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2021 Fireground Civilian Rescue Research Project

January 1, 2021 through March 31, 2021

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Abstract

To date, the American fire service has not officially collected the number of or means by which civilians are rescued at fires. Traditional fire service inputs and metrics are quantitative and negative; number of fires, property lost or damaged, number of injuries and fatalities. An unintended result of this methodology is a myopic data set with analysis limited to loss relationships. The demonstration of reduction in civilian fire deaths is only that; it cannot conclusively show more lives are actively being saved. The result of this information gap is a service unable to demonstrate how, presence, actions, or operations result in saving lives. For the fire service to deliberately improve outcomes and not just reduce loss, the mission (saving lives) must match the metrics (lives saved). Until then, the operational impact of the American fire service will remain unknown.

The purpose of this research is to demonstrate the scope and value of fireground civilian rescue reporting and use of qualitative survey methods. The results will support an improved understanding of operational influence on civilian fire victim outcomes. A clearer vision of the nation's fire problem for the future includes the knowledge of both the parameters of our problem (loss) and the dimensions of our success (saves).

From January 1, 2021, through March 31, 2021, reports of fireground civilian rescues from news outlets, press releases and social networks were actively collected, confirmed and categorized. Organizations responsible for rescues were contacted, informed of the research project, provided a rescue reporting procedure template, and directed to complete a Firefighter Rescue Survey (FRS). The FRS is an online, qualitative research tool for collection and classification of the data from first-hand reports of those directly involved in fireground civilian rescues.

In the first 90 days of 2021, there were 454 residential structure fire incidents with fireground civilian rescues by firefighters reported in U.S. news media or department press release. From those incidents, 881 civilians were rescued through the direct actions of U.S. firefighters and transferred to emergency medical for evaluation. This represents an average of 9.8 rescues per day.

In the first quarter of 2021, 247 follow up Firefighter Rescue Surveys (FRS) were completed by the departments involved in the rescue operations. This represents a 28% response rate for the total number of civilian rescues recorded. In the first quarter of 2020, 59 FRS were collected under the voluntary system with no direct outreach request, and the total number of rescues for the first quarter of 2020 was unknown. This shows the direct contact method for 2021 yielded more than four times the data over the same time period.

For the 247 Firefighter Rescue Surveys collected the incident survival rate for civilians rescued from residential structure fires was 74%. When this survival rate is applied to the 881 recorded fireground civilian rescues it can be estimated that 652 civilians' lives were saved from residential structure fires by U.S. firefighters in the first quarter of 2021.

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Introduction

With over 40 years of data collected from the national reporting system, the fire service can conclusively state that year over year Americans are at a lower risk of suffering a house fire. The same 40-year data set shows Americans have no greater odds of surviving one.

The 2018 National Fire Protection Association (NFPA) report on home structure fires evaluated American fire service data from 1977 to 2017. The report shows home fires and home fire deaths have been reduced by about 50% since 1980. Over this same time period, the death rate per 1,000 home fires has remained fairly consistent. In recent years the death rate per 1000 fires has been slightly higher than it was in 1980 (Ahrens, Home Structure Fires, 2019). The report concludes that the reduction in home fire deaths over the past 40 years has been due to the reduction in the frequency of fires and not related to any reduction in severity (Ahrens, Home Structure Fires, 2019).



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The American fire service operates as locally controlled agencies, however, there is a federal fire data collection system. The National Fire Incident Reporting System (NFIRS) is the common data set for American fire service. NFIRS was developed by the National Fire Data Center as a direct recommendation from the seminal fire prevention and risk reduction white paper, *America Burning*.

Published in 1973, *America Burning* was the first comprehensive evaluation of the American fire problem. In that report, *“The commission found an appalling gap in data and information that effectively separated us from sure knowledge of various aspects of the fire problem”* (National Commission on Fire Prevention and Control, 1973, p. 9). The Federal commission issued a recommendation that a *“National fire data system be established to provide a continuing review and analysis of the entire fire problem”* (National Commission on Fire Prevention and Control, 1973, p. 9).

The word choice of the commission was to review and analyze the “entire” fire problem. NFIRS data collection has centered on negative information, losses, fatalities and injuries. As the primary research source for the fire service, it provides a myopic view of the problem and compromises solutions. A 2019 report from the United States Fire Administration (USFA) speaks to this challenge, *“The lack of data, especially for these residential fatal fires masks the true picture of the fire problem”* (National Fire Data Center, 2018, p. 9).

The American fire service lacks qualitative data sources and there is a nearly absent set of information on rescued victims. This limits the potential for comparative analysis of trends in positive and negative outcomes. Past and present professional reports consistently identify these limitations. The void of a richer data set limits the depth of study on fire service operations to the parameters of problems and not the dimensions of success.

Firefighters from around the nation began collecting news reports on civilian rescues made by firefighters in 2015 as an effort to determine the frequency. The initial research determined that general news reporting did not provide enough operational detail on victim location, removal technique, or victim outcome. To address this gap, the group developed the Firefighter Rescue Survey in 2016 (Firefighter Rescue Survey, 2020). The survey is an online platform where firefighters that performed a rescue at a fire can report firsthand information. Between 2016 and 2020 over 1100 surveys were submitted. The four-year data set is small in comparison to national systems, yet the sample size is adequate to demonstrate proof of concept for larger scale academic research.

The 2018 NFPA report on U.S. home fires suggests that the civilian fire death rate per 1000 fires has returned to and is possibly rising above a point it was over 40 years ago (Ahrens, Home Structure Fires, 2019). The 2019 USFA report clarifies that the lack of complete data collection is a contributing factor in delay of discovery for operational impacts on civilian outcomes (National Fire Data Center, 2018). The publication of America Burning in 1973 attempted to shift the mission of the modern fire service to be more human centric and data driven. The most current national data is demonstrating potential regression in this mission. This should serve as the catalyst for a renewed evaluation.

The aim of this research is to determine the number of civilians rescued by firefighters at residential fires in the U.S and the value of the Firefighter Rescue Survey as a basis for a qualitative collection and positive input reporting system.

This will be accomplished through execution of the following objectives.

1. Capture known fireground rescues of civilians by firefighters through a daily Internet search of U.S. news media reports consistent with the U.S. Fire Administration process of collection for reports of home fire fatalities in the news.
2. Maintain continuity of current Firefighter Rescue Survey (FRS) platform as a voluntary (passive) collection method.
3. Employ active data collection methods for the FRS for a three-month period. Accomplished with direct contact and request for survey submissions from fire departments that experience incidents with civilian rescues reported in official or unofficial media outlets.
4. Review and classify 3-month data set.
5. Compare survey submissions to prior years for comparison to direct contact method.
6. Compare where available, fire victim information in the data sets of NFIRS, USFA and NFPA.
7. Allow observations from academic review and previously collected data to construct a theory on qualitative data collection and positive input reporting for the American fire service.
8. Discover needs and areas of improvement for greater qualitative data collection and avenues for positive input reporting.

Literature Review

The United States Fire Administration (USFA) and the National Fire Protection Association (NFPA) use separate sources for fire fatality data collection. The NFPA sources death certificate data collected by the National Center for Health Statistics (Ahrens, Fire death rates by state, 2019). The primary source of data used by the USFA is the National Fire Incident Reporting System (NFIRS).

The National Fire Incident Reporting System (NFIRS) is a voluntary reporting system. In 2016, 71% of United States Fire Departments reported through NFIRS, (National Fire Data Center, 2018). Due to the local organization of fire departments and voluntary nature of this federal reporting system, 71% of fire departments reporting equates to approximately 65% of the Nation's fire incidents (Ahrens, Home Structure Fires, 2019). Due to this limitation USFA discloses that report information presented are estimates. *"Because the NFIRS incident reports are submitted voluntarily, the data do not represent a statistically selected sample"* (National Fire Data Center, 2018, p. 1). In an effort to triangulate the data, the USFA also utilizes data from NFPA department surveys as a combination of sources for formal reporting and direction.

"This methodology is the accepted practice of national fire data analysts. One problem with this approach is that the proportions of fires and fire losses differ between the large NFIRS dataset and the NFPA survey sample. Because the proportions of fires and fire losses differ between the NFIRS and the NFPA estimates, from time to time, this approach leads to inconsistencies. These inconsistencies will remain until all estimates can be derived directly from NFIRS data." (National Fire Data Center, 2018, p. 3)



In 2017, USFA reviewed three years of civilian fire fatality data from NFIRS with a focus on activity prior to succumbing to conditions. The information was widely distributed as a resource for fire service operations to focus where civilian fire victims were most commonly located, escape paths and bedrooms. The report disclosed that only 31% of fatal fires reported in NFIRS included information regarding activity prior to death (United States Fire Administration, 2017). As clarified by the National Fire Data Center, the total NFIRS data represents only two thirds of national fire incidents. In 2018, a USFA report stated that 47% of fatal residential fires entered in the NFIRS system lacked sufficient data to determine the cause. (National Fire Data Center, 2018).

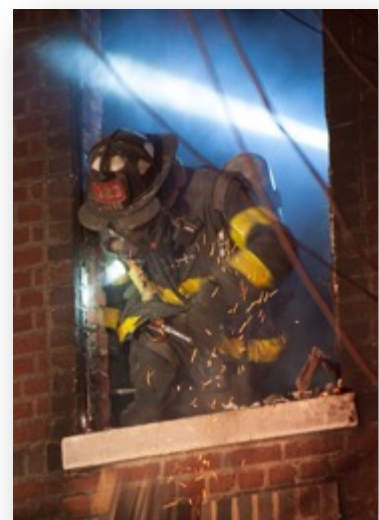
These disclosures demonstrate limitations of the concentration on fatalities. The scope of data set in this area is a small population and lack of accuracy is the result of fatality focused data being reliant on information submitted by a contributor that is not the victim and not firsthand.

Between 2015 and 2017, the Underwriters Laboratories Fire Safety Research Institute (ULFSRI) conducted research on full-scale single-family home fires. Instrumentation evaluated heat exposure and levels of fire gases in relation to survivability of civilians and firefighters (Underwriters Laboratories Firefighter Safety Research Institute, 2018). These included comparisons of atmospheres which were open or compartmentalized by closed doors. The research was rooted in 10 years of experimentation that established a foundation of comparative data. ULFSRI developed a corpus of quantitative data which validated the previous findings. This conclusively demonstrated the survivability variance between open and closed compartment fires in single family homes (Underwriters Laboratories Firefighter Safety Research Institute, 2018).

“In every experiment, a victim in the closed bedroom would survive through the length of the experiment. In the same room with an open bedroom door this is not the case. Consistent conclusions and tactical considerations can be found in previous studies on Horizontal Ventilation [13], Vertical Ventilation [57], Governor’s Island Research and others found at www.ULfirefightersafety.org.” (Underwriters Laboratories Firefighter Safety Research Institute, 2018, p. 183)

In 2016 the Firefighter Rescue Survey (FRS) was developed by firefighters from around the nation to address the knowledge gap in the fire service in regard to the number of civilians rescued from fires (Firefighter Rescue Survey, 2020). A February 2020 article in Fire Engineering Magazine, presented analysis from 3 years of data collected through FRS. The author reported that 18% of the civilian rescues submitted through the FRS data set were located behind a closed door in a compartment separated from the fire. When compared with rescues in other locations, this group had the highest survival rate at 65% (Ledin, 2020). Like the ULFSRI, the FFRS concentrates on positive outcomes (rescues), the difference is that the FRS presents field data (actual) and the not lab data (theoretical). The information source for the FRS data collection is also firsthand accounts from rescuers which improves accuracy and depth.

The ULFSRI studies has led a complete paradigm shift in civilian life safety education information from planning escape routes to preparing to shelter in place (Underwriters Laboratories, 2019). Closed-door fire prevention campaigns present as a tool that reduces the severity of home fires, something that has eluded the fire service for more than 40 years. The FRS offers a mechanism and metric as a data set to serve as supplement to the ULFSRI research. The design, qualitative nature and positive outcome concentration of the FRS can serve as the field evaluation of the ULFSRI lab findings. Continuation of the FRS data set would provide the ability to measure the impact and reach of the closed-door campaign intervention over time.



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Procedures



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In December 2020, the Firefighter Rescue Survey (FRS) first quarter data base for 2020 was reviewed to extract all Q1 rescues as a comparison. There were 59 FRS collected between 1/1/2020 and 3/31/2020.

From January 1, 2021, through March 31, 2021, reports of fireground civilian rescues from news outlets, press releases and social networks were actively collected daily utilizing Google Alerts and Facebook searches. Alert and search key words used were “Rescued from fire”, “Fire Department Rescue” and “Firefighter Rescue”. Results were sorted to isolate rescues of civilians whose life was threatened by fire and rescues were the actions performed by firefighters. Self-evacuations, rescues by bystanders, police officers or rescues by firefighters off duty or a situation where personal protective equipment or fire department equipment was not required was excluded. Qualifying rescue reports were checked to a secondary source of news outlet or fire department release, categorized and recorded in an Excel spreadsheet.

Organizations responsible for the recorded rescues were directly contacted through email or organization website contact tools and directed them to complete a Firefighter Rescue Survey (FRS). The online FRS is only a collection point, the firefighters who administer the FRS maintain it as a static site. Surveys submitted prior to January 1st, 2021 were done so on a voluntary basis and not by a direct request or department procedure. Starting on 1/1/202, departments responsible for the recorded rescues were directly contacted through email or organization website contact tools. The contact informed them of the of research project, provided a rescue reporting procedure template, and directed them to complete a Firefighter Rescue Survey (FRS). The FRS data base was reviewed weekly for submissions of rescues that occurred within the research period to evaluate the response rate to the contact email.

Throughout the research period weekly and monthly reports were posted to the FRS website and social networks. The purpose of sharing these updates was to bring continued awareness to the project and encourage response to requests for survey submission.

Results

The results presented demonstrate the combined data collected by the fireground civilian rescue research project and the Firefighter Rescue Survey from January 1st through March 31st, 2021.

454 Residential structure fire incidents with fireground civilian rescues by fire departments were reported in U.S. news media or by department press releases.

881 Civilians were rescued from residential structure fires and transferred to emergency medical evaluation by the direct actions of U.S. firefighters in during the 1st Quarter of 2021. This represents an average of 9.8 rescues per day.

247 Follow up Firefighter Rescue Surveys were completed by the firefighters or departments involved in the rescue operation. This is a 28% response rate to the direct contact collection method. For the first quarter of 2020, 59 Firefighter Rescue Surveys were collected under the voluntary system with no direct outreach request. Using the direct method for 2021 more than four times the data was collected over the same time period.

74% Incident survival rate for civilians who were rescued from residential structure fires and transferred to emergency medical through the direct actions of U.S. firefighters. The survival rate is calculated from the 247 direct follow up Firefighter Rescue Surveys.

652 Estimated civilian lives saved from residential structure fires through the direct actions of U.S. firefighters and emergency medical personnel. This is determined by applying the survival rate percentage to the total reported rescue population.

293 Single family dwelling and mobile home fire incidents had fireground civilian rescues yielding a total of 461 victims. For single family dwelling and mobile home fires with rescues, it can be anticipated that there will be more than one potential victim.

161 Apartment and multi-family dwelling structure fires had fireground civilian rescues yielding a total of 420 victims. For apartment and multi-family dwelling incidents with rescues, the average is 2.6 victims per incident.



2021 1st Quarter Fireground Civilian Rescues by State:

47 of the 50 states and Washington D.C. had fireground civilian rescues by firefighters reported in the news during the first 90 days of 2021.

Alaska - 4	Florida – 28	Louisiana – 7	Nebraska - 4	Ohio - 47	Texas - 37
Alabama – 7	Georgia – 12	Massachusetts - 28	Nevada – 6	Oklahoma - 9	Utah - 7
Arkansas – 5	Iowa – 6	Maryland - 47	New Hampshire - 19	Oregon - 3	Vermont - 3
Arizona - 3	Idaho – 7	Michigan – 15	New Jersey – 22	Pennsylvania - 71	Virginia - 19
California – 53	Illinois - 68	Minnesota – 20	New Mexico – 2	Rhode Island - 4	Washington - 23
Colorado -7	Indiana – 23	Mississippi - 1	New York – 73	South Carolina - 9	Washington DC - 4
Connecticut – 31	Kansas – 21	Missouri – 30	North Carolina - 32	South Dakota - 3	West Virginia – 5
Delaware – 2	Kentucky – 3	Montana – 2	North Dakota - 4	Tennessee - 14	Wisconsin - 31

Departments With 5 Or More Fireground Civilian Rescue Incidents In 2021 1st Quarter:

There were 10 cities with 5 or more separate fire incidents with rescues by firefighters reported in the news or department press releases in the first 90 days of 2021.

Municipality	Number of Fire Incidents with Rescues Q1 2021	Total number of civilians rescued
New York, NY	11	22
Chicago, IL	8	22
Philadelphia, PA	8	19
Charlotte, NC	6	15
Minneapolis, MN	5	11
Wichita, KS	5	10
Cincinnati, OH	5	8
Fort Worth, TX	5	7
Cleveland, OH	5	6
Jacksonville, FL	5	5

Search and Rescue Operations and Survival Rates Data for Q1 2021 Firefighter Rescue Surveys:

Total Recorded Rescues v Survival Rate:

Alive – 74% (183/247)

Deceased – 26% (64/247)

Time of Day

00:00 – 02:59 – 29 rescues

03:00-05:59 – 59 rescues

06:00-08:59 – 13 rescues

09:00-11:59 – 27 rescues

12:00-14:59 – 19 rescues

15:00-17:59 – 31 rescues

18:00-20:59 – 30 rescues

21:00-23:59 – 39 rescues

Were There Reports of a Victim v Total Recorded Rescues:

Yes - Report of Victim(s) – 73%

Yes – Report of Everyone is Out – 1%

No – No Report of Victim(s) – 26%

When Was Search Initiated v Total Recorded Rescues:

Pre-Fire Knockdown – 89%

Post-Fire Knockdown – 11%

When Was Search Initiated v Survival Rate:

Pre-Fire Knockdown – 77%

Post-Fire Knockdown – 54%

Residential Occupancy Type v Total Recorded Rescues:

Single Family Dwelling – 49%

Multi-Family Dwelling – 43%

Mobile Home – 6%

Survival Rate by Residential Occupancy Type:

Single-Family Dwelling – 65%

Multi-Family Dwelling – 87%

Mobile Home – 53%

Fire Conditions Upon Entry v Total Recorded Rescues:

Incipient – 9%

Room and Contents – 33%

Multiple Rooms – 40%

Structure – 18%

Survival Rate by Fire Conditions Upon Entry:

Incipient – 91%
Room and Contents – 80%
Multiple Rooms – 69%
Structure – 62%

Visibility v Total Recorded Rescues:

High Visibility – 13%
Moderate Visibility – 23%
Low Visibility – 33%
Zero Visibility – 30%

Survival Rate based upon Visibility Conditions at the Victim:

High Visibility – 97%
Moderate Visibility – 89%
Low Visibility – 78%
Zero Visibility – 45%

Was the Victim Found Behind a Closed Door/Isolated from Fire v Total Recorded Rescues:

Yes – 32%
No – 68%

Survival Rate for Victims Behind a Closed Door/Isolated from Fire:

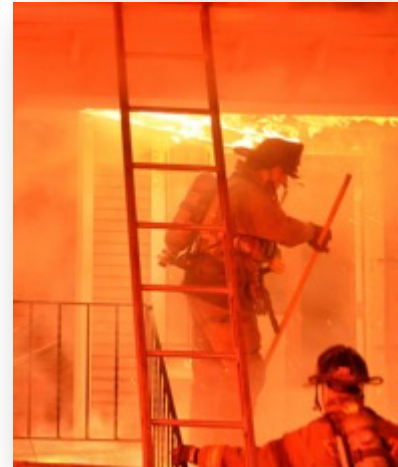
Yes – 92%
No – 65%

Victim Age v Total Recorded Rescues:

0-2 – 2%
3-5 – 5%
6-12 – 6%
13-18 – 2%
19-64 – 65%
>65 – 21%

Survival Rate by Age Group:

0-2 – 80%
3-5 – 45%
6-12 – 86%
13-18 – 75%
19-64 – 75%
>65 – 75%



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Crew Locating Victim v Total Recorded Rescue:

Primary – 51%
Attack – 25%
Other – 16%
Secondary – 2%
Salvage/Overhaul – <1%
PD – 5%
Ventilation – 1%

Did the Primary Search Crew That Located the Victim Physically Have a Hoseline With Them v Total Recorded Rescues:

Yes – 23%
No – 77%

Did the Primary Search Crew That Located the Victim Physically Have a Hoseline With Them v Survival Rate:

Yes – 59% (32/54)
No – 77% (142/184)

Search Type v Survival Rate:

Split – 73% (53/73)
Left Hand/Right Hand – 53% (17/32)
Oriented – 61% (14/23)
VES – 85% (39/46)
Search Line – 25% (1/4)
Not Assigned to Search – 85% (57/67)

Time from FD Arrival on Scene Until Victim Removed (Total Rescue Time) v Total Recorded Rescues:

<6 minutes – 37%
6 - 10 minutes – 41%
11 - 15 minutes – 11%
16 - 20 minutes – 5%
21 – 30 minutes – 2%
>30 minutes – 4%

Time from FD Arrival on Scene Until Victim Removed (Total Rescue Time) v Survival Rate:

<6 minutes – 94% (83/88)
6 - 10 minutes – 72% (71/98)
11 - 15 minutes – 54% (14/26)
16 - 20 minutes – 50% (6/12)
21 – 30 minutes – 20% (1/5)
>30 minutes – 0% (0/10)

Discussion

The United States Fire Service Administration has been collecting home civilian fire deaths reported in the news daily for several years. The Firefighter Rescue Survey has been collecting voluntary submissions since 2016, yet this is the first time the number of fireground civilian rescues has been recorded. The traditional USFA model of collecting civilian home fire fatality numbers has significant limitations with regard to interpretation. All civilian home fire fatalities are a negative outcome and there is no way to determine if a fire department was present or involved in the event leading up to that negative outcome. Collecting the number of fireground civilian rescues by firefighters creates a record of incidents where there is confirmation of fire department presence and action.

Tracking the number of fireground civilian rescues is a keystone for both these existing data sets. For the first quarter of 2021 the United States Fire Administration recorded 810 civilian home fire fatalities reported in the U.S. news media. Through the research project 881 fireground civilian rescues were recorded for the same period. A superficial comparison of 881 rescues and 810 fatalities could conclude that there were only 71 survivors of these incidents, yet this is not the case. All civilian home fire fatalities are a negative outcome, not all civilian home fire fatalities were civilians who were removed from the fire by firefighters. A high number of fire fatalities are discovered after the fire event. Although the current data set is small, for the 247 collected rescue surveys, 183 victims were alive at the time of the report submission for a 74% survival rate. If this 74% survival rate is applied to the total population of 881 recorded rescues reported in the news for the first quarter of 2021 the estimated number of civilian saves is 652.



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For the first quarter of 2021, 881 fireground civilian rescues by firefighters were recorded. From these 881 recorded rescues 247 Firefighter Rescue Surveys were collected, this represents a 28% response rate from fire departments. In 2017, USFA reviewed three years of civilian fire fatality data from NFIRS with a focus on activity prior to succumbing to conditions. The information was widely distributed as a resource for fire service operations to focus where civilian fire victims were most commonly located, escape paths and bedrooms.

The report disclosed that only 31% of fatal fires reported in NIFRS included information regarding activity prior to death (United States Fire Administration, 2017). As clarified by the National Fire Data Center, the total NFIRS data represents only two thirds of national fire incidents. In 2018, a USFA report stated that 47% of fatal residential fires entered in the NFIRS system lacked sufficient data to determine the cause. (National Fire Data Center, 2018). Given the response statistics for established national data fire fatality sets the 28% response rate for the FRS and fireground civilian rescues is within range. Additionally with 881 fireground civilian rescues recorded and a parallel of 810 civilian home fire fatalities for the same time period, leading indicators show the size of the data set is comparable.

The total number of rescues recorded for the project is likely lower than the actual total. Throughout the course of the project, individuals or organizations made contact to report fireground civilian rescues that were not discovered through the alert system. One large metropolitan municipality reported 7 civilian rescues for the fire department in the first quarter of 2021, only 1 had been collected in the news alert data set. A further demonstration of the potential lack of capture is displayed in the fireground rescues by state. 31 fireground civilian rescues were captured and confirmed during the project period for the state of Connecticut with a population of 3.6 million people. 47 fireground civilian rescues were captured and confirmed during the project period for the state of Ohio with a population of 11.7 million people. 53 fireground civilian rescues were captured and confirmed during the project period for the state of California with a population of 39.5 million people. With each of these states, the increase in population does not translate to the fireground civilian rescue numbers, presenting a significant difference in the per capita rate. With the limitations of the research project size and scope it cannot be determined if this is due to regional differences in fire events and response or news events and media response.

The leading results for the information collected in the first quarter of 2021 demonstrate there is greater opportunity. Until now, the operational impact of the American fire service on civilian outcomes has been unknown, however this project begins to present it is possible that can be changed.

Recommendations

The collection period of 90 days was selected without a knowledge of how many rescues would be recorded. The timespan was chosen to support the complete project taking place across a single academic semester. Within the project period 881 rescues were recorded and 247 Firefighter Rescue Surveys were collected. If the data collection rate for the first 90 days continued over the course of a year, it can be estimated that nearly 3,500 fireground civilian rescues by firefighters would be recorded and 1000 firefighter rescue surveys collected. The larger data set provided by capturing an entire year would be valuable in strengthening the statistical information that is being discovered and would also provide some initial indicators of the potential for seasonal or regional influences on fireground civilian rescues. The known limitations of the small size of and short period of the project data set drives the recommendation that the project be repeated for the full calendar year of 2022. The first quarter 2022 would have a comparative sample in this project and the expansion to a full calendar year of collection would increase the population and scope.

In the first quarter of 2020, 59 Firefighter Rescue Surveys were collected under the voluntary system with no direct outreach request, and the total number of rescues for the first quarter of 2020 was unknown. For the first quarter of 2021, 247 follow up FRS were completed by fire departments involved in the rescue operations and 881 fireground civilian rescues were recorded. This represents a 28% response rate for the total number of civilian rescues recorded. The direct contact method utilized for this project yielded more than four times the data over the same time period. Most of the organizations who were contacted through the request to complete the Firefighter Rescue Survey were not aware of it prior to the contact email.



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The direct contact method for this project is a variable which influenced the response rate however it is difficult to isolate as the sole contributing factor. Overall awareness of the Firefighter Rescue Survey as a site to contribute information on fireground civilian rescues and a source of qualitative data with regard to research is increasing. In identifying the direct contact method and increased awareness of the FRS result in improved collection rates with a larger data set, it is recommended that the FRS create and support a direct contact submission request when an organization has been identified as making a rescue. The FRS should also continue to seek opportunities to raise awareness of the rescue survey collection process and the rescue data product it is responsible for. These strategies reaching out to professional organizations such as the International Association of Fire Chiefs and the International Association of Fire Fighters, publication of information in professional and trade journals, and increasing social media presence.



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Data sets from the project period have been reviewed, classified and included. Further review and comparison to other existing data sets from the NFPA, USFA and NFIRS remains as a needed step towards interpretation. An example of this process would be the further review of fireground civilian rescues with regard to apartments and multi-family dwellings. For the 881 fireground civilian rescues by firefighters, 420 occurred at apartments or multi-family dwellings, this represents 48% of the total recorded rescues. Within the follow up FRS data set of 247 rescues, 106 occurred at apartments or multi-family dwellings for a total of 43% of the rescues. Of those 106 FRS for apartments and multi-family dwellings 92 survived the incident for an 87% survival rate.

According to NFPA, there has been an average of 370,650 residential fires every year for the last 10 years. Apartment and multi-family dwelling fires account for 26% of annual residential fire incidents on average (NFPA Research Data and Analytics, 2018). The use of the three separate data sets provide the fire service with a valuable clarity of an occupancy specific fire problem. Apartment and multi-family dwellings only account for approximately 1 in 4 residential fire incidents in the United States, at the same time, fires at apartments and multi-family dwelling fires account for nearly half of the fireground civilian rescues. Single family dwelling fire incidents where there was a fireground civilian rescue by firefighters averaged 1.6 victims per incident when compared to 2.6 victims per incident in apartments and multi-family dwellings. It is recommended that the same methodology applied to data sets of fire losses, cause and origin are analyzed to support targeted fire prevention and education programs and interventions, be used for fireground civilian rescue and Firefighter Rescue Survey data. This should be analyzed for the potential direction of targeted operational education, response and training interventions.

Between 2015 and 2017, the Underwriters Laboratories Fire Safety Research Institute (ULFSRI) conducted research on full-scale single-family home fires. Instrumentation evaluated heat exposure and levels of fire gases in relation to survivability of civilians and firefighters (Underwriters Laboratories Firefighter Safety Research Institute, 2018). These included comparisons of atmospheres which were open or compartmentalized by closed doors. The research was rooted in 10 years of experimentation that established a foundation of comparative data. ULFSRI developed a corpus of quantitative data which validated the previous findings. This conclusively demonstrated the survivability variance between open and closed compartment fires in single family homes (Underwriters Laboratories Firefighter Safety Research Institute, 2018). From these studies the ULFSRI studies led a complete paradigm shift in civilian life safety education information from planning escape routes to preparing civilians to shelter in place (Underwriters Laboratories, 2019). Closed-door fire prevention campaigns present as a tool that reduces the severity of home fires, something that has eluded the fire service for more than 40 years. The FRS offers both mechanism and metric to serve as triangulation of the ULFSRI research. The design, qualitative nature and positive outcome concentration of the FRS can serve as the field evaluation of the ULFSRI lab findings and public response to messaging.

Was the Victim Found Behind a Closed Door/Isolated from Fire v Total Recorded Rescues

Q1 2020		Q1 2021	
Yes	18% of victims found	Yes	32% of victims found
No	82% of victims found	No	68% of victims found

Was the Victim Found Behind a Closed Door/Isolated from Fire v Survival Rate

Q1 2020		Q1 2021	
Yes	75% of victims survived	Yes	92% of victims found
No	61% of victims survived	No	65% of victims found

The limited data set prevents drawing full conclusions, yet leading indicators are demonstrating potential of the Close Before You Doze program resulting in more deliberate compartmentalization in residential fires. The specificity of the Firefighter Rescue Survey questioning with regard to this area of concentrate, and the accuracy of the source being the firsthand account of victim discovery and location make it a powerful assessment tool for the future of ULFSRI human behavior interventions. It is recommended that the ULFSRI recognize the value of this data set to the long-term evaluation of this program.

Conclusion

The work of this three-month project and 5 years of the Firefighter Rescue Survey provides proof of concept for national fireground civilian rescue reporting and collection. From the establishment of the first fire company, firefighters have been rescuing civilians from fires, yet the absence of formal reporting provides no formal record. The result of this information gap is a fire service unable to demonstrate how presence, actions, or operations result in saving lives. This is a key point to recognize for the support of fireground civilian rescue reporting. The recorded rescue of a civilian, on the fireground, by firefighters, in definition establishes that the presence, actions and operations of the fire service was the potential difference in outcome. For the first 90 days of 2021, on average, the direct actions of firefighters were the potential difference in life and death at fires for U.S. civilians almost 10 times a day. Follow up by those inquiring to learn more, and reporting by those willing to share more about these lifesaving actions demonstrates that 7 out of 10 of these civilians survive the incident.

It has been proclaimed that life safety is the highest priority of the American fire service yet historically this has not been reflected in the approach to data collection. For the future of the fire service to deliberately work towards improving outcomes and not just reducing loss, the mission (saving lives) must match the metrics (lives saved).



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