 minutes)



## TEXAS LAW

- Senate Bill 2551, which became Texas law in June 2019, is made to help firefighters get worker's compensation if they are diagnosed with a specific type of cancer. This is a revision from a state law passed in 2005.
- "There are a number of differences between the old law and the new law. Before, there was a question about what types of cancers would be covered or not covered."
- Under SB 2551, eleven cancers are covered:

- Stomach
- Colon
- Rectum
- Skin
- Prostate
- Testes
- Brain
- Non-Hodgkin's Lymphoma
- Multiple Myeloma
- Malignant Melanoma
- Renal Cell Carcinoma

In order to be eligible under SB 2551, a firefighter must:

- Be diagnosed during employment
- Be a firefighter for at least five years
- Be free of cancer when they started the job
- Respond regularly to fire, radiation or carcinogenic calls
- Not smoke, and not be married to a smoker.

Government Code, Title 6. Public Officers and Employees,  
Subchapter A. Provisions Generally Applicable to Public Officers  
and Employees, Chapter 607. Benefits to Certain Disease and  
Illnesses, Subchapter A. Contagious Diseases, Section 607.055  
Cancer

<https://www.wfaa.com/article/news/law-helps-firefighters-workers-comp-cancer/287-052a4e15-0bd4-4eba-ae16-7f08f2ec868c>





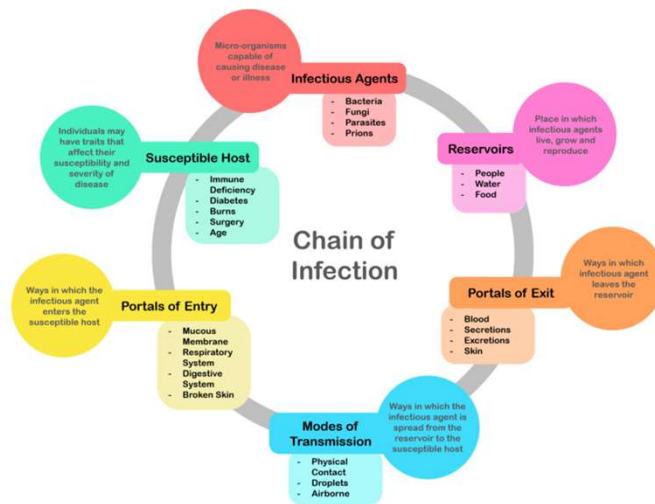
## OTHER CANCER SUPPORT/RESOURCES

- Firefighter Cancer Support Network (FCSN)
  - FCSN seeks to help firefighters/EMS professionals and their families cope with cancer. It is our goal to provide occupational-cancer awareness and prevention training nationwide. Together, we can educate, support, and make a difference.
  - <https://firefightercancersupport.org/>
- First Responder Center for Excellence (FRCE)
  - <https://www.firstrespondercenter.org/cancer/>
- National Firefighter Registry
  - <https://www.cdc.gov/niosh/firefighters/registry.html>



## INFECTIOUS CONTROL

- Creation and Maintenance of a Program
- Identification of an Infectious Control Officer
- Training
  - Initial
  - Annual
- Control Practices and Equipment
- Reporting Process
  - 24 Hours



NFPA 1581: Standard for Fire Department Infection Control Program  
 OSHA 29 CFR 1910.1030 – Occupational Exposure to Bloodborne Pathogens

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65

## The Spread of Infectious Disease

An **infection** is defined as the successful **transmission** of pathogenic microorganisms, such as bacteria, viruses, parasites or fungi that are spread:<sup>[3][4][5][6]</sup>

### •Directly:

- From person to person.
- Through respiratory droplets (i.e. coughing or sneezing) or body fluids.
- Direct exposure to infectious agent in environment
- During childbirth from mother to foetus (transplacental/perinatal)

### •Indirectly:

- Biological - Vector or Intermediate host (eg. Zika Virus)
- Mechanical - Vector or Vehicle (eg. Plague - transmission of *Yersinia pestis* by fleas)
- Airborne (eg. Tuberculosis)

## Epidemiological Triad

In humans, infections occur when an infectious microorganism enters the body, multiplies, and leads to a reaction in the body and potential infectious disease. The spread of infectious disease requires three variables, known as the **epidemiological triad**<sup>[7]</sup>:

- The agent - this microorganism that causes the infection and can be in the form of bacteria, viruses, parasites or fungi.
- The host - the target of the disease.



- The environment - surroundings and conditions (these are external to the host).

#### Infection Spread in Healthcare

Healthcare facilities, whether hospitals or primary care clinics are an area with an elevated risk of disease transmission due to the presence and relative ratio of susceptible individuals. One in ten patients get an infection whilst receiving care<sup>[9]</sup> yet effective infection prevention and control reduces health care-associated infections by at least 30%<sup>[9]</sup>. In a healthcare setting, the three components required for infection spread are the following<sup>[10]</sup>:

•**Source** - places where infectious agents survive (e.g. sinks, hospital equipment, countertops, medical devices).

- Environment - patient care areas, sinks, hospital equipment, countertops, medical devices.
- People - patients, healthcare workers, or visitors.

•**Susceptible person** - someone (patient, healthcare worker, or visitor) who is not vaccinated or immune to a particular infectious disease, or an individual with a compromised immune system (ie. immunodeficient)<sup>[10]</sup>.

- In addition, susceptibility can be heightened in individuals due to underlying medical conditions, medications, and necessary treatments and procedures that increase the risk of infection (e.g. surgery).

•**Transmission** -

- Touch, including via medical equipment or a susceptible person (e.g. [MRSA](#) or VRE).
- Sprays or splashes (e.g. pertussis).
- Inhalation of aerosolised particles (e.g. [TB](#) or measles).
- Sharps injuries introducing blood-borne pathogens (e.g. [HIV](#), HBV, HCV).

#### Controlling Infectious Diseases Within Communities

Infection control and prevention is a global issue and there are many protocols and guidelines that can be followed to minimise the spread of [infection](#) between people, within a population and globally<sup>[2]</sup>. Identifying at-risk groups such as children, [older people](#) and those with chronic conditions can also help guide relevant strategies to protect these vulnerable groups. The first step when looking at infection control can start at the community level by changing behaviour, including:

- Regular [hand washing](#).
- Usage of appropriate face-masks if suffering from respiratory infections to prevent spread (also indicated for protection from respiratory infections)
- Using insect repellents.
- Ensuring up-to-date routine vaccinations and participating in immunisation programmes.
- Taking prescribed medications, such as antibiotics, as directed by health professionals.
- [Social distancing](#) - avoiding contact with others.
- Using condoms when having sex, especially with a new partner.

Other steps that can be taken to control the spread within communities include environmental measures such as:

- Modifying environments.

- Surveillance of diseases.
- Food safety.
- Air quality.

#### Medical Interventions

As well as simple steps to prevent and control infections, there are biochemical interventions that can be implemented to speed up the recovery process and in some cases prevent viral infections completely.<sup>[11]</sup> The development of antibiotics, [antivirals](#) and [vaccinations](#) have been shown to speed up recovery, slow down the progression and in some cases eradicate infectious diseases from entire populations.

#### Antibiotics

Antibiotics are prescribed for bacterial infections and support the body's natural defence system to eliminate the disease-causing bacterial agent. They are designed to either kill bacteria or stop them from reproducing, however poor use of antibiotics, over-prescribing and the mutation of bacteria has led the development of resistant bacteria<sup>[12]</sup>. In these cases, either stronger doses are required or the combination of one or more antibiotics.

#### Vaccinations

Vaccinations are designed to improve immunity to a particular disease. Vaccines work by introducing small amounts of the disease-causing virus or bacteria into the host, allowing them to build up natural immunity. The introduction of regular vaccines have slowed down and in some cases eradicated certain diseases such as [polio](#), measles, mumps, whooping cough and rubeola (measles). There are also vaccinations for chickenpox but this is not given routinely and is reserved for those at risk of spreading the disease to those with a weakened immune system<sup>[13]</sup>. This is due to the fact that it is prevalent in children under 10 years of age and symptoms are usually mild; this method allows them to build up natural immunity and contributes to improving the immunisation of a community<sup>[14]</sup>. This type of protection is known as **herd immunity**<sup>[15]</sup>.

#### Antivirals

For infectious diseases that are caused by viral agents such as influenza, [HIV](#), herpes, and hepatitis B, antibiotics provide no defence and in these cases, antiviral medications are the most effective at slowing down the progression of the disease and boosting the immune system. Unfortunately, as with antibiotics, viruses can mutate over time and become resistant to these antiviral drugs<sup>[12]</sup>.



## BLOODBORNE PATHOGENS

**Table 4.** Risk of infection and required post-exposure prophylaxis for the three most commonly transmitted pathogens

| Pathogen                           | Infection risk after needlestick*                | Post-exposure prophylaxis (PEP)  |  |
|------------------------------------|--|--|--|
|                                    |  | What to do?  | When to act?   |
| Human immunodeficiency virus (HIV) | 0.3%   | A four-week course of a combination of either two or three antiretroviral drugs determined on a case-by-case basis | As quickly as possible, preferably within hours      |
| Hepatitis B virus (HBV)            | Approximately 0% with PEP; 6% to 30% without PEP | HBIG† alone or in combination with vaccine (if not previously vaccinated)  | Preferably within 24 hours, no later than seven days |
| Hepatitis C virus (HCV)            | 1.8%   | No recommendation  | N/A  |

\*After needlestick injury from a known positive patient source

†HBIG=Hepatitis B immune globulin

Source: Adapted from Exposure to blood: What healthcare personnel need to know. Centers for Disease Control and Prevention website. Available at: [www.cdc.gov/hcidd/dhqp/pdf/bbp/Exp\\_to\\_Blood.pdf](http://www.cdc.gov/hcidd/dhqp/pdf/bbp/Exp_to_Blood.pdf).

**Table 1. Potentially Infectious Body Fluids**

| Potentially Infectious     | Not Considered Infectious* |
|----------------------------|----------------------------|
| Blood                      | Feces                      |
| Tissue                     | Nasal secretions           |
| Semen                      | Saliva                     |
| Vaginal secretions         | Sputum                     |
| Visibly bloody body fluids | Sweat                      |
| Cerebrospinal fluid        | Tears                      |
| Synovial fluid             | Urine                      |
| Pleural fluid              | Vomit                      |
| Peritoneal fluid           |                            |
| Pericardial fluid          |                            |
| Amniotic fluid             |                            |

\* Unless visibly bloody. Source: References 3, 7.

#### Rhinitis and laryngitis

Large particles are deposited in the nose, pharynx, and larynx. More soluble gases (e.g., sulfur dioxide) are absorbed by upper respiratory tract mucous membranes, causing edema and mucus hypersecretion.

#### Tracheitis, bronchitis, and bronchiolitis

Large particles (more than  $10\text{ }\mu\text{m}$  in diameter) are deposited and then cleared by cilia. Small particles and fine fibers are deposited in bronchioles and bifurcations of alveolar ducts. Less soluble gases penetrate to deeper, small airways.

#### Asthma and chronic obstructive pulmonary disease

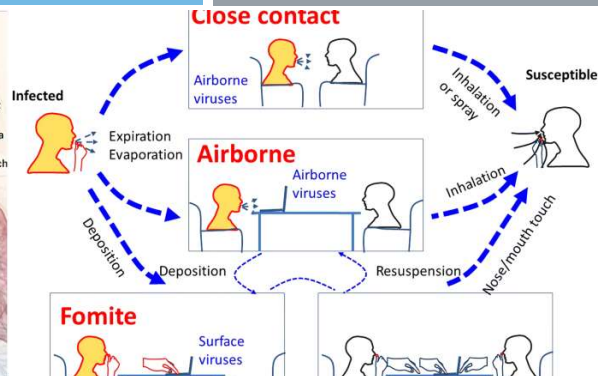
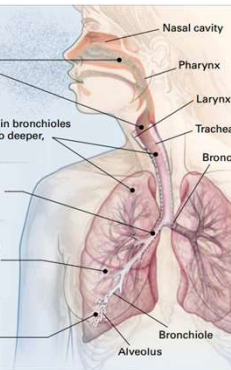
Allergens and irritants are deposited in large airways by turbulent flow, causing chronic inflammatory changes.

#### Cancer

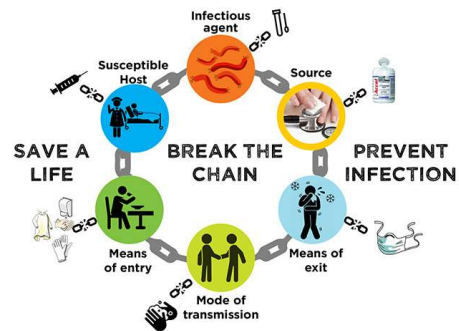
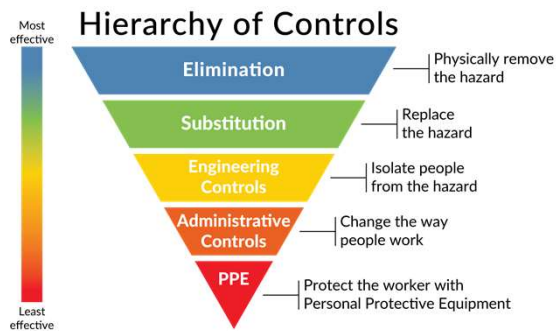
Carcinogens (asbestos and polycyclic aromatic hydrocarbons) come into contact with bronchial epithelial cells, causing mutations in proto-oncogenes and tumor-suppressor genes. More than one such contact results in malignant transformation.

#### Interstitial disease

Small particles (less than  $10\text{ }\mu\text{m}$  in diameter) and fibers are deposited in terminal bronchioles, alveolar ducts, and alveoli. Penetration to the interstitium results in fibrosis and the formation of granulomas.



## RESPIRATORY BORNE PATHOGENS



## ELEMENTS OF INFECTION/EXPOSURE CONTROL PROGRAM



## DOCUMENTATION REQUIREMENT (CONFIDENTIAL PERSONNEL FILE)

| Record Number | Record Title                 | Record Description  | Retention Period | Remarks  |
|---------------|------------------------------|---|------------------|--|
| GR1050-22c    | MEDICAL AND EXPOSURE REPORTS | Environmental, biological, and material safety monitoring reports concerning toxic substances and harmful physical agents in the workplace, including analyses derived from such reports. | 30 years.        | By regulation - 29 CFR 1910.1020(d)(1)(ii). See Local Schedule PW 5450-01 for Asbestos Management Records. |

- Exposure Incident Report
- Any Associated Investigation
- OSHA Sharps Injury Log
- Letter of Determination for Associated Exposure Investigation

PREPARED BY R. ANDY DEXTER AAS, NRP, LP, EMS-I, FSCEO

08/07/2021

69

[https://www.tsl.texas.gov/slrml/localretention/schedule\\_gr](https://www.tsl.texas.gov/slrml/localretention/schedule_gr)



## ANNUAL REQUIREMENTS

- Training on Exposure/Infection Control for all personnel
- Review of Policies, SOPs, OGs
- Complete an annual report on incidents encountered
- Implement control methods and practices



# WELLNESS & FITNESS PROGRAM

HEALTH AND SAFETY

08/07/2021

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FSCFO

1





## PRE-EMPLOYMENT PHYSICAL OR SCREENINGS

- Need
- Components
  - Physical Exam with Physician
  - Audiogram
  - Pulmonary Function Test
  - Body Composition
  - 12 Lead ECG
  - Vision Screening
  - Chest X-Ray
  - Blood Work
  - Urine Analysis and Drug Screen
  - Tuberculosis (PPD) Skin Test



NFPA 1582: Comprehensive Occupational Medical Program for Fire Departments



## PRE-EMPLOYMENT PHYSICAL OR SCREENINGS

- Physician sends a report to the department
  - **TIER 1 – Fit for Duty:** Fit for full firefighting duties.
  - **TIER 2 – Fit for Duty:** Some decline in health parameters, however fit for full firefighting duties.
  - **TIER 3 – Clear for Duty:** Recommend restrictions in firefighting activities.
  - **TIER 4 – Unfit for Duty:** Not recommended for firefighting duties.
- Confidential
- Detailed report to applicant
- No cost to member

NFPA 1582: Comprehensive Occupational Medical Program for Fire Departments

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73



## ON-GOING PHYSICALS

- Important for maintaining a viable workforce
- Confidential
- Physician sends a report to the department
  - **TIER 1 – Fit for Duty:** Fit for full firefighting duties.
  - **TIER 2 – Fit for Duty:** Some decline in health parameters, however fit for full firefighting duties.
  - **TIER 3 – Clear for Duty:** Recommend restrictions in firefighting activities.
  - **TIER 4 – Unfit for Duty:** Not recommended for firefighting duties.
- Detailed report to member

*NFPA 1500: Standard on Fire Department Occupational Safety and Health*

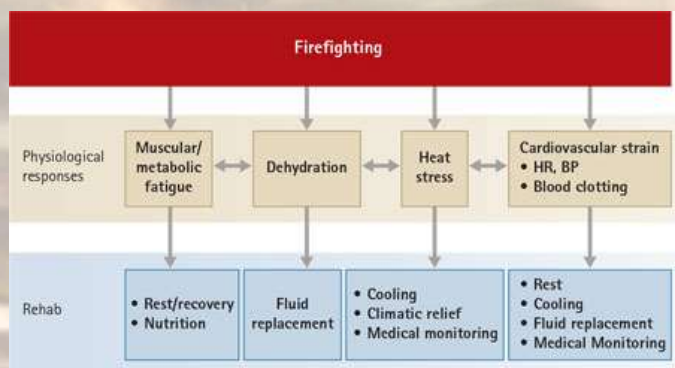
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74



## MEDICAL MONITORING / REHAB



NFPA 1584: Recommended Practices on the Rehabilitation of Members Operating at Incident Scene Operations and Training Exercises

- For Training and Incidents
- Prevention of injuries / illnesses
- Consists of:
  - Rehydration
  - Active and/or passive cooling
  - Medical Evaluation
    - Blood Pressure
    - Pulse Rate
    - Respiratory Rate
    - Carboxyhemoglobin levels
    - Air Monitoring

## RESPIRATORY PROTECTION / FIT TESTING

- Creation and Maintenance of a Program
- Physical Exam with OSHA Questionnaire
- Fit Testing of Mask Types
  - Full Face
  - Half Face
  - N95 Respirator
- Training
  - Initial
  - Continuing Education

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OSHA 29 CFR 1910.134 – Respiratory Protection

NFPA 1404: Fire Service Respiratory Protection

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76



## SAFETY PRACTICES

- Facility Safety
  - General Housekeeping
  - Storage Practices
  - Slips / Trips / Falls
  - Utilities
  - Functionality of Systems
  - Emergency
    - Power
    - Lighting
    - Fire Extinguishers
    - Alarm Systems
    - Sprinkler Systems
- Tactical Safety
  - Command Function
  - Part of the IAP
  - Accountability
  - Rapid Intervention Teams
  - Structural Stability
  - Fire Progression
  - Evaluation of Tactics employed
- STOP / ALTER / SUPPEND

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77





## WELLNESS & FITNESS INITIATIVE

- Fitness Components
  - Flexibility
  - Cardiovascular Fitness
  - Muscular Fitness
  - Body Composition
- Wellness Components
  - Nutrition
  - Back Care
  - Heart & Lung Disease
  - Physiological Stress Recognition and Control

NFPA 1583: *Standard on Health-Related Fitness Programs for Fire Fighters*

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78



## FIRST RESPONDER WELLNESS PYRAMID

| Resources  |
|--|
| Chaplains  |
| Counselors (psychological)                         |
| Behavioral Health Personnel<br>(non-psychological) |
| Peers / Mentor                                     |
| Wellness Coordinator                               |
| Resiliency trainer                                 |
| Intervention                                       |
| Treatment  |
| Monitoring   |

| Challenges / Opportunity        |
|---------------------------------|
| Academic Involvement            |
| Research Opportunities          |
| Funding                         |
| Member Agency Involvement       |
| Member Scalability              |
| Urban                           |
| Suburban                        |
| Rural                           |
| Resiliency Olympics             |
| Physical Resiliency Resources   |
| Physical Therapy                |
| Athletic Trainer/Strength Coach |
| Performance Nutritionist        |

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## CRITICAL INCIDENT STRESS PLAN

- Possible Indications
  - Mass Causality
  - Injuries/Fatalities involving coworkers
  - Suicides
  - Injuries/Fatalities involving family members
  - Violence directed to coworkers
  - Death of a Civilian / Child
  - Excessive media attention
- Signs & Symptoms
  - Difficulty in concentrating
  - Short-term memory
  - Obsessive / Compulsive
  - Loss of mental flexibility
  - Isolation / Withdrawal
  - Abuse
    - Sex
    - Drugs
    - Alcohol
    - Etc.

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80



## EMPLOYEE ASSISTANCE PROGRAM

- Member and Family have Access
- Composed of
  - Counseling Services
    - Mental
    - Marital / Relationship / Family
    - Financial
  - Smoking Cessation
  - Substance Abuse

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81



## NATIONAL RESOURCES AVAILABLE

- National Suicide Prevention Lifeline
  - 1-800-273-TALK (8255)
  - [www.PocketPeer.org](http://www.PocketPeer.org)
- SAMHSA's National Helpline
  - Substance Abuse and Mental Health Administration
  - 1-800-662-HELP (4357)
  - <https://www.samhsa.gov/find-help/national-helpline>
- Crisis Text Line
  - Text HOME to 741741 to reach a Crisis Counselor
- UNC School of Medicine
  - <https://heroeshealth.unc.edu/>
  - Download the app for COVID-19 Mental Health Resources
- Firefighter Behavioral Health Alliance
  - <https://www.ffbha.org/>
  - Director of Professional Health
  - Online Self-Assessment Tool
  - National Fire Service Suicide Reporting System

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■ <https://www.crisistextline.org/text-us/>

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82



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83



## INITIAL TRAINING / PERFORMANCE STANDARDS

- NFPA 1403 requirements
- Certification
  - Firefighter I
  - Firefighter II
- Cardiopulmonary Resuscitation
- First Aid
- Body Substance Isolation / Bloodborne Pathogens
- NIMS

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84

## RISK MANAGEMENT PLAN ANALYSIS

- Risk Identification
- Risk Evaluation
  - Frequency
  - Severity
- Risk Prioritization

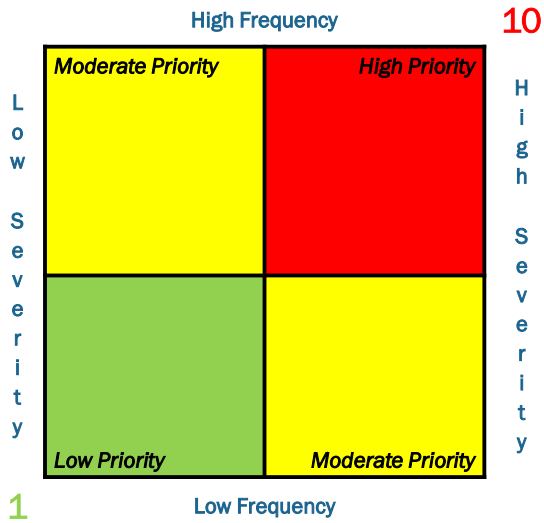


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85





## RISK VS. FREQUENCY

- Risk-Control
  - Risk Avoidance
  - Risk Transfer
  - Control Measures
  - Plan Implementation
- Monitorship
- Evaluation
- Revision



**QUESTIONS?  
COMMENTS?  
CONCERNS?**

## **COURSE CONCLUSION**

HEALTH AND SAFETY

PREPARED BY R. ANDY DEXTER AAS,  
NRP, LP, EMS-I, FSCEO

[ADDEXTER.SFFMA@GMAIL.COM](mailto:ADDEXTER.SFFMA@GMAIL.COM)

CELL: (281) 782-5231