



RESEARCH

NATIONAL FIRE DATA SYSTEM INSIGHTS

East Coast Subject Matter Expert Workshop Insights

June 2018

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Company and/or brand names cited in this report are included if specifically identified by a meeting attendee. Usage in this report in no way confers or implies NFPA approval, endorsement or support for any company and/or brand name.

To learn more about research and data analytics at NFPA, visit www.nfpa.org/research

To learn more about the National Fire Data System Project, visit www.nfpa.org/nfdsproject

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EXECUTIVE SUMMARY

On October 4-5, 2017 a group of fire service stakeholders met to share their insights on fire data to help the NFPA better understand who to develop the National Fire Data System. The following report summarizes their discussions.

One of the strongest lessons learned from this event is that the number, complexity and content of questions fire departments are being asked to answer are beyond the capacity for any one fire data system, regardless of how complex, to answer. The departments represented seemed to use many different systems, databases, and approaches to answer the diverse range of questions. As one person put it, the answer on how best to build the National Fire Data System (NFDS) may lie in developing a “system of systems”.

Meeting Purpose:

To bring key fire service stakeholders representing various backgrounds, experiences, and types of organizations together to identify who is asking fire-related questions, what questions are they asking and what information or data is needed to answer those questions.

Meeting Objective:

To develop and refine typical “use cases” of modern fire activity data for a diverse range of constituents.

ABOUT THE NATIONAL FIRE DATA SYSTEM (NFDS)

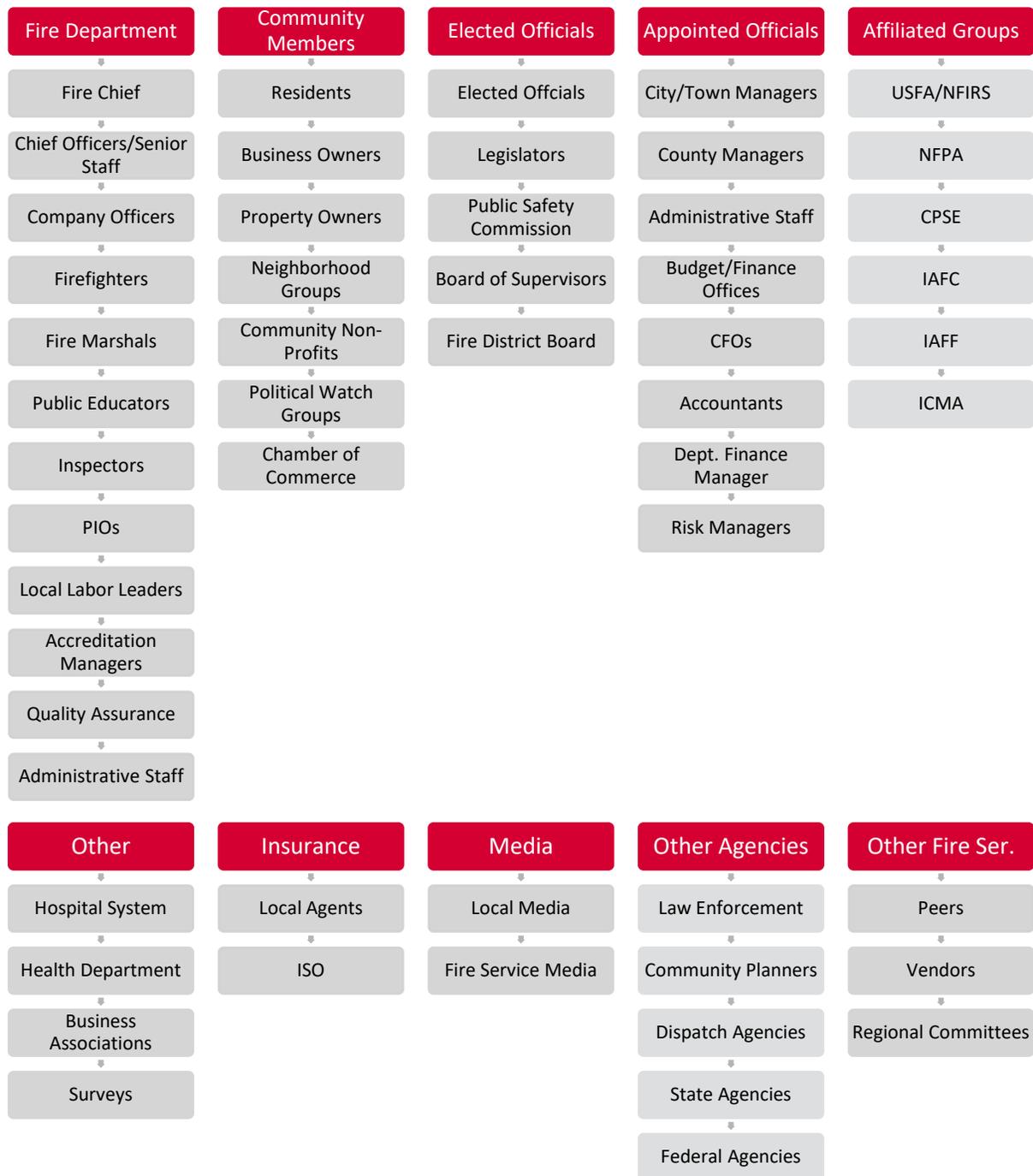
The goal of the National Fire Data System is to support local, evidence-based decision making on operational performance; community risk reduction; firefighter safety, health, and wellness; and other fire service activities. The project will develop the groundwork for a horizontally and vertically scalable system to collect data from fire departments. The project will develop, build, and test the foundation of a system-agnostic infrastructure that will take in and store data from any systems that local agencies use and export data that conforms to existing and emerging industry standards. Challenges include inconsistent data silos, delayed data access and underutilized data. Fire departments across the country have consistently struggled with the collection, analysis, and utilization of data that can enhance safety, operational performance, and risk reduction outcomes for firefighters and the communities that they serve.

Thank you to DHS/FEMA for providing partial funding for this workshop through an Assistance to Firefighters Grant/Fire Prevention and Safety grant award.

DATA QUESTIONS

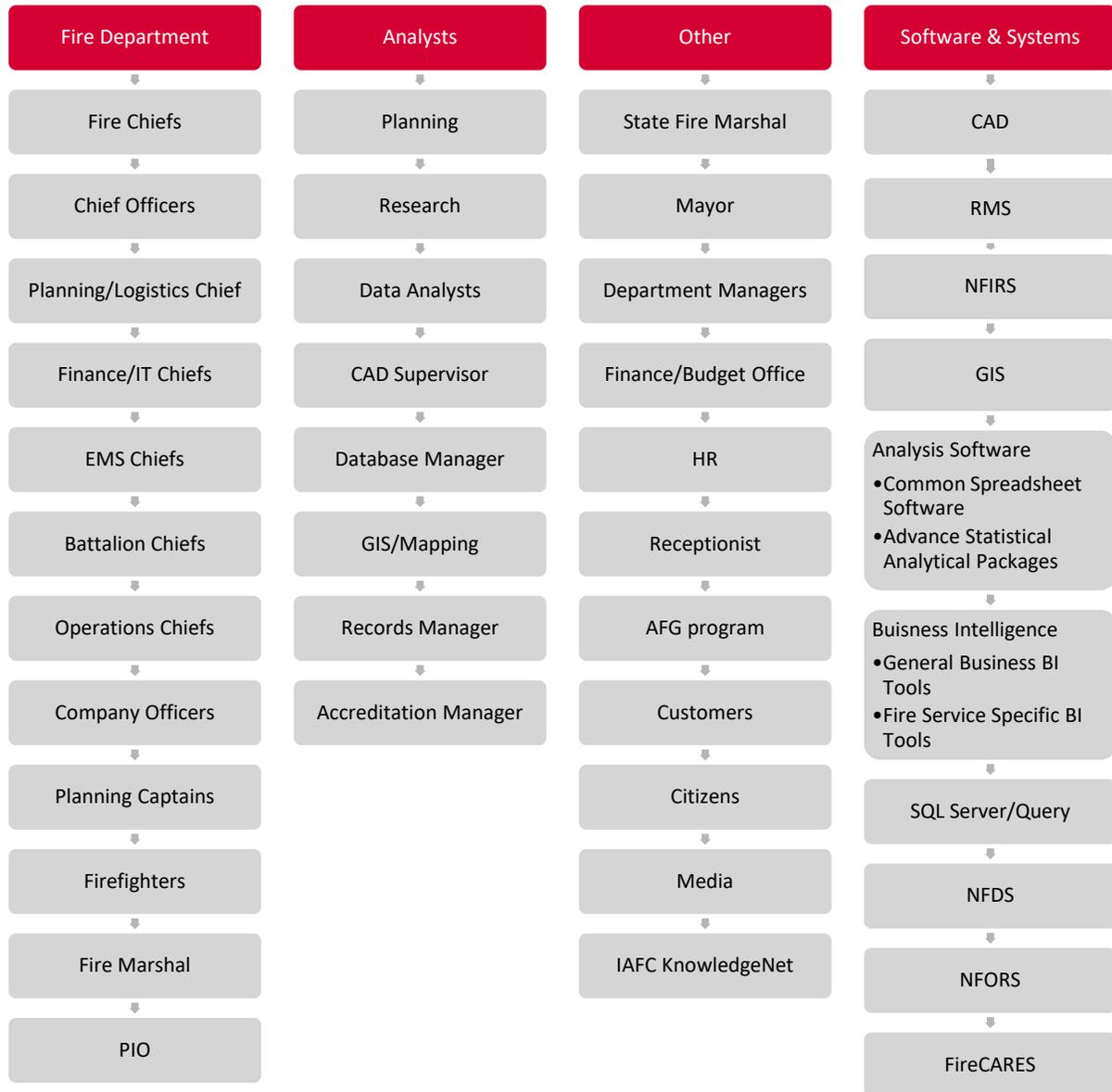
WHO IS ASKING QUESTIONS?

The meeting began with attendees compiling who is asking questions of fire data; the identified personas were in turn organized by their roles and responsibilities into the groups found in Figure 1. As there is much crossover, this list is imperfect. However, the exercise highlighted the complexity of audiences that use and need fire service data.



WHO IS BEING ASKED THE QUESTIONS?

Secondly, the attendees looked at who is answering questions. While less complex than the first question, this exercise highlighted how technology supports fire service data. One attendee noted that “software can be used to answers question and to keep individuals free” for other needs such as increasingly sophisticated analysis. Another attendee noted that the “log book is often the most accurate record for fire incidents”.



WHAT QUESTIONS ARE BEING ASKED?

Attendees were asked to compile a list of questions they receive. Attendees noted that many questions are reactive; for example, after a mass casualty event, departments will typically receive questions about their ability to respond to such an incident.

Attendees also felt that there is an opportunity for fire departments to engage citizens and help them better understand the questions they should be asking of their fire departments.

Questions often delve into operational and administrative challenges. Some of this data is subject to FOIA requests, with departments answering these requests within the rules and regulations of their state and local community.

A request for data is often subject to the availability of resources that can compile data. Several noted that media questions are typically time-sensitive.

There is much similarity in the questions that are asked, but the reasons why a question is asked may be very different.

Note: This is not the complete list of questions identified by the attendees but are representative of the types of questions being asked.

From Citizens

- What do my taxes pay for?
- Is this building safe?
- How far is my house from the hydrant?

From the Media

- What is your call volume?
- How often do you respond to a specific property type?
- If an active shooter situation happened, how will the department respond?

From Fire Department Officials

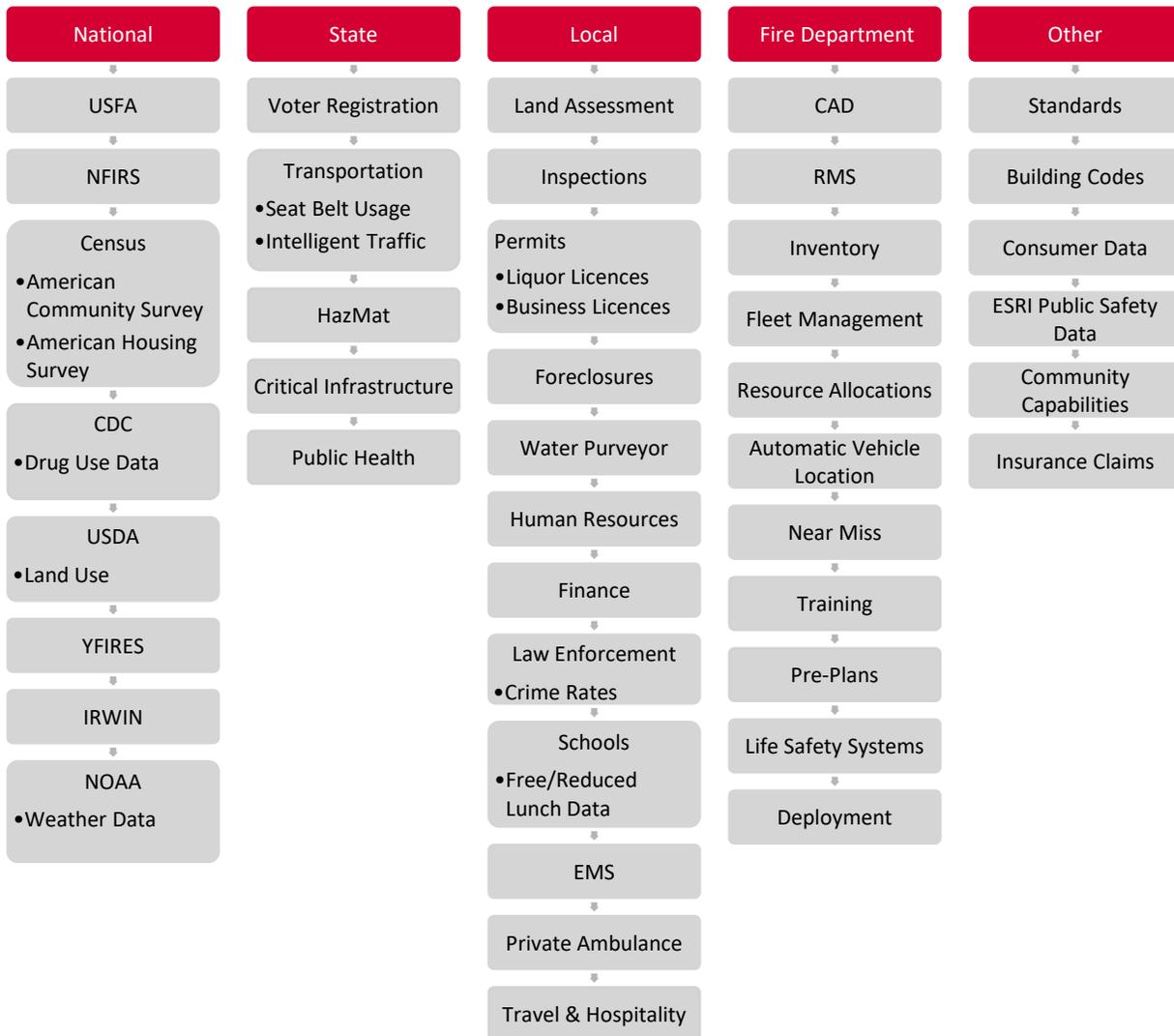
- How many times did we provide mutual aid and where did we go?
- Why do you need funding for this activity?
- Where are our hydrants located?
- What training have we offered?
- What is our department's demographic makeup? What are the demographics of the community we serve?
- Are we meeting our performance measures?

From Elected Officials

- How many times did we provide mutual/auto aid and where did we go?
- Why do you need funding for this activity?
- Have you met ICMA performance measures?

WHAT ARE THE SOURCES OF DATA?

Attendees provided information on the sources of the data they use to answer questions. Note that in many cases data is not integrated, requiring significant time and resources for analysts to identify a data set, ensure that it matches with other sources, and run queries, which may or may not be automated. As many data requests are time-sensitive, the lack of integrated data often limits the quality and timeliness of answers that can be provided.



RECOMMENDATIONS

IMPROVING QUESTIONS AND ANSWERS

The attendees stated that educating anyone who is asking questions of fire service data (the personas identified earlier in this report) was a critical piece to improving fire service data.

They felt that it was important to build and maintain trust when using data. They identified several recommendations on how to handle data that will result in improvements:

- Share valid data, even if it requires ongoing clarifications and updates
- Leverage the skills and knowledge of your people by including them in conversations to ensure that data is being used and understood properly
- Be consistent in formatting and style of data presentation
- Use caveats, footnotes and other methods to clarify explain and account for abnormalities or weaknesses in data

Note: Meeting attendees noted their ongoing and often abundant use of caveats – statements that clarify sources, limitations, and/or abnormalities – when portraying data. Their use largely stems from the need to ensure that the information they present portrays the full picture while accounting for anything that may skew an outcome. This is ongoing pain point for analysts that they try to address through the consistent use of visuals and graphical aids to help end users understand the data they see and to not draw erroneous conclusions.

How do we empower residents to ask effective questions?

Attendees noted that they don't often get questions from citizens beyond basic, often insurance-related questions. The attendees felt strongly that educating residents on how they can better interact with the fire department is a critical need. Some departments are seeing social media such as Facebook as a platform for these interactions – even to the extent that residents are using the department's open data sources to answer each other's questions about the department. While positive, there are often complexities to this data that the department can often more fully explain. In other words, the value of data isn't just in numbers but in the interaction between the department and the community it protects. Lastly, some attendees noted that it is often perceived as a double-edged sword as educated citizens will ask tough questions. Attendees cautioned that departments need to be prepared to answer resident questions appropriately.

TRAINING AND PROCEDURES

New System, Same Process

A theme emerged that went against conventional logic. Changes or improvements in technology do not necessarily fix the data problems within departments. When building new systems, many departments seemed to re-instate established but sometimes antiquated practices or procedures. This apparently occurs for several reasons: fear of change and/or loss of control; knowledge of current systems limited to one or two people; and a lack of training for end users on new systems. The attendees saw the need for “translators” who can help departments design systems and procedures that work to complement one another. An attendee noted that “people and processes make good data, not technology”.

Approaches to Training

Attendees discussed improvements that can be made to training protocols that would increase the quality of captured data. Their recommendations include:

- Use normal words versus technical jargon
- Place training documents in a central spot so all users can access them at any time and from any location
- Implement a phased approach to training that progresses from teaching personnel how to use systems to how data can be used to make critical decisions
- Incorporate end user feedback to improve quality and applicability of training
- Create short, simple training videos

Adapting Systems to Meet Needs of Users versus Requiring Users to Adapt to Systems

Entering fire incident data along with the other reports that firefighters typically complete is often an arduous and unenjoyable part of the job. The attendees discussed technological improvements that can be leveraged to remove some of the burden of entering data from firefighters:

Rethinking How Firefighters Engage with Data

Virginia Beach (VA) Fire Department

The VBFD has taken a back-to-basics approach to improving its data quality. After identifying that delegating station report writing to the lowest ranking member was resulting in poor data, VBFD instituted a policy that prohibited new firefighters from filling out reports. They developed tiered training courses on report writing for firefighters and aspiring company officers. The courses were designed to both improve data quality and to demonstrate how data is used within the organization. The department also engaged Master Firefighters as members of the NFIRS QA process so that they could gain knowledge and expertise as they fill critical reporting and data leadership roles in the future.

- Pre-populate specific fields from other sources such as CAD
- Minimize the number of questions using smart formatting
- Draw critical information from narratives using advanced technologies
- Allow end users to skip over questions and return to them later when they have the data available
- Presume that the firefighters will not have extensive training or remember hundreds of different codes
- Don't make firefighters work for the system, make the system work for them (i.e. use color coding or other intuitive designs such as red, yellow and green buttons for levels of fire)
- Lack of real-time availability of a department's data limits its use
- AI cannot solve everything and not everything needs to be automated)
- Cannot sacrifice functionalities for "pretty" user interfaces.

Improving Narratives

Attendees raised the possibility of using narratives to complete reports, which highlighted the importance of quality narratives. The attendees felt that much could be done to improve how narratives are typically written. The attendees were asked if there a standard narrative format like SOAP (Subjective, Objective, Analysis, and Plan) format that is often taught to EMTs that could be leveraged to improve narratives. Some critical challenges and thoughts from this discussion:

- There seems to be little consistency in what should be included.
- A combination of approaches that balance the use of narratives and drop-downs is a possible answer.
- Use chronological approaches to help improve quality and ease of input.
- Find ways to account for local phrases and usage.
- Find ways to implement good quality control mechanisms.

Keeping Data in the Hands of Leadership Austin (TX) Fire Department

The AFD produces annual, short fact sheets with their most relevant, oft-requested information. It serves as a handy cheat sheet for executive staff and helps to keep information coming from all levels of the department consistent. It features year-over-year comparisons of vital data such as call volume, response times, and city and department demographics.

APPENDIX A: SURVEY SUMMARY

In April 2017, the NFPA published the *National Fire Data Survey: Findings on the State of the Existing American Fire Data Ecosystem*. The survey was designed to learn what types of data fire departments collect; what software they use to capture, store and analyze data; and how they use that data for local decision-making.

The survey found a growing paradigm shift away from simply creating static fire records to the emergence of a dynamic fire data environment where digital records are being created through a host of systems. While some fire service agencies seem to primarily use data for reporting compliance and record-keeping processes, an increasing number of fire service agencies appear to be using data to manage their organization and their operations.

Theme 1:

The Fire Service recognizes the value of data.

Theme 2:

The Fire Service isn't satisfied with the status quo.

Two key themes emerged when we asked the fire service to sum up fire data in one word (see right) and continued throughout the survey findings. Underlying these themes is the intricate, seemingly disparate reality: that current systems store substantial quantities of fire data but the benefits of these systems are often limited by data quality, accuracy, and access.

Increasingly, fire departments are analyzing data for local decision-making. Fire departments collect and maintain data on a wide variety of fire activities, including response information, patient care, fire inspection, training, public education, and many other types of records. These records go beyond the type of information collected by the National Fire Incident Reporting System (NFIRS). A comprehensive approach to connect all fire activity data is needed to ensure that fire departments work with data that truly accounts for the full picture of their activities.

Finally, there does not appear to be one overarching fire data problem, nor does there appear to be one overarching one-size-fits-all fire data solution. Depending on the size of the agency, their current capabilities and need, fire departments seem to have different fire data problems. Challenges that one department may be struggling with are likely issues recently solved by another department or other data domains outside of the fire service. Identifying, leveraging, and sharing best practices across the fire service and beyond can likely have significant benefit.

Full Report: www.nfpa.org/news-and-research/resources/fire-service-resources/national-fire-data-system-project

APPENDIX B: MEETING AGENDA



NATIONAL FIRE PROTECTION ASSOCIATION

The leading information and knowledge resource on fire, electrical and related hazards

EAST COAST FIRE DATA SUBJECT MATTER EXPERT WORKSHOP

October 4, 2017: Noon – 4:30pm • October 5, 2017: 8:30am – 4:30pm
Confidante Hotel • Century Lounge

Meeting Purpose:

To bring key fire service stakeholders representing various backgrounds, experiences, and types of organizations together to identify who is asking fire-related questions, what questions are they asking and what information or data is needed to answer those questions.

Meeting Objective:

To develop and refine typical “use cases” of modern fire activity data for a diverse range of constituents.

October 4, 2017

Noon – 1:00pm	Attendee Check-In Lunch Available – Vista Terrace	
1:00pm	Day 1 Start	
1:00pm – 1:45pm	Welcome and Introductions	M. Hinds-Aldrich
1:45pm – 2:15pm	NFPA Fire Data Efforts	M. Ayub
2:15pm – 2:30pm	Break	
2:30pm – 3:30pm	Just the person I was looking for... <i>Who is asking or being asked fire-related questions?</i>	M. Knight
3:30pm – 4:30pm	I’ve got a question for you... <i>What fire-related questions do they have?</i>	M. Hinds-Aldrich
4:30pm	Adjourn	
6:30pm	Group Dinner!	Meet in Lobby

October 5, 2017

8:00am – 8:30am	Continental Breakfast Available	
8:30am	Day 2 Start	
8:30am- 9:00am	Your Takeaways from Day 1	M. Knight
9:00am – 10:00am	Find. That. Data. <i>Where is the data needed to answer fire-related questions?</i>	M. Hinds-Aldrich

10:00am – 10:15am	Break	
10:15am – 11:15am	Help me understand what you're trying to do... <i>Why are they asking?</i>	M. Knight
11:15am - Noon	Seems like you are asking... <i>How do we help others ask the right questions?</i>	M. Hinds-Aldrich
Noon – 1:00pm	Lunch	
1:00pm – 1:45pm	Developing Fire Activity Data Use Cases	M. Knight
1:45pm – 2:45pm	Moving to Outcome Measures	M. Hinds-Aldrich
2:45pm – 3:00pm	Break	
3:00pm – 4:00pm	Next Steps	M. Knight
4:00pm – 4:30pm	Final Thoughts & Wrap Up	M. Hinds-Aldrich
4:30pm	Adjourn	

Partial funding for this meeting has been provided by a DHS/FEMA/Assistance to Firefighters Grant/Fire Prevention and Safety grant award.

APPENDIX C: MEETING ATTENDEES

Scott Bliss, Assistant Chief, Central Arizona Fire & Medical Authority (AZ)
Kristin Chaffee, Strategic Program Manager, Tualatin Valley Fire Rescue (OR)
Monica Colby, Fire & Life Safety Specialist, Rapid City Fire Department (SD)
David Daley, Battalion Chief, South Metro Fire Rescue (CO)
David Downey, Fire Chief, Miami Dade Fire Rescue (FL)
Mike Duyck, Fire Chief, Tualatin Valley Fire Rescue (OR)
Brad Hardin, Battalion Chief, Fayetteville Fire Department (AR)
Jennifer Heatly, Business Process Consultant, Austin Fire Department (TX)
Laura Hitt, Chief of Staff, Tualatin Valley Fire Rescue (OR)
Stephanie Julazadeh, Captain/Accreditation Manager, North Charleston Fire Department (SC)
Dan Peterson, Fire Chief, Unified Fire Authority (UT)
Maura Power, Analyst, Fairfax County Fire Department (VA)
Maria Reyes, Accreditation Manager, Miami Dade Fire Rescue (FL)
Adam Thiel, Commissioner, Philadelphia Fire Department (PA)
Christine Thies, Business Process Consultant, Austin Fire Department (TX)
Amy Valdez, Battalion Chief, Virginia Beach Fire Department (VA)
Brent Van Scoy, Engineer/IT Coordinator, Omaha Fire Department (NE)
Craig Weinschenk, Fire Protection Engineer, Underwriters Laboratory (MD)

Mohammed Ayub, NFPA
Dr. Matt Hinds-Aldrich, NFPA
Melissa Knight, NFPA