Health and Wellness in The Fire Service

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Why study firefighter health?

“When we hit the fire ground, your risk factors become my risk.”

~ Firefighter Steve Mast
Robust Portrait of Firefighter Health

Captures the “Culture” of Health and Wellness in a National Study Using Sophisticated Qualitative Research Methods

Comprehensive assessment of Firefighter Health Using Epidemiological Research Methods
Purpose of AHA Study

- Develop baseline understanding of thoughts, opinions, attitudes, beliefs
- Understand key misconceptions
- Understand mechanisms of motivation
- Examine differences in regions/type of department
- Identify key themes for intervention
Overview of AHA Study
Purpose of FIRE Study

- Examines Risk Factors for Cardiovascular Disease and Cancer
- A Longitudinal (over 1 year) Cohort Study
- Both Career and Volunteer Departments
- Random Selection (increases generalizability)
- Both Self-Report and Measured Assessment
Overview of FIRE Study

• Missouri Valley Region
• N=714, > 90% Response Rate
• Department level data
  – Semi-structured Interview
• Individual Level
  – Objective Health Measures
  – Comprehensive Self Report Measure
Self Report Questionnaire

(1) General health and attitudes toward body weight
(2) Health history (personal & family)
(3) Mental health
(4) Nutrition
(5) Physical activity
(6) Substance use
(7) Fire service beliefs & attitudes
(8) Injury
Blood Pressure  Cholesterol
Height, Weight
Body Composition

CO (Smoking)
Career Departments

Colorado
- Boulder FD
- Buckley AFB FD
- Red, White & Blue Fire District
- USAF Academy FD

Kansas
- Chanute FD
- Great Bend FD
- Kansas City Kansas FD
- Olathe FD

Missouri
- University City FD

Nebraska
- Norfolk FD

Wyoming
- Rock Springs FD
## Volunteer Departments

**Colorado**
- Holyoke FPD
- Fruita FD

**Kansas**
- Tonganoxie City FD
- Yates Center FD

**Missouri**
- Linneus FPD
- College of the Ozarks FD
- Intercity FD
- Cooper County FD

**Nebraska**
- Petersburg FD

**North Dakota**
- Jamestown Rural FD
- Oakes VFD

**South Dakota**
- Madison VFD
- Yankton VFD
Baseline demographic and clinical characteristics of career and volunteer firefighters in the FIRE study

<table>
<thead>
<tr>
<th>Variable</th>
<th>Career (N=500)</th>
<th>Volunteer (N=214)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>38.0(9.9)</td>
<td>39.7(12.0)</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>95.6</td>
<td>93.0</td>
</tr>
<tr>
<td>Race (% white)</td>
<td>86.2</td>
<td>97.2</td>
</tr>
<tr>
<td>Years in the Fire Service (years)</td>
<td>13.4(9.4)</td>
<td>10.9(10.3)</td>
</tr>
<tr>
<td>Education (% HS or greater)</td>
<td>92.4</td>
<td>92.5</td>
</tr>
</tbody>
</table>
Firefighters Like Being Firefighters

Percent Who Agree or Very Much Agree

<table>
<thead>
<tr>
<th></th>
<th>Career</th>
<th>Volunteer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimistic About Career</td>
<td>75.8</td>
<td>61.7</td>
</tr>
<tr>
<td>Satisfied with Job</td>
<td>84.2</td>
<td>74.8</td>
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<tr>
<td>Satisfied with Morale of Coworkers</td>
<td>59.2</td>
<td>67.8</td>
</tr>
<tr>
<td>Satisfied with My Morale</td>
<td>67.2</td>
<td>70.1</td>
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</table>
Health Beliefs of Firefighters
Lifespan Compared to General Population

Career Volunteer

<table>
<thead>
<tr>
<th></th>
<th>A Lot Longer</th>
<th>Longer</th>
<th>Same</th>
<th>Shorter</th>
<th>A Lot Shorter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career</td>
<td>0.2</td>
<td>2.2</td>
<td>29.5</td>
<td>62.9</td>
<td>5.2</td>
</tr>
<tr>
<td>Volunteer</td>
<td>0.9</td>
<td>3.3</td>
<td>70.6</td>
<td>23.8</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Actual Cohort Mortality of Firefighters

Insufficient Data to Make Definitive Statement

2001 article in *American Journal of Industrial Medicine*

- Firefighters in Philadelphia (n = 7,789)
- Similar mortality to US White Males for all causes
- Increased mortality from cancers of the colon and kidney, non-Hodgkin’s lymphoma and multiple myeloma
Do Firefighters Have Higher Rates of Heart Disease and Cancer?

- **Career**
  - Heart Disease: 69.8%
  - Cancer: 65%

- **Volunteer**
  - Heart Disease: 32.7%
  - Cancer: 26.2%
Safety Beliefs and Practices

Firefighter Life Safety
STARTS WITH YOU

Have the Courage to be Safe
SO EVERYONE GOES HOME

www.EveryoneGoesHome.com
SCBA Use

<table>
<thead>
<tr>
<th>SCBA Use During Fire Career</th>
<th>SCBA Use During Fire Volunteer</th>
<th>SCBA Use Salvage and Overhaul Career</th>
<th>SCBA Use Salvage and Overhaul Volunteer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6</td>
<td>15.9</td>
<td>12.7</td>
<td>22.9</td>
</tr>
<tr>
<td>4.3</td>
<td>26.6</td>
<td>24</td>
<td>22.9</td>
</tr>
<tr>
<td>15.2</td>
<td>31.3</td>
<td>29.2</td>
<td>29.6</td>
</tr>
<tr>
<td>72.8</td>
<td></td>
<td>29.6</td>
<td>18.7</td>
</tr>
</tbody>
</table>

Percent

- Almost Never
- Sometime
- Often
- Nearly Always
Body Composition of Firefighters
Definition of Obesity

“Overweight and obesity are both labels for ranges of weight that are greater than what is generally considered healthy for a given height. The terms also identify ranges of weight that have been shown to increase the likelihood of certain diseases and other health problems” (CDC)

“Obesity is defined as excess adipose tissue” (TOS-NAASO)
Definition of Obesity

BMI (kg/m²)
- Overweight = BMI > 25 and < 30
- Class I = BMI > 30 and < 35
- Class II = BMI > 35 and < 40
- Class III = BMI > 40

Body Fat Percentage
- Men, BF% > 25; Women, BF% > 30

Waist Circumference
- Men WC > 40 inches; Women WC > 35 inches
Prevalence of Overweight and Obesity

US Prevalence=68.0%*

US Prevalence=33.8%*

*Flegal et al. JAMA 2010;303:235-241
Accuracy of BMI Obesity Classification in Career Firefighters

“High BMI, Low Body Fat” – BMI says they are obese, but body fat or WC says they are not

“Skinny Fat” – BMI says they are normal, but body fat or WC says they are obese
Why does body composition matter?

- Overweight, CVD, and low fitness are documented problems among firefighters

- Obesity and low fitness associated with higher risk of CVD and injury in other occupational groups

- High levels of fitness are associated with better health and job performance in firefighters and among workers in general
Food in the Firehouse

FIREHOUSE SUBS
Real Food; For Real Heroes

FIREHOUSE COOKING
Food from America's Bravest

R.G. Adams
Meals as Bonding

“...just eating with them on those days I put on some weight and it’s very difficult to do that because part of the fire service family is built around that kitchen table. That’s where it takes place. That’s where real problems are solved.”

“Yeah, at some stations, just everybody just brings their own food in... You know, they have problems in their groups and they don’t seem to cook up as much... just like guys that don’t get along together.”
## Best Potato Soup
- Feeds 6-8 people or 4-6 firefighters

- 4 Cups potatoes, diced but unpeeled
- 1/4 LB butter
- 2 Cups finely diced yellow onions
- 1/2 Cup flour
- 1 Quart warm water
- 1/4 Cup chicken bouillon
- 1 Cup potato flakes
- 4 Cups half and half
- 1/2 tsp. Tabasco sauce
- Salt, Pepper, Garlic powder and Dried Basil to taste

Sauté onions in melted butter for 10 minutes in large kettle.  
Add flour to onions and butter and cook for 5 minutes, stirring until flour is absorbed.  
In a separate container combine, water, chicken bouillon, potato flakes, and seasonings.  
Stir until no lumps remain.  
Add to onion mixture, 1 cup at a time.  
Add half and half, stirring until smooth and lightly thickened.  
Reduce heat and simmer for 15 minutes.  
In a separate pan, the potatoes should be covered with water and brought to a boil, and simmered for 20 minutes.  
Drain potatoes and add to soup to complete. If too thick for taste, milk may be added to thin down.  
Serve with chopped green onions and cheese! sprinkled on top.  
Cook time approx. 40 minutes
Portion Sizes

“...a thimble full or a bucket full, it costs ten bucks”

“It was almost like we were loading up because you didn't know whether you're going to eat later on in the day, you know. You know, what if. And sometimes we have to get up in the middle of a meal and go and people are munching on something as they're walking to the fire truck to get on to go on some emergency.”
"They exert a little peer pressure on each other if somebody is grabbing the Twinkies and they won't say, "Oh, don't eat that." They'll just tease the snot out of them until he puts it back, doughboy. A lot of peer pressure. They were giving me crap the other day, "Well, you worked out three or four days a week. How come you're sitting on a gut?" "Because I eat seven days a week."
Physical Fitness and Exercise

“Research has demonstrated the need for high levels of aerobic fitness, muscular endurance, muscular strength, muscular power, flexibility, and body composition in order to perform safely and effectively in the fire service.”

*The Fire Service Joint Labor Management Wellness-Fitness Initiative, 3rd Edition*
Low Fitness in the Fire Service

- Estimates based on VO₂ max categories from Cooper Clinic
- US Adult estimate used Cooper norms, but unclear whether they refer only to those in the “very poor” category only or combined “very poor” and “poor”
- Regardless, fitness levels among firefighters are lower than expected given their status as “industrial athletes”

* Carnethon et al. JAMA 2005;294:2981-2988
Sit and Reach Flexibility

Career

Volunteer

Percent

0 5 10 15 20 25 30 35

Poor
Fair
Average
Good
Excellent
Why does low fitness matter?

- Low fitness associated with higher risk of CVD and injury in other occupational groups

- High levels of fitness are associated with better health and job performance in firefighters and among workers in general

- Low fit firefighters in our sample were more likely to be overweight or obese and have worse CV profiles than more fit firefighters
Physical Training/Activity

- Factors that facilitate regular PT:
  - Support from leadership
  - Funding and adequate space for equipment
  - Time allocated for PT during the duty day
  - Information or training on methods of PT (Peer Fitness Trainers)
  - One committed person or leader can make a difference
Physical Training/Activity

- Factors that facilitate regular PT:
  - Making PT part of the department culture and providing the expectation that it part of being a firefighter
  - Working out in a group (e.g., crews working out together)
  - Competition and participation in events like the Combat Challenge
Factors that facilitate regular PT:

“The chief goes over and works out at time, so we see him – we know he’s going over there. He’s setting an example also, himself, but doing that.”

“Our fitness committee has done an outstanding job and the chief gets the money for them. And XXXX just did a lot of work getting all the stations outfitted with supplemental stuff...”

“...but every station I’ve been at there’s always one guy who always comes out and works out. Eventually, everybody kind of joins in.”
Factors that facilitate regular PT:

“So, it – it kind of goes hand in hand if – if, for the officers that are doing it, chances are that everybody’s doing it, so it is not an issue.”

“We’ve got state of the art gyms in every house. Their days are structured so that basically they can set their schedule based on what they have to accomplish that day and we encourage them to build in physical training into their daily schedule...We also allow guys to come in off duty. They don’t have to have a gym membership.”
Physical Training/Activity

- Barriers to regular PT:
  - Heavy call volume
  - Lack of support from leadership or other administration
  - No time set aside during duty day for PT
  - Inadequate space and/or equipment (e.g., gym set up in bay or poorly ventilated room)
  - Chiefs and other officers not setting example
Physical Training/Activity

- Barriers to regular PT:
  - Concerns about public perception
  - Concerns about not recovering from a hard workout when getting called out for an emergency
  - Risk management limits on types of PT and concerns about injury
Barriers to regular PT:

“...That’s the big stumbling block is – is having the money...”

“The leadership....Like I said, you’ve seen our chiefs...They’re all overweight. They’re all overweight.”

“...and I had a chief that was stuck with this, that you couldn’t play organized sports...and it was like, it killed the camaraderie...”

“...we used to have basketball goals in the old fire stations and we had some injuries over there. And because of that they said ‘No more basketball’.”
Barriers to regular PT:

“We got some flack over that in the paper...each station has the same equipment...I mean it’s good stuff, and it – that’s why we caught so much heat about it because it cost some money.”

“They do provide a dungeon.”

“I think it is a good idea (fitness evaluations), but again, it goes back to, you know, what about those of us who run the busier units that aren’t necessarily guaranteed time to work out.”
Work Related Injuries Among Firefighters
Definition of “Injury”

Anything for which you have completed an accident report for the department, reported to workers compensation, or received medical care (by a physician or other medical professional).
Percent of Firefighters Injured Previous Year

- Career:
  - None: 75.3%
  - 1 Injury: 19.5%
  - 2 or More Injuries: 5%

- Volunteer:
  - None: 93.5%
  - 1 Injury: 5.1%
  - 2 or More Injuries: 1.4%
<table>
<thead>
<tr>
<th>Type of Injury</th>
<th>Career Firefighter (N = 95)</th>
<th>Volunteer Firefighter (N = 16)</th>
<th>Volunteer Firefighter (N = 11)</th>
<th>Volunteer Firefighter (N = 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial Injury/ Open Wound</td>
<td>16.8</td>
<td>31.3</td>
<td>36.4</td>
<td>0</td>
</tr>
<tr>
<td>Fractures</td>
<td>2.1</td>
<td>0</td>
<td>9.1</td>
<td>0</td>
</tr>
<tr>
<td>Dislocations, Sprains, Strains</td>
<td>97.9</td>
<td>81.3</td>
<td>63.6</td>
<td>33</td>
</tr>
<tr>
<td>Amputations</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Concussions, Internal Injuries</td>
<td>6.3</td>
<td>6.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Eye Injury</td>
<td>2.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fire/Chemical Burn, Scalds, Frostbite</td>
<td>6.3</td>
<td>0</td>
<td>9.1</td>
<td>0</td>
</tr>
<tr>
<td>Acute Poisoning and Infections</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Respiratory Injury</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thermal Stress/Heat Exhaustion</td>
<td>1.1</td>
<td>6.3</td>
<td>18.2</td>
<td>33</td>
</tr>
<tr>
<td>Heart Attack or Stroke</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>4.2</td>
<td>6.3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Most injuries were sprains and strains
- Referred to as “Musculoskeletal Injuries"
Location of Musculoskeletal Injuries
(Percent of All MS Injuries)

- Back: 34.9%
- Leg: 6.6%
- Wrist: 1.9%
- Ankle: 17.9%
- Shoulder: 16%
- Arm: 5.7%
- Neck: 5.7%
- Foot: 5.7%
- Buttocks: 2.8%
- Finger: 3.8%
- Knee: 19.8%
- Head: 1%

Location of Musculoskeletal Injuries - Image
Mental Health and the Fire Service
Mood Problems Reported by Firefighters

- Anxiety Diagnosis: 6.4% (Career), 6.5% (Volunteer)
- Depression Diagnosis: 8.8% (Career), 6.1% (Volunteer)
- CESD10 > 4: 13.2% (Career), 18.2% (Volunteer)
# Impact of Depression on Career Firefighters

<table>
<thead>
<tr>
<th>Health/Career Outcome</th>
<th>Depressed Firefighters are...</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAGE Alcohol Screener</td>
<td>2.5 times more likely to have ETOH problem</td>
<td>.001</td>
</tr>
<tr>
<td>Epworth Sleep Scale – Off Duty</td>
<td>2.9 times more likely to have sleep problem at home</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Epworth Sleep Scale – On Duty</td>
<td>1.8 times more likely to have sleep problem at work</td>
<td>.052</td>
</tr>
<tr>
<td>Self-Rated Health</td>
<td>2.3 times more likely to report “fair” or “poor” health</td>
<td>.044</td>
</tr>
<tr>
<td>Work-Related Injury</td>
<td>2.6 times more likely to report 1 or more work related injuries</td>
<td>.001</td>
</tr>
<tr>
<td>Morale</td>
<td>3.2 times more likely to report low morale</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Morale of Crew</td>
<td>3.2 times more like to report low morale of crew</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Tobacco Use in the Fire Service

The deadliest fire is right under your nose.

Cigarettes Don’t Know When You Are Asleep

Smoking is the #1 cause of preventable home fire deaths.

If You Smoke, Put It Out. All the Way. Every Time.

CLICK HERE for more information from the U.S. Fire Administration.
Prevalence of Smoking

• Most guessed that less than 5% of firefighters in their department smoked cigarettes (AHA Study).

<table>
<thead>
<tr>
<th>Past 30 Day Smoking</th>
<th>Past 30 Day Smoking</th>
<th>Past 30 Day Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career Firefighters† Fire Study</td>
<td>Volunteer Firefighters† Fire Study</td>
<td>US Adults‡ (unadjusted)</td>
</tr>
<tr>
<td>13.2%</td>
<td>16.8%</td>
<td>20.6%</td>
</tr>
</tbody>
</table>

† Smoking defined as smoked 100 cigarettes in lifetime and smoked in past 30 days
‡ Smoking defined as smoked 100 cigarettes in lifetime and, at the time of the interview, smoked at least some days. MMWR, November 13, 2009 / 58(44);1227-1232
Reasons for Decline

• Parallels National Trends (although faster decline)
• Education and Experience
• Smoking Bans and Contracts
• Peer Pressure (Firefighters don’t smoke)
• Cost
• Fewer Recruits Smoke
Current Smokeless Tobacco Use

Percent

Career 17
Volunteer 15.4
US Males 6.5

Smokeless Tobacco Use Past 30 Days

High Use Not By Accident

New Polaris Ranger 6X6 from the US Smokeless Tobacco Grant. Picture left to right is Bob Williams of US Smokeless Tobacco, James Demers of The Demers Group, James Graham of US Smokeless Tobacco, Director Rep. Daniel Eaton, Chief XXXX, President John Manning and Director Harry Boynton.
Smokeless Tobacco and Fire Service Culture

“I see a lot less smoking now but I do see a lot of dipping and chewing.” Chief in the Central US

“Most of us chew.” Volunteer Firefighter in the East

“I hate to say this, it sounds so cliché to say culture, but it’s the culture you know? I think of you come into a culture where people are using smokeless tobacco, your much more likely to use it.” Chief in the West
Alcohol Use

- Used Alcohol Last 30 Days Career: 81.8%
- CAGE > 2 Career: 12.8%
- Used Alcohol Last 30 Days Volunteer: 69.2%
- CAGE > 2 Volunteer: 13.2%
Alcohol Intake (Among Drinkers)

“On days you drank, how many drinks did you drink on average.”

<table>
<thead>
<tr>
<th>Percent</th>
<th>1 or 2</th>
<th>3 or 4</th>
<th>5 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career</td>
<td>37.9</td>
<td>32.6</td>
<td>27.9</td>
</tr>
<tr>
<td>Volunteer</td>
<td>44.6</td>
<td>29.7</td>
<td>25.2</td>
</tr>
</tbody>
</table>
Problem Drinking Among Drinkers

<table>
<thead>
<tr>
<th></th>
<th>Career</th>
<th>Volunteer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binge Episode</td>
<td>64.9</td>
<td>62.2</td>
</tr>
<tr>
<td>Driving While Intoxicated</td>
<td>9.2</td>
<td>10.8</td>
</tr>
</tbody>
</table>
Recognition of A Drinking Culture

- “I think that if you go to most fire departments, even a police department, we drink.” Chief from West
- “Police and fire are some of the top drinkers.” Firefighter from East
- “We call it [alcohol] stress management.” Firefighter from the East
- “Our use [of alcohol]? Here? I would say it is heavy.” Chief from West
Questions?