Assistance to Firefighters Grant Program (AFG)

Fire Prevention & Safety Grants (FPS) Research and Development (R&D) Activity

2017 FPS R&D Frequently Asked Questions

What is the purpose of the AFG FPS R&D activity?

The purpose of AFG's FPS R&D activity is to improve firefighter safety, health, or wellness through research and development that reduces firefighter fatalities and injuries. Project proposals for FPS R&D funding should identify specific outcomes that are expected to lead to improved firefighter safety, health, or wellness. These outcomes likely will be related to new or improved programs, policies, and/or products. As an applied research program that aims to benefit firefighters, applicants are expected to develop strong partnerships with relevant fire service organizations and fire departments.

The "2015 Fire Service Research Agenda," produced by the National Fallen Firefighters Foundation (NFFF), contains information that can be used as guidance for those interested in performing studies relative to current research priorities of the fire service. [LINK: http://www.everyonegoeshome.com/wp-content/uploads/sites/2/2016/05/2015-Rearch-Agenda.pdf]

What is meant by "firefighter fatalities and injuries"?

Line of duty deaths (LODDs) may be the result of incidents linked to firefighter training, vehicle crashes, and other fire service activities. The U. S. Fire Administration tracks and collects information on the causes of on-duty firefighter fatalities that occur in the United States. [Link: https://apps.usfa.fema.gov/firefighter-fatalities/]. Fatal and non-fatal injuries are also tracked and described by the National Fire Protection Association (NFPA) [LINK - Injuries: https://www.nfpa.org/news-and-research/fire-statistics-and-reports/fire-statistics/the-fire-service/fatalities-and-injuries/firefighter-injuries-in-the-united-states and Link - Fatalities: https://www.nfpa.org/news-and-research/fire-statistics-and-reports/fire-statistics/the-fire-service/fatalities-and-injuries/firefighter-fatalities-in-the-united-states].

Firefighter fatalities and injuries can be linked to behavioral and mental health events that occur during firefighting activities. Behavioral and mental health includes post-traumatic stress, depression, and suicide. Cancer is also a significant concern for firefighters and is related to exposures to carcinogenic chemicals and particulates encountered in and related to firefighting activities. [LINK: https://www.cdc.gov/niosh/firefighters/ffcancerstudy.html].

What is meant by "strong partnership" with the fire service?

With AFG's R&D focus on improving firefighter safety, health and wellness, applicants are expected to partner with fire service organizations and departments from the earliest stages of study design to the end of the study. These partners should provide the study with a depth of fire service expertise and experience that (assuming the study is successful) likely will improve future dissemination, implementation, and impact. For example, an applicant studying cancer outcomes among volunteer firefighters might partner with the National Volunteer Fire Council (NVFC) as well as fire departments in several regions of the country. Applicants should submit letters of support from partners and explain the specific roles and responsibilities of each key partner within the grant application.

What is meant by AFG's focus on "fire service in the United States"?

AFG's R&D interest is in improving the safety, health, and wellness of firefighters throughout the nation. Most studies will need to select or sample participants in a way that is feasible for research study and such that outcomes can be generalized nationwide by firefighters. These studies, if successful, are expected to lead to new or improved programs, policies, and products that have potential for widespread adoption and use. Exceptions may occur but the reason for the exception must be clearly explained in the application. An example of an exception may be preliminary studies or proof of concept designs.

Where can I find information about past awards?

AFG maintains a listing of the grants awarded on its website. Abstracts of completed and active R&D program studies organized by fiscal year of the award can be accessed at: https://www.fema.gov/fire-prevention-safety-research-development-grants-grant-awards.

What studies are not eligible for R&D awards?

The NOFO specifies what types of studies are ineligible for R&D awards. These include:

- Projects that focus primarily on curriculum development and delivery of education or training materials
- A descriptive study about the fire service or any study without reduced firefighter injury or enhanced firefighter safety aims
- Projects with local emphasis and little or no indication of application to the broader fire service
- Projects that emphasize funding for service delivery

What is the difference between the R&D activity and the National/State/Regional Programs and Studies category under the FP&S activity?

The National/State/Regional Programs and Studies category under the FP&S activity focuses on dissemination and implementation of existing programs, polices, or products that have been shown to be effective through previous rigorous scientific evaluation. Projects under the FP&S activity may focus at the local (not national) level. It is not a program that supports research.

Research to determine effectiveness of programs, polices, or products should be applied for under the R&D activity. If a study aims to conduct research that can be generalized nationwide, especially if it involves human subjects, then the application must be made through the R&D activity so that appropriate reviews (for funding) and monitoring (if awarded) can be conducted.

Does AFG accept applications for R&D projects all year long or during a specific time?

Applications are accepted during an approximately one-month "open application period" that usually takes place during the first quarter of the calendar year.

How can I find notices of the R&D application periods?

Notices can be found via email notification and also via postings on the AFG website. Please note that AFG offers several different kinds of funding announcements annually, but only one is for R&D. These several different announcements are referred to as Notices of Funding Opportunities (NOFOs). The NOFO that pertains to R&D is called the Fire Prevention and Safety (FP&S) NOFO. The FP&S NOFO contains two funding activities: (1) Fire Prevention and Safety Activity and (2) Firefighter Safety Research and Development Activity.

How do I sign-up for e-mail notification about the open period for submitting R&D project applications?

To register for automatic e-mail notices of NOFO and other important program information go to: https://www.fema.gov/e-mail-alert-archive

I have two or three projects in mind. According to the NOFO I may request funding for more than one project per application. How does that work?

Applicants may only submit one application under the Fire Prevention and Safety NOFO. However, that one application may contain up to six (6) projects, including up to three (3) under the Fire Prevention and Safety Activity and up to three (3) under the Research and Development Activity. Each application is limited to a maximum federal share of $1.5 million dollars. Research and Development applicants applying under the Early Career Investigator category are limited to a maximum federal share of $75,000 per project year.

When the application is received, the projects will be separated and each one will be evaluated on its own merit (without reference to any other project in the application). For that reason, each project must be fully documented including a budget and relevant supporting documents (such as letters of support specific to each project and biographical information for principal team members), even if the information is the same for more than one project.

What are the research categories under the R&D activity?

The R&D activity is divided into six (6) categories, including (1) clinical studies, (2) technology and product development, (3) database system development, (4) dissemination and implementation research, (5) preliminary studies, and (6) early career investigator. Applicants will be asked to indicate which of these categories is most relevant to each project. Categories help to organize the project submitted. All categories are considered equally for awards.

What is meant by the “clinical studies” category?

This category may address one (or more) of three areas of specialization: clinical, behavioral, and social. For example, clinical studies may focus on physiological function before, during, or after firefighter activity; behavioral research may address mental health interventions for work-related issues such as post-traumatic stress or depression; and studies in the social category may seek an understanding of how departmental culture and psychosocial norms impact safety.

What are “technology and product development” studies?

Technology and product development activities include a wide scope of projects that result in outcomes that can enhance safety or health of firefighters. Results may be new or improved equipment. Also, results may be new information that will be useful in improving the safety of fire fighting strategies and fire ground operations, or information about hazardous exposures. For example, firefighter safety can be improved through greater understanding of fire phenomena inside and outside structures, and the development of products to enhance firefighter situational awareness and effectiveness. New products can be developed by application of new technologies or adapting existing products and technology to new uses. As the intention of the R&D awards is to deliver outcomes that are likely to be implemented nationally by the fire service, inclusion of a cost-effectiveness analysis is encouraged. Technology and product development projects need to assess the ultimate practicality of deployment and use of the results by firefighters during actual firefighting operations.

What are “database system development” studies?

Information from databases can inform the fire service about where there are challenges, and what specific factors influence firefighter safety, health and wellness. For instance, a database system may be developed to identify firefighters’ use of hospital emergency departments nationwide. Such epidemiologic information potentially could result in changes to fire service programs, policies, and products, leading to reduced fatal and non-fatal injuries nationwide. Researchers who apply for funding in this category also should consider resources and strategies for continued support and maintenance of the database system after the initial one to three-year funding period. These grants should be considered as start-up and demonstration funding only.

Note: If you intend to develop a dataset as a function of your specific research study, without data collection with the same participants post study, then your proposal likely fits the clinical or technology category rather than the database systems category.

What is "dissemination and implementation" research?

This is a research (not a Fire Prevention and Safety Activity) category and, as such, it is distinct from the activities of dissemination and implementation of study results, per se. Instead, it is about conducting research on the effectiveness of methods for dissemination and implementation of results.

The precondition for studies in this research category is a previously completed rigorous research trial or test that achieved a successful result (and had peer review publication or AFG Program Office concurrence). This category supports moving from research to practice in ways that enhance uptake, translation, fidelity, and long term sustainability.

The study design for dissemination and implementation research (D&I research) should be as relevant and rigorous as the research that led to the outcome of interest. For instance, D&I research might include a control and comparison trial to examine whether adoption and sustainability of a new program is more likely to be achieved following in-person training or internet training, and/or with use of department level mentors or online chats with experts.

Note: D&I research should not attempt to re-examine original intervention outcomes as was done in the prior effectiveness trials. A replication study would be a different focus and should be directed to a clinical or technology category.

What are "preliminary studies"?

The preliminary study category supports researchers' need to answer questions or establish methods prior to determination of a specific study design. This is particularly true when there is little evidence already available in the literature or from other sources. For example, when little or no research existed on women firefighters, preliminary study established the need for certain kinds of research, such as regarding reproductive health. Data from preliminary work likely would strengthen a subsequent application for a larger (clinical or technology) study.

In another example, this category was used effectively to gain support for evaluation of advanced sensors that could be candidates for building a practical gas and particulate hazard warning system. The preliminary study allowed the researchers to identify and eliminate risks associated with sensor performance so that the follow-on major proposal was able to build and test a practical new product for deployment.
Link: https://www.fema.gov/fire-prevention-safety-research-development-grants-2012-grant-awards-01284

Note: If an application could be competitive without the results of preliminary study (such as when adequate information and methods are already established with prior research in this area), then the clinical or technology category should be used.

What are "early career investigator" studies?

This project category is intended to promote the development of new principal investigators who wish to engage in research to improve firefighter safety, health, and wellness. The project may be identified with any of the five other R&D activity categories. This category is reserved for projects led by a principal investigator who received a PhD or equivalent advanced level research degree no more than five years prior to the opening date of the application period. As the development of new research talent through mentoring is a focus of these awards, projects that are affiliated with larger ongoing fire service research efforts are encouraged. The applicant must be an eligible institution, as individuals are not eligible to receive an award under the program. All proposed projects must have a fire service partner. As noted earlier, these awards are limited to a maximum federal share of $75,000 per project year.

What kinds of expertise are required for PIs and interdisciplinary research teams?

Generally, scientists who take the lead in R&D studies in the clinical category are trained in area(s) of specialization that are specific to the study topic, such as physicians who are toxicologists in toxicology research,

clinical or social psychologists in behavioral and mental health areas, and sociologists in social or cultural areas. Scientists and engineers that take the lead in R&D studies in the technology and product development category also are trained in area(s) of specialization that are specific to the study topics, such as combustion scientists leading studies of toxic gas exposures, textile engineers for development of better fabric for advanced turnout gear and protective shelters, fire protection engineers to address fire dynamics in structural firefighting. In some cases physicians and engineers team up to study the heat stress and work effort need to accomplish routine firefighting tasks to better define expectations for safe work on the fire ground. Also, scientists and engineers with relevant expertise may be from many other specializations such as anthropology, behavioral sciences, biostatistics, chemical engineering, codes and standards, computer sciences, economics, electrical engineering, emergency medicine, epidemiology, fire modeling, geophysical sciences, health behavior, kinesiology, mechanical engineering, neural science, nutrition, physics, physiology, and public health to name a few.

How are R&D project proposals evaluated?

A panel of fire service professionals carries out an initial review. As detailed in the NOFO, the fire service panel uses a specific set of criteria to consider relevance of the proposal for reducing firefighter fatal and nonfatal injuries and the likelihood of implementation of successful research results.

The highest scoring projects from the fire service evaluation receive further evaluation by a science panel that is composed of experts in fields relevant to the proposed research. The science review panel uses a set of specific criteria that addresses the scientific rigor of the proposal.

Do applicants receive feedback from the review(s)?

Where an application received a fire service review only, that feedback is provided. The aim is to indicate where the proposal was not considered sufficiently relevant and/or how the applicant might improve relevance.

Where fire service relevance was sufficiently strong to merit the proposal receiving further review by a science panel, but the proposal was not funded, then feedback from both the fire service review and the science panel will be sent to the primary contact specified in the application.

Should letters of support be included with an application for funding?

AFG encourages participation with research partners throughout the project from application through dissemination of results. In particular, partnerships with fire departments are very much encouraged and are part of the evaluation process for all project proposals. Letters of support are defined as commitments of fire departments to provide specified support to the projects in terms of fire service expertise (e.g., consultations, advisory board membership), encouraging firefighter participation in the study, and/or use of facilities (e,g., control burn buildings, fitness equipment).

Letters from partners and other supporting organizations should be included in the Appendix of the application.

Note: Applicants may reduce size of letters so that two images can be placed side by side on a landscape format page, if sufficient in size that the text of the letter can still be read.

What should be considered in selection of potential fire service partners, and others?

The project team, including partners and others, is evaluated for its ability to complete the proposed project in a timely manner and deliver research results that are relevant to reducing firefighter fatal and non-fatal injuries and can satisfy rigorous scientific review, such as peer review for publication as a contribution to the body of knowledge. The principal investigator should assemble a research team with expertise to accomplish all parts of the proposed project. For example, partners may have the ability to encourage firefighter participation in the study, or the ability to review and promote program, product, or policy changes based on study results.

How important is it to address all guidance and criteria in the application?

Project evaluation total scores are rank ordered from the fire service review with the highest going forward for additional science review. The projects are then ranked according to the highest science panel evaluation scores. FEMA makes awards based on this final ranking. Thus, it is critical that the application addresses each of the evaluation criteria as thoroughly as possible.

How can the structure of the application support the Panel Reviews?

Fire service panel reviewers will have access to the entire application. Applicants generally have found it useful to focus specifically on the fire service evaluation criteria in the first few pages of the narrative. The remaining pages of the narrative may be used to address the science review criteria.

What information might be included to help fire service reviewers?

The primary information about fire service evaluation criteria is provided in the NOFO. Further guidance is offered here, per criterion:

• **Purpose.** Reviewers will consider your justifications of the study importance which may be established by citing high injury rates as established by respected sources, such as CDC, NFPA, NIOSH, and USFA; or new trends toward increasingly high injury rates; and/or identification within the NFFF research priorities. Further, they may draw on their own experience and that of other firefighters they know to appreciate your stated purpose. Thus, examples or anecdotal data could be useful tools for clarifying your purpose. These are not the only possible justifications; however, they may provide a good foundation.

• **Implementation.** For implementation by the fire service, reviewers may focus on whether the fire service would adopt your (successful) results. It is best to address this issue for the fire service reviewers in the front pages of the application. If you recognize that future implementation would require a series of steps before the fire service would be ready for change, you could suggest some appropriate strategies. Note that you will address this again under the "dissemination and implementation" criteria for the science reviewers.

• **Potential Impact.** In describing potential impact, you may project numbers of reduced injuries that would be accomplished with the (expected) results. If you provide strategies to overcome implementation barriers, you can further demonstrate that you have knowledge of fire service realities and the change process.

• **Barriers.** Barriers to timely completion of the study and the eventual implementation of the proposed results are important to discuss in the early pages of the narrative. Especially important to discuss are those barriers that involve fire service participants, from recruitment and retention, to compliance and bias, to national and local political concerns, among other factors. Addressing these types of barriers, as well as the strategies to overcome them, is another way to underscore your knowledge of the realities of the fire service.

• **Partnerships.** Since fire service partnerships are a central element of a research team, your development of those partnerships prior to the application would be reflected in the detailed letters of support you provide in the Appendix. An overview of those relationships would be helpful in the front pages of the application. In many cases, fire service panelists will expect to see evidence of relevant national or regional partnerships that support the study's purpose and goals and eventual national implementation. For instance, if the population of interest were volunteer firefighters, then the National Volunteer Fire Council (NVFV) would be expected to be a helpful partner.

What further guidance can be given for addressing the criteria considered in the Science Panel Review?

The science review of an application is a thorough and rigorous evaluation by experts knowledgeable in the research areas relevant to the proposed project. It is critical that the content of the narrative and the appendix fully address how the proposed research is responsive to the evaluation criteria. Generally applicants choose to follow a sequence in the narrative that follows the order of the science evaluation criteria as provided in the NOFO. Further guidance is offered here, per criterion:

• **Goals, objectives, and specific aims.** The goals, objectives, and specific aims criterion intends to provide a framework that guides the applicant to move from a statement of broader purpose (such as reducing toxic exposure) to providing precise, measurable, and/or behavioral details that represent what you plan to achieve by this study (such as increased time lapsed from suppression to overhaul). The applicant's goals and objectives should drive the study design and activities. If that is not the case, then some goals and/or objectives should be dropped (or design and activities amended); measurements and analyses must follow the methods planned and should lead to answers regarding specific aims.

• **Literature review.** The literature review in the application demonstrates the principal investigator and scientific team are knowledgeable about what has been studied in the past. This expertise suggests the ability to do applied research in this area. Importantly, the literature review makes evident how the proposed research will contribute to the existing body of knowledge in this area. Without a strong literature review, the relevance of this study, as proposed, will be less evident.

• **Methods.** Project methods describe the overall approach to the study. Methods may be a study design such as a randomized control trial or a large-scale fire test series design. Related information, such as how best to select participants or structures, contents and firefighting methods utilized, respectively, should be described.

• **Measurements.** Project measurements include the more macro and micro aspects of the research. The applicant may specify established instruments that will provide the data for analysis. Where extensive, a table format may be useful. Sufficient information would be such that the feasibility of the analytic plan can be assessed.

• **Analysis.** Project analysis may include the statistical plan for determining clinical and statistically significant results, including power analysis information. For instance, where fire departments rather than individual firefighters are the unit of analysis, then sampling, measurement strategies, and analysis would reflect that decision. For technology and product development studies the analysis plan should specify what constitutes significant or successful results.

• **Dissemination and implementation.** The dissemination and implementation criterion (not the same as dissemination and implementation research) asks principal investigators to indicate how the results of the proposed project (if successful) would be disseminated to the fire service and scientific communities. Not only does this criterion cover dissemination of study results, but also how the study might move to implementation, that is, moving from research to practice. The applicant should show how the issues for dissemination and implementation have been taken into consideration throughout the study and in development of their project product. For instance, if a product can be made available via the Internet that would improve access and adoption. Also, providing the research result to relevant firefighter standards organizations to promote national adoption is a proven means to implement successful research results. This development of dissemination and implementation plans does not intend to suggest that the applicant would be responsible for all the subsequent activities.