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EXAMINING INJURY DATA REPORTING PRACTICES AMONG WILDLAND
FIREFIGHTERS

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Professional Paper

presented in partial fulfillment of the requirements
for the degree of

Master of Athletic Training
In Health and Human Performance

The University of Montana
Missoula, MT

Official Graduation Date May 2018

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Examining Injury Data Reporting Practices in Wildland Firefighters

Chairperson: Dr. Valerie Moody

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Abstract:

 Wildland Firefighter (WLFF) Crews lack an injury surveillance program to collect information on non-traumatic and traumatic injuries. Tactical athletes including: police, military and structural firefighters all have a variety of collection systems in place for injury data collection. The lack of injury data prevents WLFF crews from identifying high-risk environments, implementing injury prevention programs, and improving the overall quality of care on the job. Over the last several decades the recent rise in wildfire occurrences and wildfire suppression costs creates a need for healthy and strong individuals in the field. The cost of firefighter salaries and medical care can be mitigated with the use of an athletic trainer along with better knowledge of on the job injuries. In this project we suggested an effective injury surveillance program document that can be used in data collection out in the field. We also addressed in this project the importance of having an athletic trainer in the field to promote health and safety among wildland firefighters.
A review of current practices in injury surveillance was conducted in other tactical professions such as military, structural firefighting and police. Strengths and weaknesses of each injury surveillance system were identified to facilitate development of an injury surveillance program for wildland firefighters.

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Introduction:

According to the National Interagency Coordination Center (NICC), between the years of 2006-2016 the United States averaged about 80,000 fires a year and burned nearly 6.5 million acres of private and federal land.[1,2] Containment and control of wildland fires utilizes a variety of resources and personnel who must physically perform at high intensities for long hours at a time. Long hours combined with reduced sleep and high-energy expenditures increase the risk of injury on the job.

Currently there is limited data on injury rates and types of injuries sustained. When searching for injuries associated with Wildland Firefighters (WLFF) the majority of data available is on fatality rates. Challenges in collecting injury data include multiple agencies providing oversight of the WLFF and not having one centralized reporting system to input injuries and the lack of reporting of injuries by the WLFF themselves. In addition, oftentimes the data collected combines structural firefighter injuries with wildland firefighter injuries. The need for a comprehensive injury database specific to the WLFF is essential to optimize care provided to the WLFF and to help mitigate injury risk. This database should be inclusive of traumatic and non-traumatic injuries to provide a clear understanding of the risks associated with wildland firefighting. Subsequently, the injury database can be used to implement injury mitigation strategies to be used year round.

Review of Literature

Wildland Fire Overview:

In 2017, from January 1st to September 26th, over 49,039 fires burned approximately 8,446,055 acres of land in the United States, which is greater when

compared to the annual average measured every ten years.[3] From 2006 to 2016 the average fire count was 53,885 with 5,860,611 acres burned.[3] There is a need for thousands of WLFF year to year to help control these threats. Suppression costs have also risen to upwards of two billion dollars a year. In 2015 Federal Fire Suppression costs between the United States Forest Service and the Department of Interior (DOI) (made up of: Bureau of Indian Affairs, Bureau of Land Management, National Park Service, and US Fish and Wildlife Service) were $2,130,543,000.[4] In 2016 the cost was $1,975,545, 000.[4]

The cost and number of fires are only expected to increase in the years to come. The United States burns three times as many acres of land as it did 3 decades ago and Forest Service scientists believe that the acreage burned may double again by mid-century.[5] Improper management of federal lands and the change in climate conditions has also contributed to the extension of the fire season, to approximately 78 days longer than previous seasons in the 1970's.[5] Increasing costs and the increasing number of fires create a greater need for healthy and strong personnel equipped to fight these fires. Forest Service fire personnel have increased from 5,700 employees in 1998 to over 12,000 in 2015, while staffing dedicated to management of federal land has decreased from approximately 18000 in 1998 to less than 11,000 in 2015.[5]

Overseeing coordination of fire crews occurs at the National Interagency Coordination Center (NICC) in Boise, Idaho. The NICC is the center of coordination and mobilization of resources for wildland fire and other incidents all across the United States.[6] Regionally, there are 10 geographic area coordinating centers (GACC) across the continental United States.[6] These regional centers act in the same way as the NICC, to

mobilize and demobilize emergency management resources and personnel to incidents in their area or other areas if deemed necessary.[7] Each region controls the ordering of resources and fire crews at any given fire.

<u>Wildland Fire Crew Types</u>

Firefighter personnel include men and women serving on a variety fire crew types: Type 1-IHC (Interagency Hotshot Crews), Type 2, or Type 2-IA (Initial Attack).[8] The variety of crews that contribute to suppression of wildfires include: Hand crews, Engine Crews, Fuel Crews, Helitack Crews, Hotshots, Smokejumpers, Wildland Fire Modules and Prescribed Wildland Fire Crews.[9] Firefighters can be employed through the United States Department of Agriculture (USDA) Forest Service, Bureau of Land Management (BLM), National Park Service (NPS), Bureau of Indian Affairs and Tribal Programs (BIA) and United States Fish and Wildlife Service (USFWS).[10] Hand crews are comprised of 18-20 individuals, including one crew boss and 3 squad bosses whose primary job is to construct firelines with hand tools and chainsaws.[9,10] Hand crews construct burn-out areas using drip torches and mop up/rehabilitate burned areas.[9] Engine crews are utilized during initial attack and extended fire suppression. Crews are made up of three to ten individuals who perform tasks such as laying hose, fire line construction, burnout operations, and mopping up hotspots.[9]

Fuel crews specialize in working on hazardous fuel reduction and restoration of fire adapted ecosystems.[9] Work on a ten member or less crew like this may entail timber, woodland or shrub thinning with chainsaws, utilizing prescribed fire to reduce fuel, piling and chipping of slash, chemical application to undesirable fuels, and monitoring pre and post fire effects.[9] Helitack crews range in size from 7 to 10 wildland firefighters that

specialize in helicopter operations.[9] Helicopter operations include delivery of crews for

initial attack (suppression of fires with hand tools and chainsaws) and some are trained

for rappelling while others are dropped off in rugged hard to reach terrain.[9] Other

operational tactics of Helitack crews are delivery of food and supplies, water or retardant

drops with a fixed tank or bucket drop, or assisting other prescribed fire operations.[9]

Prescribed fire crews participate in prescribed fire and wildfire activities that

include: burn unit prep, fire operations, maintenance of equipment and supplies, mop ups,

and monitoring.[9] Wildland fire modules are crews of seven to ten members that assist

in planning, fire behavior monitoring, ignition, holding, project preparation and

execution.[9] The last two crew types, Hotshots and Smokejumpers, are arguably some of

the most physically fit and knowledgeable firefighters in the field. Hotshots or IHC's

(Interagency Hotshot Crews) are type one crews made up of approximately 20 seasonal

and career firefighters.[9, 10] IHC's perform the same jobs as Hand crews; however they are

typically more specialized and are deployed to the most rugged terrain in the most

difficult spots on a fire. These crews place a huge emphasis on obtaining proper physical

fitness before going into the field.

The U.S. Forest Service and the Bureau of Land Management employ around

350-400 of the most elite wildland firefighters to become Smokejumpers.[10]

Smokejumpers serve on several bases across the northwest and are delivered to the fire

via parachute, helicopter, vehicle, or by foot.[10] Smokejumpers are typically air dropped

by parachute to the ground along with cargo boxes of tools, food, and equipment that are

utilized to control and "mop-up" the wildfire until declared out.[10] In addition to fire

suppression, Smokejumpers also provide hazardous fuel reduction services to land

management agencies. Smokejumpers also place a huge emphasis on physical fitness due to air drops into rugged terrain.

Physical Demands on Wildland Firefighters

Traditionally, the term tactical athlete has been used to identify personnel in law enforcement, firefighting, and military professions who require unique physical training in order to optimize their occupation.[11] Arguably, the WLFF also fits under this umbrella of unique athletes. All WLFF must complete a work capacity test, also referred to as the "Pack test".[12] Potential employees must complete 4.83 km (3 mile) hike on a level surface in no longer than 45 minutes carrying a 45 lb. pack.[12]

Once in the field WLFF are subjected to intense and demanding working conditions with working days ranging from 12-18 hour days at any given time, carrying gear packs ranging from 12 to 20kg (26-45lbs).[13,14] WLFF hike on steep terrain, carry heavy loads and work 14 days on with 2-4 days off. IHC's total energy expenditure (TEE) has been researched to be 4556 ± 943 kcals/ day.[12] Water turnover rates on average for both men and women are about 9.5 ± 1.7 L/d.[12] Wildland firefighters must stay healthy in order to perform their job, having proper fitness and injury care will help these tactical athletes stay healthy and alert in the field to perform to their highest capacity.

Wildland Firefighter's Injuries:

WLFF injury data is not as readily available as other tactical athlete professions. The limited research available informs us that injuries occur in a variety of ways including on the slopes of rocky terrain, managing hand tools such as chain saws or Pulaski's, or in vehicle transportation accidents.[15] High incidences of fatigue from long

shifts day in and day out increases the risk for potential injury. Lack of proper nutrition and decreased calorie intake can also have an effect on the WLFF's performance.

Britton et. al. [16] conducted research in 2013 looking into injuries among wildland firefighters. Her research examined non-fatal firefighter injuries among federal wildland firefighters reported to the US Department of the Interior (DOI) during the years 2003-2007. The information was collected directly from the Safety Management Information Systems (SMIS) Fire Management Incident Report module, a web-based reporting catalog controlled by the DOI.[16]

Britton et. al.[16] found that ages of injury range from the youngest at 17 to the oldest around 65. Engine crews and Type 1 Hand crews had the highest number of reported injuries, particularly in younger WLFF, whereas the older firefighter's injuries had the largest reported population within overhead/camp crews.[16] Britton et. al.[16] also found that the most frequently injured body part was the lower extremity at 35.2% (n=458/1301) followed by the upper extremity at 22.5%(n=293/1301). It was also found that one third of the injuries 23.8% (n= 19/80) sustained by smokejumper and helitack crews were to the head or neck and 16% (n=13/79) of overhead/camp crews' injuries were to the back.[16] According to Britton et.al.[16] 65% (n=844/1301) of injuries reported occurred during peak fire season (July-September). In another study, Purchio et. al.[17] asked WLFF to reflect and self report on the injuries they sustained over their previous 5 seasons. There were a self-reported total of 453 injuries sustained on the job.[17] The data's demographic included out of 453 responses 87.9% male and 11.9% female 0.2% were unreported or did not distinguish gender.[17] Based on demographics WLFF most likely to sustain and injury were males at 88% (n=398/453) between the ages of 35-44

(n=171/453) serving on an engine crew (53%) (n=240/453). Purchio et. al.[17] found that on an average 14-day roll most of the reported injuries occurred on the tenth day (15%) (n=18/131) followed by the 14th day (11%) (n=13/131).

Britton et. al.[18] also discussed in her paper *Fire Characteristics Associated with Firefighter Injury on Large Federal Wildland Fires* that the odds of injury increase as the complexity of the fire increase. This study analyzed information provided by the National Interagency Fire Center from the years 2003-2007 on injuries when firefighters could not return to his or her job assignment, person-days worked, and fire characteristics (year, region, season, cause, fuel type, resistance to control, and structures destroyed). The complexity or the peak incident management level (PIML) of a fire is determined by the staff of the agency holding jurisdiction over the fire.[18] Fires are rated on a level from 1-5, type 1 being the most complex fire requiring the most elite firefighting units from all over, whereas type 5 are the least complex that often involve only one local firefighting unit.[18] As expected, Type II or I fires are more likely to have reported injuries. Factors contributing to that are the increased personnel working on the fire and the amount of time spent extinguishing the fire.[18]

Purchio et. al.[17] found of 248 WLFFs, 91% (n=226) experienced some type of injury on the fireline. Nearly half of the injuries reported (n=209/453) were musculoskeletal injuries including sprains and strains, alongside a variety of other low back, knee and ankle injuries.[17] 76% of WLFF (n=343/453) reported that their injury directly affected their ability to continue with normal daily tasks.[17] 16% (n=17/108) felt that their injury was preventable when it occurred on the fire line.[17] Complimentary data published by Britton et. al.[16] states that 29.4% (n=382/1301) of injuries were sprains or

strains and 35% (n=458/1301) of the injuries reported were to the lower extremity.

Sprains and strains were also the leading injury in Engine crews at 26.8% (n=117/437),

type two hand crews at 34.1% (n=85/249), Smokejumper and Helitack crews at 45%

(n=36/80), and Overhead Camp Crews at 27.9% (n=22/79).[16] Type one Hand crew's

number one injury was slips trips and falls 26.8 (n=59/220), followed by poisoning and

environmental exposure at 21.8% (n=48/220).[16] Other injuries included

contusions/wounds, that fell to a close 2nd or 3rd on the injury list depending on crew

types, followed by burns/heat related, fracture/dislocation, and other/unspecified.[16]

Although the data presented provides foundational knowledge on types of injuries

sustained in wildland firefighting, it does not fully encompass what is actually happening

in the workforce. Limited documentation and reliance on reported information is not

enough to paint a clear picture of the extent of injuries sustained. In addition, little to no

information exists from non-federal agencies regarding injuries sustained by wildland

firefighters and the impact of those injuries in the workforce.

Injury Data Collection Methods:

The DOI collects non-fatal firefighter injury data through occupational injury

reports, illness, workers compensation reports or accident reports involving DOI

employees.[19] Information is accessed through an online web-based reporting system titled

SMIS (Safety Management Information Systems) and incidents are reported by the

involved employee or a supervisor.[19] In 2002 the Fire Management Accident Report

Module (FMAR) was implemented to help capture fire specific information during any

fire management activity, including both wildland firefighting activity and structural

firefighting.[19] Therefore researching injuries specific to wildland firefighting, information must be teased out from other unrelated incidences.

Incident Management Situation Reports (IMSR) maintained by the National Interagency Coordination Center in Boise, Idaho is another system that collects data on large fires that require federal response.[18] These federal agencies include the US Forest Service and the following agencies within the DOI: Bureau of Land Management, Bureau of Indian Affairs, United States Fish and Wildlife Service and the National Park Service.[18] Nonfederal agencies are not required to participate but may voluntarily submit information through the system.[18] Final reports from each fire culminate information on number of injuries, personnel deployed, and fire characteristics.[18]

Collection of the information above in these inter-agencies unfortunately is not specifically divided between wildland firefighters and structural firefighters and the injury information collected is not categorized and reported by specific injury. The lack of specific injury data limits the ability to take the next step toward preventative measures.

When a wildland firefighter sees an emergency medical technician (EMT) on the job, the EMT must fill out a medical incident report (MIR) (ICS-206 WF). Appendix 1 following this paper provides a copy of the ICS-206 WF. Typically in these situations, they are very serious incidences that require immediate medical attention and transport. EMT's are not trained to diagnose ligamentous and muscular injuries, so in the event of a musculoskeletal injury often times there is not an appropriate report of their patients' conditions. In the United States, wildland firefighting data reported by the NICC primarily focuses on fatality rates.[20] For this reason, having a reliable musculoskeletal

injury surveillance system will help capture not only fatalities, but also help track injuries that may occur on the job with wildland firefighters. The first step is to examine what other tactical athlete professions are using as current practice for injury reporting and documentation.

Military:

Tactical athletes injured on the job, such as military personnel, experience a more defined system of reporting. The *Defense Medical Surveillance System* (DMSS) is a central repository of medical surveillance data for the United States armed forces (Including Army, Navy, Air Force, Marines) that is maintained by the *Armed Forces Health Surveillance Center* (AFHSC).[21, 22] The DMSS receives data from over 100 field sites, and when the data is received, the information is checked for completeness on arrival to be sure that all essential entries have been logged and identified before they are fully submitted into the database.[21]Longitudinal records are kept for individuals who have served in the US military since 1990.[21] The DMSS include document statuses, changes in demographics, military characteristics, military and medical experiences and service members experience throughout their careers.[21]

Originally the DMSS mainly collected data on traumatic injuries.[22] During 2001 and 2002 the US military recognized a need to update injury surveillance to include not only acute traumatic injuries, but also a subset of musculoskeletal conditions found in the Chapter 13, ICD-9-CM focusing on the musculoskeletal system.[22] Inclusions of these injuries have been a standard in many well-accepted injury surveillance systems, including those maintained by the National Collegiate Athletic Association (NCAA).[22] Three groups within the Department of Defense (DOD) worked independently to identify

a list of injury related diagnosis codes. All three lists contributed to broader definition of injury surveillance within the military. The three contributing groups were: Army Medical Surveillance Activity, DOD Military Injury Metric Working Group, and Injury Prevention Program in the US Army Center for Health Promotion and Preventive Medicine (USACHPPM).[22]

Law Enforcement:

Law Enforcement has been ranked the 10th most dangerous occupation in the United States, specifically referring to police and sheriff patrol officers.[23] Currently there is no surveillance database specifically designated to law enforcement tactical athletes. Today's variety of published fatality and assault data is accessed in the *National Law Enforcement Officers Memorial Fund Database* (NLEOMF) or the *Law Enforcement Officers Killed and Assaulted* (LEOKA) annual statistical analysis.[24] Information is also found in Law Enforcement workman's compensation reports through the United States Department of Labor or through the United States Bureau of Labor Statics (USBLS).[23,25] The USBLS conducts an annual *Survey Of Occupational Injuries and Illness* (SOII). [25,26]

The SOII is the largest injury and illness survey system in the country providing non-fatal injury and illness data for occupations including, but not limited to, firefighters and police officers, from a sample of about 200,000 employers.[24,25, 26 24,27] Recording criteria for non-fatal workplace injury and illness must fall under one or more of these four complications: Loss of consciousness, days spent away from work, restricted work activity or job transfer, and medical treatment beyond first aid care.[28] Employers must also report any injury or illness diagnosed by a physician or other licensed health care professional.[28]

The NLEOMF is a database of all line-of-duty deaths broken down by a "primary reason", whether it was accidental or felonious, and other demographic factors.[24] LEOKA is a statistical compilation published of law enforcement officers who were accidentally killed or assaulted in the line of duty, prepared and published annually by the FBI Uniform Crime Reporting System's Law Enforcement Officers Killed and Assaulted Program.[24] Information reported in LEOKA regarding felonious deaths includes: narrative information, weapon type, assignment the officer was on, and distance between officer and offender.[24] Nonfatal assaults are broken down by extent of the injury and type of weapon.[24]

Structural Firefighters:

In 2015 the major types of injuries that occurred on fire ground operations were strains, sprains, and muscular pains (52.7%).[29] In non-fire ground operations 58.0% of injuries were attributed to strains, sprains and muscular pains.[29] This data was collected by the *National Fire Protection Association* (NFPA) in 2016. The NFPA was established in 1896 as a global non-profit devoted to firefighter health by eliminating injury, death, economic loss due to fire, and also eliminating electrical and related hazards.[30] The NFPA establishes codes and standards, research, training, education, outreach and advocacy for firefighters. Annually the NFPA surveys all volunteer and career fire departments across the United States. The NFPA surveys those departments who protect communities with a population larger than 2,500 as well as a random sample of fire departments who serve communities under 2,500.[24] Two major reports are published each year in the *NFPA Journal*.[24] *The Firefighter Injury Report* estimates the total number of line-of-duty injuries, broken down by nature of each injury and type of duty as well as

cause regarding fire ground injuries.[24] In addition, the *Firefighter Fatality Report* breaks down all on duty deaths by cause, nature, type of duty, demographics, type of property regarding fireground deaths and the relationship between all of these factors.[24] The NFPA studies firefighter fatalities and injuries to provide national statistics on their frequency, extent, and characteristics.[29] Programs like the NFPA create availability of injury surveillance data so departments and individual members can recognize injury prevention needs for firefighters.

Additional resources for firefighter injury data are the International Association of Fire Fighters (IAFF), United States Fire Administration (USFA), and the National Fire Incident Reporting System (NFIRS).[24] The IAFF published a report from about 100,000 firefighters using a stratified random sample of career-only and career/volunteer fire departments titled: *Death and Injury Survey* in 2000.[24] Information collected during this survey included: line-of-duty deaths and injuries, occupational injury and illness, retirements, and incidence and type of infectious disease exposure.[24] Injuries are broken down by nature of the injury and type of duty performed during the injury.[24] The USFA also produces an annual report of firefighter on duty deaths.[24] Fatality records are broken down by nature and cause of injury, type of duty, fireground activity, demographics and type of property.[24] The data recorded overlaps well with the NFPA's firefighter fatality report. Lastly the NFIRS is an incident based database maintained by the USFA.[24] The database collects information from 44 states and consists of about one third to one half all United States fire departments.[24] The NFIRS maintain a firefighter casualty model which includes injury information on the nature, cause and severity of the injury, body part involved, activity at the time of the injury, and type of personal protective equipment

worn and whether it performed appropriately.[24] Similarly to Law Enforcement the SOII

also provides accessible information on Firefighter occupational injury and illness.[24]

Analysis of Existing Documentation:

The availability of injury data in the emergency responder workforce is very

limited. There are four main types of resources seen that contribute to injury surveillance

databases: responder-specific sources, incident-specific sources, general population

occupational health and safety sources, and focused epidemiological studies.[24]

Responder-Specific sources are a collection of injury and fatality data reports for a single

service such as police officers or structural firefighters.[24] Information from these sources

can be used to focus on the uniqueness of hazards specific to that profession.[24] Incident-

Specific databases report incidents specific to a certain injury or disease that may occur.[24]

General Population Data is a collection of data on work related injuries, illnesses, and

fatalities that can be used in an analysis of occupational coding data sets.[24] Focused

studies are studies conducted by individual researchers or small cohorts that look at one

or more general safety or health issues.[25,26]All five of these resources are essential to aid

in the collection of injury surveillance data. While all 5 are not necessary for injury data

collection it is recommended to have the most resourceful pieces of data that do not

necessarily over lap with each other.

Military:

While access to the DMSS is limited for public use, an overall picture of the

process is provided to illustrate the record keeping system in place and how this database

collects and shares a variety of medical information. Figure 1 below was resourced from
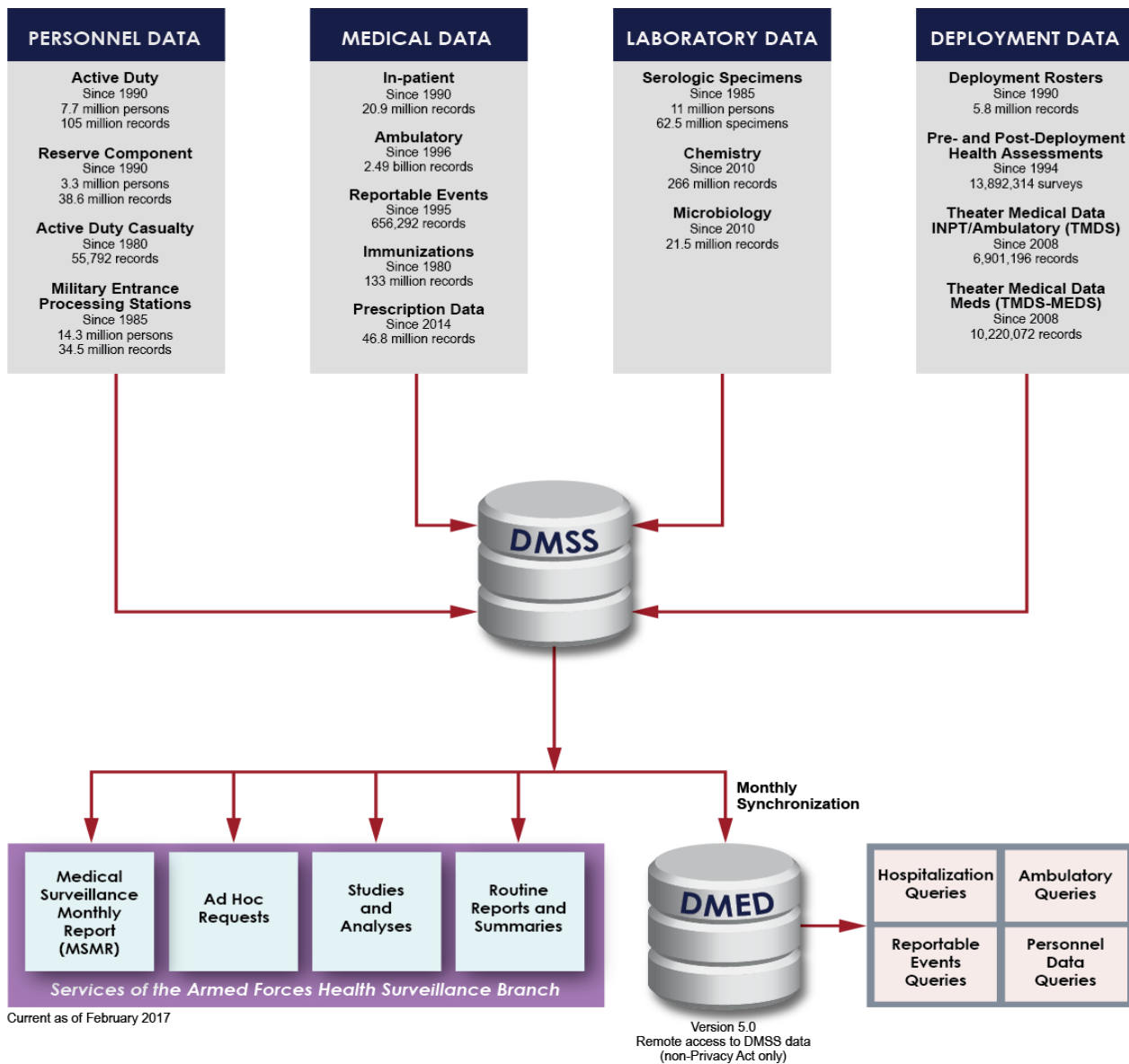
the military health website breaking down the DMSS and introducing the *Defense Medical Epidemiological Database* (DMED).[31]

The DMSS is a collection of personnel data, medical data, laboratory data, and deployment data from all divisions of the military (Air Force, Marines, Navy, and Army). Personal data contains all information on serving active duty, Reserves and National Guard personnel. Personal data also includes casualty data for active duty and active Reserve/National Guard deaths as well as personnel involved at Military entrance processing stations.[31] Military enlistment processing stations are locations where applicants go to complete the enlistment process. Medical data includes: all in-patient hospital data, ambulatory data, reportable events, immunizations, and prescription data.[31] Reportable medical events are classified by the military as inherent and significant threats to military operations and to the health of the public. A full list of reportable events can be found in the *Armed Forces Reportable Medical Events Guidelines and Case Definitions.*[32] Laboratory Data includes: serologic specimens, chemistry, and microbiology. Lastly, deployment data includes: deployment rosters, pre- and post-deployment health assessments, theater medical data INPT/ambulatory (TMDS), theater medical data meds (TMDS-MEDS). Theater Medical Data Store (TMDS) is a web-based server with all service member information collected at theater based medical treatment facilities while on deployment.[33] All of the reports listed above are compiled into the DMSS which then become monthly reports which may be access through the DMED. The DMED provides a standardized remote access point for current epidemiologic methodology for authorized military personnel.[34] Authorized military personnel available

to view this database are U.S. military medical providers, epidemiologists, medical researchers, and safety officers or medical operators/clinical support staff.[34]

The DMSS centralizes health information for all employees for easy analysis and access. The DMED provides easy access to all medical professionals who can in turn educate and implement recommendations for better health benefits across the military. The importance of centralization of all information is to help give medical professionals a better picture of trends and issues that may arising. When developing a wildland firefighter database, centralization of information will be an important concept for injury information access. Table 1: Injury Surveillance System Review-Military below is references for all information discussed in this section.

Figure 1[31]**:**

PERSONNEL DATA

Active Duty
Since 1990
7.7 million persons
105 million records

Reserve Component
Since 1990
3.3 million persons
38.6 million records

Active Duty Casualty
Since 1980
55,792 records

**Military Entrance
Processing Stations**
Since 1985
14.3 million persons
34.5 million records

MEDICAL DATA

In-patient
Since 1990
20.9 million records

Ambulatory
Since 1996
2.49 billion records

Reportable Events
Since 1995
656,292 records

Immunizations
Since 1980
133 million records

Prescription Data
Since 2014
46.8 million records

LABORATORY DATA

Serologic Specimens
Since 1985
11 million persons
62.5 million specimens

Chemistry
Since 2010
266 million records

Microbiology
Since 2010
21.5 million records

DEPLOYMENT DATA

Deployment Rosters
Since 1990
5.8 million records

**Pre- and Post-Deployment
Health Assessments**
Since 1994
13,892,314 surveys

**Theater Medical Data
INPT/Ambulatory (TMDS)**
Since 2008
6,901,196 records

**Theater Medical Data
Meds (TMDS-MEDS)**
Since 2008
10,220,072 records

DMSS

**Monthly
Synchronization**

Medical Surveillance Monthly Report (MSMR)

Ad Hoc Requests

Studies and Analyses

Routine Reports and Summaries

Services of the Armed Forces Health Surveillance Branch

Current as of February 2017

DMED

Version 5.0
Remote access to DMSS data
(non-Privacy Act only)

Hospitalization Queries

Ambulatory Queries

Reportable Events Queries

Personnel Data Queries

Defense Medical Surveillance Systems . Health.mil. https://health.mil/Military-Health-Topics/Health-Readiness/Armed-Forces-Health-Surveillance-Branch/Data-Management-and-Technical-Support/Defense-Medical-Surveillance-System. Published February 2017.

Table 1: Injury Surveillance System Review – Military

Surveillance Systems	Pros	Cons	Survey	Regularly updated Database of Information	Published Information Resources:
Defense Medical Surveillance System (DMSS)	-Encompasses all divisions of the military. -Consistent information between all divisions. -Publishes Monthly Reports. -Electronic system	-Data available only to certain personnel within the Military		X	*- Defense Medical Epidemiological Database* (DMED) provides access to all published reports

Law Enforcement:

Unlike the military system, a centralized law enforcement database is not available but there is sufficient evidence and published articles to promote police officer health and safety. The mission of the *National Law Enforcement Officers Memorial Fund* (NLEOMF) is to make the profession safer and to tell the history of those Americans who have served our country within law enforcement.[35] Their website offers a variety of officer safety resources, traffic safety tips, fact sheets, and links to "Destination Zero", a program designed to help agencies improve health and safety for law enforcement officers.[35] NLEOMF also recently published an article studying over 1,016 line of duty deaths from the years 2010-2016.[35] Information was broken down into a variety of categories and case studies. Some examples include: type of death (traffic related incident, call for service, job related illness etc.) along with call type (disturbance robbery suspicious persons etc.), type of firearms used in domestic disputes, and more. [35]

The *Law Enforcement Officers Killed and Assaulted* (LEOKA) is a report released by Federal Bureau of Investigation year to year.[36,37] The United States Department of Justice Federal Bureau of Investigations collects, analyzes, and releases the information every year regarding officer fatality and assault. The FBI reaches out to U.S. Capitol Police, U.S. Department of Homeland Security, U.S. Department of the Interior, U.S. Department of Justice, U.S. Department of the Treasury, and the U.S. Postal Inspection for information about officers who were assaulted or killed in the line of duty.[38] Neither the NLEOMF or LEOKA breakdown the specific injuries sustained by the officer; they are only broken down by how the assault was committed against the officer.

The more non-specific to law enforcement database is the SOII. The SOII survey is a yearly random sampling of about 200,000 employers designed to provide an estimation on the number of work related injuries and illnesses and the rate at which they occur. The data collected is use to identify and correct safety hazards in the work environment. The Bureau of Labor Statistics surveys business in a variety of categories, some of those categories include, but are not limited to: Health care and social assistance, manufacturing, accommodation and food services, construction, educational services, finance and insurance, agriculture, forestry, fishing, and hunting, and utilities etc.[27] Participation in the survey is not required for all business, only a select few business are notified that their participation is mandatory, others may choose to participate.[25] Incidents must be reported in this survey if the there was a loss of consciousness by the employee, days spent away from work due to the injury/illness, restricted work activity or job transfer due to the injury/illness, and medical treatment beyond first aid care.[28] Published results of this survey give overall numbers for incident rates of non-fatal injury/illness.

Unfortunately, the survey does not break down types of injuries (fractures, dislocations, strains, sprains, lacerations, etc.) with each profession. They are only broken down by general days missed from work due to that specific injury.[25] Specifically, in the 2016 report, police protection incidence rate of injury was the highest at 10.2 per 100 full-time workers.[25] This represents a very small proportion of the police force.

Overall the reporting systems for Law enforcement specifically targets assault and fatality prevention. There has yet to have been a developed surveillance system for specific injury prevention in relation to musculoskeletal injuries on the job. The law enforcement databases specifically the LEOKA and NLEOMF are a positive influence on the workforce due to their dedication to employee and public education. Table 2: Injury Surveillance Systems Review- Law Enforcement compares all the surveillance systems discussed above in this section.

Table 2: Injury Surveillance Systems Review – Law Enforcement

Surveillance Systems	Pros	Cons	Survey	Regularly updated Database of Information	Published Information Resources:
National Law Enforcement Officers Memorial Fund Database (**NLEOMF**)	-Continually updated information as fatalities occur. -Promotes Public Education and Officer Safety Resources	-Does not cover non-fatal officer data -Non-Profit no guaranteed funding		X	-Fatalities Report
Federal Bureau of Investigation's *Law Enforcement Officers Killed and Assaulted* (**LEOKA**)	-Covers both fatal and non-fatal assaults. -Address how the assault was committed, weapon used etc. -Information is collected from 6 U.S federal departments.	-Does not break down what specific injuries were sustained during the assault.		X	-Annual *Law Enforcement Officers Killed and Assaulted* Report
Survey Of Occupational Injuries and Illness (**SOII**)	-Mandatory to certain employers. -Public data accessible to all employers once published. -Published annually with reader friendly charts diagrams and graphs	-Reviews a variety of professions. Does not specifically target tactical athlete professions. -Some surveys are not mandatory for employers.	X		-Bureau of Labor Statistics publishes Injury and Illness data from the SOII for employers and the public to access

Structural Firefighters:

The annual *Firefighter Injury/Fatality Repor*t published by the NFPA is seemingly one of the most resourceful surveillance documents available for injury resources. As mentioned in the previous section, the NFPA sends out a yearly survey to a variety of fire departments across the country. The voluntary *National Fire Experience Survey* provides data for firefighter injury and fatality reports.[39] Figure 2 is the injury data collection section included below and is the most relevant section of the survey to this paper.[40]

Figure 2[40]:

PART V **INTENTIONALLY SET FIRES IN STRUCTURES AND VEHICLES**

Report in this part fires that were intentionally set for structures and vehicles.

	Number of Fires	Number of Civilian Fire Casualties. If none, write 0		Estimated Property Damage and Contents from Fire. If no loss, write 0
		Deaths	Injuries	
1. Structure Fires Intentionally set (IT=110–129, and cause E1=1)				
2. Vehicle Fires Intentionally set (IT=130–139, and cause E1=1)				

PART VI **FIRE SERVICE EXPOSURES AND INJURIES**

Total number of firefighters that were exposed to infectious diseases (hepatitis, meningitis, HIV, other) in 2016 (severity 1, cause 4, and object 25, 51): _____

Total number of firefighters that were exposed to hazardous conditions (asbestos, chemicals, fumes, radioactive materials, other) in 2016 (severity 1, cause 4, and object 41, 52, 53, 56): _____

Total number of nonfatal firefighter injuries (not exposures) during all types of duty in 2016 (severity 1 (not exposures), and severity 2 thru 6): _____

On-Duty Fire Fighter Injuries (not exposures to infectious diseases) by Type of Duty, and Nature of Most Serious Injury

Departments using NFIRS 5.0 should include results on cases where severity is 1 (not exposures), and severity is 2 thru 6. Primary apparent symptom (PAS) codes are noted in parenthesis for each category. At non-fire emergencies includes EMS and rescue calls, and hazardous condition calls, while other on-duty includes inspection and maintenance duties.

Nature of Most Serious Injury (Primary Apparent Symptom (PAS) codes in parenthesis)	Type of Duty				
	(A) Responding to or Returning from Incidents	(B) At the Fire Ground	(C) At Non-Fire Emergencies	(D) Training	(E) Other On-Duty
1. Burns (PAS 12, 13, 14, 15)					
2a. Smoke or Gas Inhalation (PAS 01, 02)					
2b. Other Respiratory Distress (PAS 03, 44, 64, 65)					
3. Burn and Smoke Inhalation (PAS 11)					
4. Wound, Cut, Bleeding, Bruise (PAS 21–25, 35, 36, 72, 73)					
5. Dislocation, Fracture (PAS 31, 32, 63)					
6. Heart Attack or Stroke (PAS 41, 42, 43)					
7. Strain, Sprain, Muscular Pain (PAS 33, 34, and 98)					
8. Thermal Stress (frostbite, heat exhaustion) (PAS 57, 83–85)					
9. Other (PAS All other codes)					
10. TOTAL					

Other (please specify): _____

FIREGROUND INJURIES BY CAUSE

In the following table, include injuries that occurred at the fireground as reported in column B above. Report the number of injuries that occurred at the fireground by cause, based on the initial factor leading to the injury. Departments using NFIRS 5.0 can find cause and object involved in injury codes in parentheses.

1. Exposure to Fire Products (cause 4, object 47–49, 53, 64): _____
2. Exposure to Chemicals or Radiation (cause 4, object 52, 56): _____
3. Fall, jump, slip, trip (cause 1 to 3): _____ 4. Overexertion, strain (cause 7): _____
5. Contact with object (cause 6): _____ 6. Struck by (cause 5): _____
7. Extreme weather (cause 4, object 62): _____ 8. Other: _____

Please report the number of injuries that resulted in lost time (severity 4 thru 6): _____
How many hours were lost as a result of these injuries? _____

FIRE DEPARTMENT VEHICLE CRASHES

Please report below the number of crashes involving fire department emergency vehicles or fire fighter's personal vehicles while responding to or returning from incidents in 2016. (If none, report 0).

Accidents involving fire department emergency vehicles: _____ Resulting fire fighter injuries: _____
Accidents involving fire fighter's personal vehicles: _____ Resulting fire fighter injuries: _____

Survey of Fire Departments for United States Fire Experience During 2016.

Injuries are broken down in this report by nature of injury and type of duty, fire department vehicle accidents that resulted in firefighter injury, fireground (area what the fire is occurring) injuries by cause, and more.[39] From the first survey the NFPA put out in 1981 total firefighter injuries have decreased almost 50%.[39] In 1981 there were an estimated 103,340 injures and in 2016 there was an estimated 62,085.[39] The reduction in firefighter injuries may be due to the education and research the NFPA publishes on a yearly basis, updating regulations and informing departments of appropriate safety measures.

Other resources such as the IAFF[41] and USFA[42] also publish helpful documents and resources for firefighters. IAFF maintains a publically accessible Line-of-Duty death database.[41] The USFA is a U.S. Department of Homeland Security's Federal Emergency Management Agency created to educate the public, conduct research through data collection and publish current research.[42] The NFIRS is the system utilized by firefighters for data collection within departments.[43] The NFIRS sets a standard that fire departs use all over the country to uniformly report their activities including EMS and fire response along with equipment used during each response. The free system is available through the USFA.[43]

Several reasons have been identified for completing standardized medical documentation. The first reason was quantification of data leaves a footprint.[44] Having a trail of documentation quantifies the purpose of the system.[44] The second reason was about data using the same language.[44] The fire service should speak the same language when comparing and sharing its data. Much like the DMSS does for the military having a national standard improves the communication and allows documentation and analysis to

be easily identified. Finally the NFIRS serves as a business asset.[44] It allows the fire

service to identify trends in the data as well as quantify activities and resources.[44] Table

3: Injury Surveillance Systems Review-Law Enforcement below compares all the

surveillance systems discussed above in this section.

Table 3: Injury Surveillance Systems Review – Structural Firefighters

Surveillance Systems	Pros	Cons	Survey	Regularly updated Database of Information	Published Information Resources:
National Fire Protection Agency's (NFPA) *National Fire Experience Survey (NFES)*	-Reaches a large audience of structural firefighters across the nation. -Includes musculoskeletal injuries as well other medical conditions that may occur due to job exposure. -Large Survey Response -Publishes data annually	-Not mandatory -Paper or electronic submissions	X		-Annual *Firefighter Injury Report* -*Annual Fatality Report*

International Association of Fire Fighters (IAFF)	-Line-Of Duty database collects publically reported information and departments. -Resources are provided for departments on appropriate protocol and handling of line of duty deaths -Association provides health tips and variety of other wellness information.	*-Death and Injury Survey* has only been conducted once in 2000. -Does not provide any injury data.	X	-Line-of-Duty death database *-2000 Death and Injury Survey*
United Stated Fire Administration (USFA)	-Reference for NFPA articles -Provides Information collected from and advocates NFIRS use in data collection -Public friendly understand of published data.	-Only collects data from those reporting with NFIRS and resources published by the NFPA	X	-Provides training and information on fire safety and management. Works in conjunction with NFPA to publish statistics and Information.

The National Fire Incident Reporting System (NFIRS)	-Largest national annual database on fire information -Catches about 75% of annually reported fires, about 24,000 departments report using NFIRS each year. Information documented after each call (nature of the call, the actions firefighters took in response to the call, and the end results, including firefighter and civilian casualties, a property loss estimate)	-Not required to be utilized by all fire departments or agencies. -Does not specify injury specific data for fire service employee	X	-Data collection system utilized by fire departments all across the United States

Suggested Method of Injury Documentation:

The World Health Organization's Guide to Injury Surveillance outlines a simple 8-step flowchart for developing a successful surveillance system.[45] The first step is to define the problem.[45] Once the problem is defined, finding a means to collect the data is the next step.[45] After the data is collected, a system for the data entry needs to be developed.[45] As the data is entered into the database it is processed and interpreted.[45] With the interpreted results, reporting the results and using those results for prevention

and treatment can be conducted.[45] Most importantly every system must be evaluated for its success and changes that should be made.[45] Figure 3 below displays the flow chart.

Figure 3[45]:
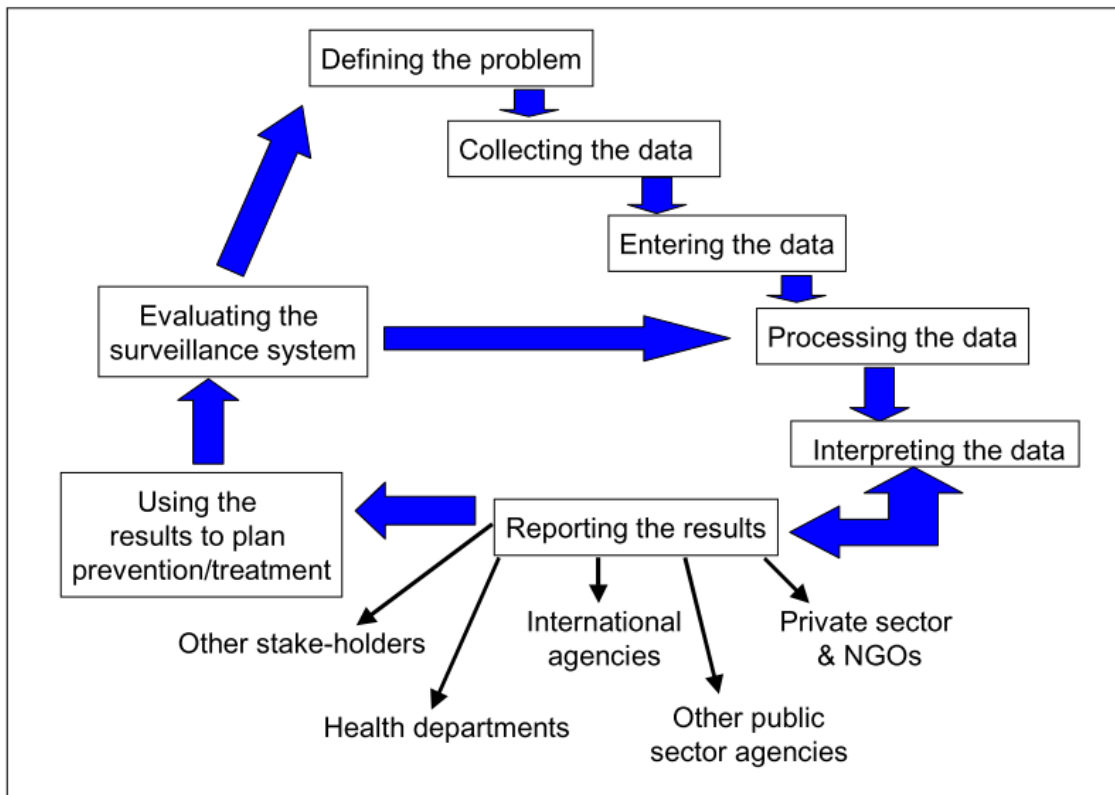
Holder Y, Peden M, Krug E, Lund J, Gururaj G, Kobusingye O. Injury Surveillance Guidelines. *World Heal Organ*. 2001.

  The NFPA and Military DMSS system have modeled this system designed by the World Health Organization. Through a yearly collection of data, analysis is conducted and results are shared with fire departments and other firefighting agencies. As the NFPA strives to better protect their firefighters new equipment and methods are updated to better reduce the incidence of injury or loss. The DMSS functions in a similar way, except the DMSS becomes the resource for all medical information regarding every individual serving in the military. Medical paperwork is entered into the system where it can be referenced by any military medical provider.

Similar to the military, the DOI is divided up into 5 divisions that hire WLFF and

EMTs. Tracking data divided between 5 divisions is not a successful method of

documentation. Unifying documentation and providing one database that can be accessed

electronically will make injury/illness tracking a more simplified process for data

analysis. EMT's, Athletic Trainers or other health care providers in the field may submit

electronic documents and forms to this database, which in turn can be analyzed post fire

season. Figure 4 below represents the contribution of all 5 divisions of the DOI to the

Surveillance System.

Figure 4:
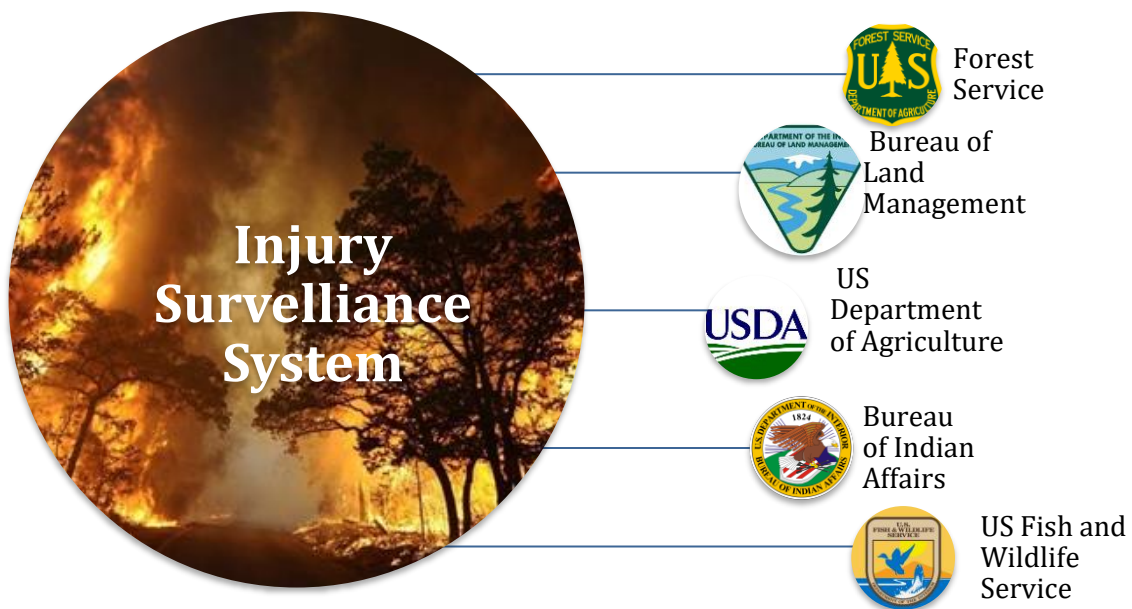
Injury Surveillance for Collegiate and High School Sports:

Along with the DMSS and the NFPA the National Collegiate Athletic Association has been successfully collecting and analyzing injury surveillance data since 1982.[46] The Injury Surveillance Program (ISP) is designed to track and analyze medical illnesses and injury data that result from sport participation.[46] Athletic Trainers have been collaborating with the NCAA since the beginning of the program, helping develop the largest sports injury database program in the world.[46] The NCAA Sport Science Institute successfully does this by partnering with Datalys. Datalys is an independent non-profit research organization that manages the ISP.[46] NCAA Schools are not required to participate, but it is highly desired for the benefit of collegiate athletes.

Athletic Trainers working in schools who utilize web-based electronic medical records (EMR) have the option to sign up for the ISP and submit data every week for every sport.[46] Compatible web based EMR's make the process quicker and simpler for athletic trainers. Compatible EMR systems include: Athletic Trainer System, SIMS, SportsWare Online, Vivature NExTT, and Presagia Sports.[47] For those schools that do not use compatible EMR systems, Datalys makes the process uncomplicated and offers a free web-based system for any school to utilize.[47]

High School Reporting Information Online (RIO) in another internet-based data collection tool used by the National High School Sports-Surveillance Study.[48] RIO was first implemented in 2005 and has published annual injury analysis articles since its birth.[48] The system was originally established to mirror the highly successful NCAA ISP at the high school level.[48] Over the years the system has evolved to meet the needs of individuals within the high school community including: student athletes, parents,

pediatric sports medicine clinicians, athletic directors, and the National Federation of State High School Associations (NFHSA).[48] Dr. R. Dawn Comstock and her staff at the University of Colorado Denver analyze the data sent in from high schools all over the country.[48] Participation in the study is not mandatory but highly recommended. In order to participate an athletic trainer working at a high school must apply and contact High School RIO at UC Denver. The research completed by UC Denver is funded through a combination of sponsors and research grants.[48]

The NCAA ISP and RIO both demonstrate successful methods of injury documentation utilizing athletic trainers. It is noted that for the NCAA IPS and RIO that the contributing injury information is supplied by Athletic Trainers. Athletic Trainers are qualified medical professionals to diagnose and treat injuries. Employees collecting the information must be qualified to diagnose injuries in order to collect accurate data.

Designing an Injury Surveillance System

The first step to successful surveillance system is establishing uniform documentation. Identifying necessary information that can be utilized in data analysis will help create successful outcomes. After analyzing a variety of surveys and databases the most appropriate documents used in injury data collect were pieces of the NFPA's *National Fire Experience Survey* and SOII survey. Additionally, the documents already used within Wildland firefighting medical documentation are a beneficial resource for developing an appropriate injury surveillance document. Following this paper, Appendix 2 is a drafted document of appropriate information to be included during wildland fire injury surveillance.

The World Health Organization (WHO) breaks down the steps to building an injury surveillance program.[43] Figure 5 is an image of the flow chart provided by the WHO. [43] The United States Forest Service has expressed an interest in injury prevention among wildland firefighters and serves as the key stakeholder for the development of this injury surveillance system. Objectives for this injury surveillance system include creating a database to track wildland firefighter injuries with the intent to identify strategies to reduce injury rates. Including data from all 5 entities (USFS, USDA, BIA, BLM, and USFWS) is critical to not only creating a uniform database to better understand the types of injuries occurring in wildland fire, but also to the development of appropriate injury prevention strategies to mitigate risk. As a result of analysis across systems, the development of a uniform medical record is presented in Appendix 2 that may be used to initiate creation of an injury database. Involved stakeholders, such as the United States Forest Service must approve a project moving forward using this documentation system. Implementation of a pilot project with an institution and involved stakeholders is recommended. The next section of this paper illustrates the successes of several programs that have incorporated athletic trainers with tactical athlete professions for the purposes of documenting injuries and demonstrating reduction of injuries and overall costs to the organizations.

Figure 5[43]**:**

1. Identify stakeholders
2. Define system objectives
3. Define a case
4. Identify data sources
5. Assess available resources
6. Inform and involve stakeholders
7. Define data needs
8. Collect data
9. Establish a data processing system
10. Design and distribute reports
11. Train staff and activate system
12. Monitor and evaluate

Holder Y, Peden M, Krug E, Lund J, Gururaj G, Kobusingye O. Injury Surveillance Guidelines. *World Heal Organ*. 2001.

Athletic Trainers Already Working with Tactical Athletes:

In 2016 George Mason University Sports Medicine Assessment Research and Testing Laboratory and the Athletic Training Education Program teamed up with Prince William County Department of Fire and Rescue in Virginia to provide nationally certified

and state licensed Athletic Trainers.[49] Their mission was to deliver part time cost efficient

medical and healthcare services to injured or ill employees and contribute to the

prevention and rehabilitation of injuries.[49] In nine months the cost savings was

documented at $593,682.59 for an employee working 20 hours a week with structural

firefighters.[49] The athletic trainer's duty was to also collect injury data.[49] Utilizing

SportsWare, an electronic medical database, they were was able to track treatment data

and employee injuries.[49] Figure 6 illustrates the central role the athletic trainer plays in

the sport medicine model.

Figure 6:
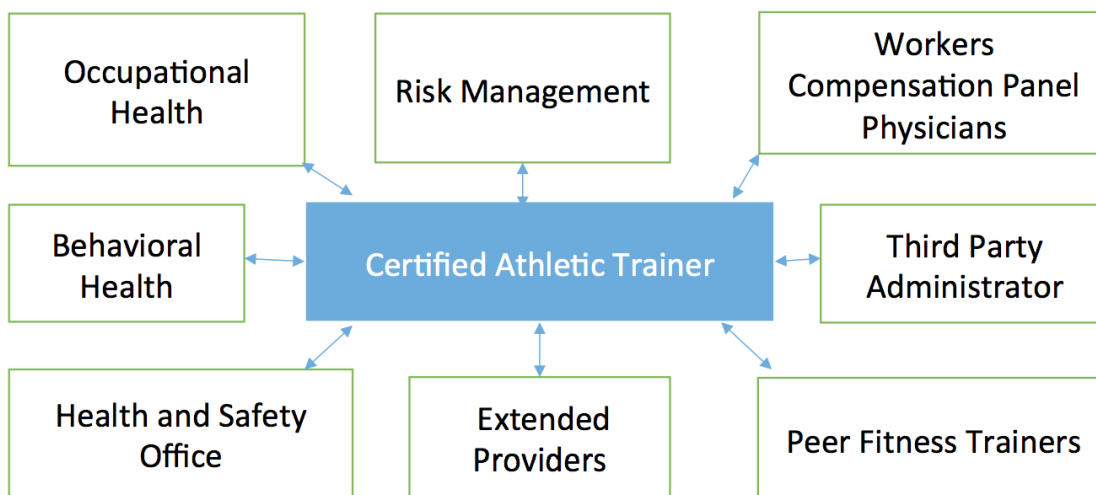
Bishop B. Athletic Trainer Initiative: Injury Prevention and Rehabilitation Program.

Fairfax County Police Department located in Fairfax, Virginia integrated an

athletic trainer for a similar purpose.[50] Goals of this project were to provide prompt

access to a physician or other health care provider, enhance the delivery of medical care

provided by athletic trainers (clinical assessments, medical care, rehabilitation, re-

conditioning, and injury prevention), and to also provide resources for additional need for

wellness (nutrition, stress reduction, blood pressure maintenance, concussion education

34

and management, as well as health education).[50] Utilizing Athletic Trainers in a large

county police force has shown reductions in overall medical costs by 22.05% and

musculoskeletal costs by 21.2%.[50] Similar to Figure 6 (above), Figure 7 displays a

slightly different role the athletic trainer plays in this role for law enforcement.

Figure 7:
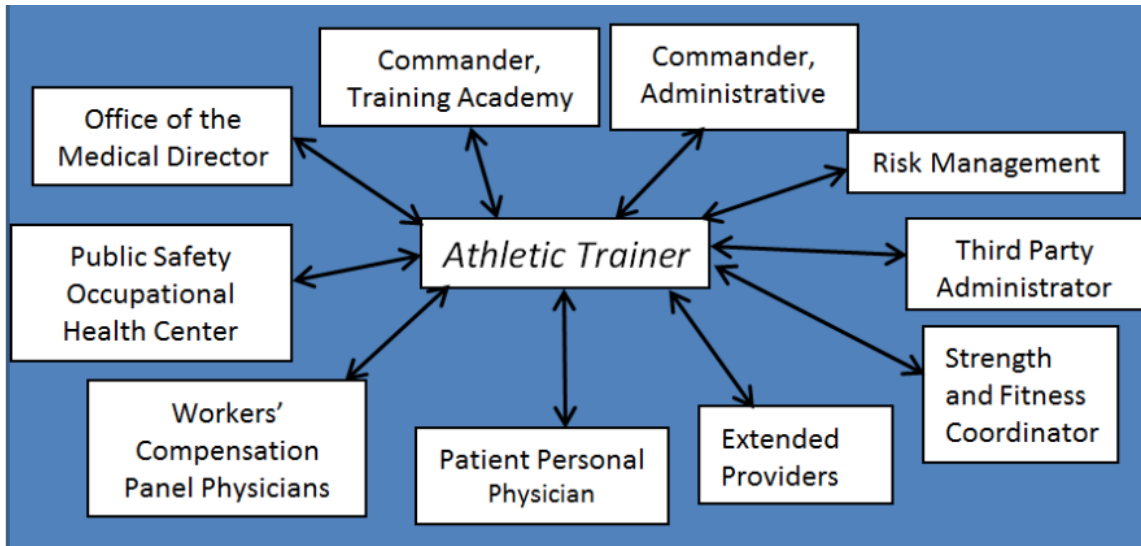
Burck NC. Reducing Law Enforcement Medical Costs Utilizing the Sports Medicine Model.

Additionally, athletic trainers serve in the military, also implementing the sports

medicine model. In 2003 the Marine Corps started the Sports Medicine Injury Prevention

Program (SMIP).[51] The mission of this program is to reduce injury attrition by injury

prevention.[51] As of October 2013 when this article was published in the National Athletic

Trainers Association magazine, 27 athletic trainers were employed through the SMIP

working at entry level training sites all across the nation.[51] The U.S. Marine Base located

in Quantico, Virginia employs one Athletic Trainer.[51] The athletic trainer provides injury

prevention and care, data collection, and hydration information to candidates in the

facility.[51] The Warrior Athletic Training Program out of the Auburn University employs

graduate athletic trainers to provide similar care preventing and caring for injuries and conducting research at Fort Benning, an infantry army base.[52]

Athletic Trainers recently have become more heavily utilized in the tactical athlete workforce (working with the medical staff providing care and injury prevention education, reducing the cost of injury, and collecting data and research for each profession). Athletic Trainers would be a key financial asset in wildland firefighting to the data collection and injury prevention process.

Pilot Project

Moving forward from this paper requires the testing of the injury surveillance document. Placing an athletic trainer in Wildland Fire Camp will be the first step for implementing the uniform medical record proposed in this project. The Athletic Trainer will record and report injuries sustained by WLFF, track referrals to other healthcare providers, and monitor time lost due to injury. Following this project the athletic trainer will develop a model of value for rendering athletic training services to WLFF and develop recommendations for Athletic Trainer integration as part of the healthcare team to serve WLFF all across the country. Ultimately an athletic trainer will provide on-site injury evaluation, treatment, and follow up care for wildland firefighters. The care provided can lead to faster return to work, which in turn reduces the cost of the injury to state and federal agencies. Collected data will be analyzed and can be used to build injury prevention strategies.

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Appendix 1: ICS 206 WF Document

MEDICAL PLAN (ICS 206 WF)
Controlled Unclassified Information//Basic

Medical Incident Report

FOR A NON-EMERGENCY INCIDENT, WORK THROUGH CHAIN OF COMMAND TO REPORT AND TRANSPORT INJURED PERSONNEL AS NECESSARY.

FOR A MEDICAL EMERGENCY: IDENTIFY ON SCENE INCIDENT COMMANDER BY NAME AND POSITION AND ANNOUNCE "MEDICAL EMERGENCY" TO INITIATE RESPONSE FROM IMT COMMUNICATIONS/DISPATCH.

Use the following items to communicate situation to communications/dispatch.

1. **CONTACT COMMUNICATIONS / DISPATCH** (Verify correct frequency prior to starting report)
   Ex: "Communications, Div. Alpha. Stand-by for Emergency Traffic."
2. **INCIDENT STATUS:** Provide incident summary (including number of patients) and command structure.
   Ex: "Communications, I have a Red priority patient, unconscious, struck by a falling tree. Requesting air ambulance to Forest Road 1 at (Lat./Long.) This will be the Trout Meadow Medical, IC is TFLD Jones. EMT Smith is providing medical care."

Severity of Emergency / Transport Priority	☐ **RED / PRIORITY 1 Life or limb threatening injury or illness. Evacuation need is IMMEDIATE** Ex: Unconscious, difficulty breathing, bleeding severely, 2° – 3° burns more than 4 palm sizes, heat stroke, disoriented. ☐ **YELLOW / PRIORITY 2 Serious Injury or illness. Evacuation may be DELAYED if necessary.** Ex: Significant trauma, unable to walk, 2° – 3° burns not more than 1-3 palm sizes. ☐ **GREEN / PRIORITY 3 Minor Injury or illness. Non-Emergency transport** Ex: Sprains, strains, minor heat-related illness.	
Nature of Injury or Illness & Mechanism of Injury		Brief Summary of Injury or Illness (Ex: Unconscious, Struck by Falling Tree)
Transport Request		Air Ambulance / Short Haul/Hoist Ground Ambulance / Other
Patient Location		Descriptive Location & Lat. / Long. (WGS84)
Incident Name		Geographic Name + "Medical" (Ex: Trout Meadow Medical)
On-Scene Incident Commander		Name of on-scene IC of Incident within an Incident (Ex: TFLD Jones)
Patient Care		Name of Care Provider (Ex: EMT Smith)

3. **INITIAL PATIENT ASSESSMENT:** Complete this section for each patient as applicable (start with the most severe patient)

Patient Assessment: See IRPG page 106

Treatment:

4. **TRANSPORT PLAN:**
Evacuation Location (if different): (Descriptive Location (drop point, intersection, etc.) or Lat. / Long.) Patient's ETA to Evacuation Location:

Helispot / Extraction Site Size and Hazards:

5. **ADDITIONAL RESOURCES / EQUIPMENT NEEDS:**
Example: Paramedic/EMT, Crews, Immobilization Devices, AED, Oxygen, Trauma Bag, IV/Fluid(s), Splints, Rope rescue, Wheeled litter, HAZMAT, Extrication

6. **COMMUNICATIONS: Identify State Air/Ground EMS Frequencies and Hospital Contacts as applicable**

Function	Channel Name/Number	Receive (RX)	Tone/NAC *	Transmit (TX)	Tone/NAC *
COMMAND					
AIR-TO-GRND					
TACTICAL					

7. **CONTINGENCY:** Considerations: If primary options fail, what actions can be implemented in conjunction with primary evacuation method? Be thinking ahead.

8. **ADDITIONAL INFORMATION:** Updates/Changes, etc.

REMEMBER: Confirm ETA's of resources ordered. Act according to your level of training. Be Alert. Keep Calm. Think Clearly. Act Decisively.

ICS 206 WF (03/18)   Controlled Unclassified Information//Basic

Appendix 2: Wildland Fire Injury and Illness Record (WFIR)

Patient Name: _____ DOB: _____ Age: _____

Gender: ☐Male ☐Female

Time/Date of Injury:

Date: _____

Hour:_____
        ☐ PM
        ☐AM

At date of injury, how many days in a row have you worked since your last day off?

Days: _____

Years in Fire Service:

_____

What day of roll did the incident occur (Circle):

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Crew Name: _____

Crew Type:

☐Engine ☐Hand Crew ☐Fuel Crew ☐Hotshot Crew ☐ Type II ☐Type II-IA ☐Helitack Crew

☐Smokejumper ☐Prescribed Wildland Fire Crew ☐Wildland Fire Module

Employee Type:

☐Part time Seasonal

☐Full Time Seasonal

☐Full Time Year Round

☐Volunteer

Explain the terrain where the injury/illness occurred (Briefly describe the area):

New or reoccurring Injury/Illness?

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☐**New (This Season)**

☐**Reoccurring (Previous Season injury)**

☐**Reoccurring (Current season)**

Type of Duty During the Event of the Injury:	Severity:
☐**At assignment location** ☐**Responding to or returning from assignment** ☐**Training** ☐**Other On Duty** **If checked other please specify:** _____	☐**Urgent-Red**: Life Threatening Injury or illness (Ex. Unconscious, difficulty breathing, bleeding severely, heat stroke, disoriented, 2-3 degree burns >4 palm sizes) ☐ **Priority-Yellow:** Serious Injury or Illness (Ex. Significant trauma, no ability to walk, 2-3 degree burns not more than 1 to 2 palm sizes) ☐ **Routine-Green:** Not a life threatening injury (ex. Sprains, Strains, Minor Heat Related Illness)

MOI: Injury/Illness Type and Cause?

☐**Slip/Trip Fall**

☐**Equipment/Tool/Machinery**

☐**Struck by/Against Object**

☐**Motor Vehicle/Transport**

☐**Weather Environmental**

☐**Bite/Sting/Poison**

☐**Fire/Smoke/ Flash Burn**

☐**Other**

Please specify below the cause (Duty injury occurred during, what equipment caused the injury, weather conditions, type of insect):

_____

_____

_____

Nature of Injury:

☐Burns

☐Smoke Inhalation

☐Other Respiratory Distress/Illness

☐Contusion (Bruise)

☐Blister

☐Laceration/Abrasion

☐Dislocation (Joint out of place)

☐Subluxation (Joint "Slipped out" and back into place)

☐Fracture (Broken Bone)

☐Stomach Illness

☐Bite/Sting

☐Tendonitis

☐Nerve Trauma

☐Muscle Cramp/Spasm

☐Muscle Strain (Stretch or tear of muscle tissue)

☐Ligament Sprain (Stretch tear ligament tissue)

☐Meniscus Tear

☐Heart Attack

☐Stroke

☐Thermal Stress (Frost Bite, Heat exhaustion)

☐Other

Region Of the Body:

☐Injury to Head

☐Injury to Neck

☐Injury to thorax

☐Injuries to the abdomen

☐Lower back, lumbar spine

☐Pelvis/Sacrum

☐Injuries to hip and thigh

☐Injuries to knee and low leg

☐Injuries to ankle and foot

☐Injuries shoulder and upper arm

☐Injuries of elbow and forearm

☐Injuries to wrist hand and fingers

☐Injuries involving multiple body injuries

Can you describe the injury below (ex. patient experienced edema of lateral knee or patient fractured 3rd metatarsal of left foot):

Will the patient return to the next working day after the incident?

Plan of Immediate Care (ex. Rest ice wrap, 2 days no work, or manual therapy next 2 nights no days off from work.)

Appendix 3: Acronym Guide

WLFF –Wildland Firefighter

NICC- National Interagency Coordination Center

DOI- Department of the Interior

GACC- Geographic Area Coordination Center

IHC-Interagency Hotshot Crews

IA- Initial Attack

USFS- United State Forest Service

USFWS-United State Fish and Wildlife Service

BIA-Bureau of Indian Affairs

BLM- Bureau of Land Management

USDA- United States Department of Agriculture

NPS- National Park Service

TEE- Total Energy Expenditure

SMIS- Safety Management Information System

PIML-Peak Incident Management Level

FMAR- Fire Management Accident Report Module

IMSR- Incident Management Situation Report

EMT- Emergency Medical Technician

MIR-Medical Incident Report

DMSS- Defense Medical Surveillance System

AFHSC- Armed Forced Health Surveillance Center

NCAA- National Collegiate Athletic Association

DOD- Department of Defense

USACHPPM- US Army Center for Health Promotion and Preventive Medicine

NLEOMF-National Law Enforcement Officers Memorial Fund Database

LEOKA-Law Enforcement Officers Killed and Assaulted

USBLS- United States Bureau of Labor Statistics

SOII-Survey of Occupational Injuries and Illness

FBI- Federal Bureau of Investigation

NFPA- National Fire Protection Association

IAFF-International Association of Fire Fighters

USFA- United States Fire Administration

NFIRS- National Fire Incident Reporting System

DMED- Defense Medical Epidemiological Database

TMDS-Theater Medical Data Store

TMDS-MEDS- Theater Medical Data Store-medication

WHO- World Health Organization

ISP- Injury Surveillance Program

EMR- Electronic Medical Records

RIO- Reporting Information Online

NFSHA-National Federation of State High School Associations

SMIP- Sports Medicine Injury Prevention Program