# FY 2009 Assistance to Firefighters Grant Program Fire Prevention and Safety Grant

## FINAL REPORT

## Integrated Risk Management/ Home Safety Visits
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### Project Management and Analysis

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| Peg Carson | Staff Coordinator; Vision 20/20 |
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## City of Philadelphia, PA Fire Department

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## Other Communities

We wish to thank fire officers in the following communities that joined the project late in the grant period to supplement two that had to curtail their efforts.

Huntington, WV

Niceville, FL

Northampton, MA

Williamsburg, KY

## Evaluation Advisors

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## EXECUTIVE SUMMARY

Under a grant to the Institution of Fire Engineers (IFE) US Branch from the FEMA Assistance to Firefighters Grant (AFG) program, three major cities and a group of five smaller ones with wide geographic distribution tested the concept of Integrated Risk Management (IRM) or Community Risk Reduction, as it is increasingly known in the United States. IRM had proven successful in England and other nations, with dramatic decreases in fire deaths.

A key concept in IRM is making visits to high-risk homes. The visits usually are made by two- person teams consisting of two line firefighters, two people from the community, or a firefighter and a volunteer. Some prevention bureau personnel also may be used, but most of the implementation is usually by line personnel and/or community volunteers. The use of home visits was a major aspect of IRM to be tested in this project—how to adapt the general concept to the environment of various cities to demonstrate its feasibility and robust flexibility.

The core of each home visit consisted of testing each smoke alarm in the home, and installing new ones or replacing batteries to bring the smoke alarm complement up to the latest code. The visiting team also instructed members of the household on fire safety and sometimes other safety points, and left written safety materials. The team documented the results of the visit, including the demographics of the household, risk factors, status of smoke alarms when they arrived and when they left, and the verbal and written safety information provided.

IFE coordinated and guided the project, and supplied grant-funded smoke alarms and some additional resources to each participating community. The participating communities were: Lexington, KY; Madison, WI; Philadelphia, PA, Amherst, MA and a group of four smaller communities (Niceville, FL; Northampton, MA; Huntington, WV; and Williamsburg, KY). In each community the vast majority of visits were by line firefighter teams.

The cities documented the installation of 14,440 smoke alarms, of which 12,640 were purchased under this grant. Additional smoke alarms were purchased with other resources, some stimulated by this grant. The numbers of smoke alarms installed were as follows:

| | |
|---|---|
| Lexington | 200 |
| Madison | 3000 (+ 1738 from another grant) |
| Philadelphia | 9000 (+ 62 from other sources) |
| Amherst and four smaller communities (Niceville, FL; Northampton, MA; Huntington, WV; and Williamsburg, KY) | 440 |
| **Total** | **12,640 (+ 1,800) = 14,440** |

Besides the 14,440 smoke alarms with documented installations were several hundred more purchased under the grant but installed after the data collection deadline kept in reserve for late citizen requests (after generating much publicity and interest among high-risk homes).

The sections below summarize the key results.

## Focus on High-Risk Homes

Each participating community identified individual homes or geographic areas that had higher than average fire risk, and were likely to need more smoke alarm protection. The communities were highly successful in doing this. Three of the cities focused on single family dwellings; one (Lexington) focused on mobile homes. Multi-family dwellings generally were excluded because local laws required them to have smoke alarms provided by the landlord. However some flexibility was available for visits to selected apartments and other occupancies.

In three communities all of the homes approached were entered because they were visited by appointment. Philadelphia used a canvassing approach to reach much larger numbers of households, and entered about half of those tried. People not at home and people who did not want to be bothered were the main reasons for non-entry.

About 16,000 people lived in the slightly over 6,500 homes visited by the project. Over three-quarters of the homes (78%) had at least one high-risk demographic factor (children under 5, older adults, smokers, and people with disabilities). The majority of the homes were occupied by minorities.

## Situation Found

Another indication that the communities did identify high-risk homes was the need for more working smoke alarms found in most of homes visited.

Thirty five percent (35%) of the homes had no working smoke alarm at all.

Where alarms were present, a third of them (33%) were not working.

In Philadelphia, 79% of the homes needed at least one more smoke alarm. In Amherst and the smaller communities, at least 87% required an alarm. In Madison it was 97% and in Lexington close to 100%.

Thirty-eight percent (38%) of the homes visited admitted they had no escape plan.

## Actions Taken

Fourteen thousand four hundred two (14,402) alarms were installed in the homes by the visiting teams, an average of 2.2 per home. Madison had to install about 5 per home.

Eighty-eight percent (88%) of the homes were instructed on the testing and maintenance of alarms, and escape planning. About 78% received written material on alarm testing, escape planning, and other safety subjects.

## Results

After the visits 98% of the homes visited had at least one working smoke alarm, and there was an average of almost 4 working smoke alarms per home. At least 94% of the homes met code on completion of the visits. Most of the others were informed as to what additional alarms would be needed to meet code. (A small fraction of homes did not want to be bothered by the installation of alarms.)

The results are summarized in Table 1 below:

**Table 1: Summary of Home Visit Results**

| | Amherst et al | Lexington | Madison | Philadelphia | Total |
|---|---|---|---|---|---|
| **HOMES VISITED** | | | | | |
| Number visited/entered | 166/166 | 54/54 | 902/902 | 10,082/5418 | **11204/6540** |
| Most common type of home | Single-family Dwellings (71%) | Mobile Homes (96%) | Single-family Houses (90%) | Single-family Dwellings (92%) | - |
| Number of people living in the homes | 382 | 196 | 1659 | 13749 | **15986** |
| Percent of homes with at least one risk factor (older adults, young children, smokers, disabilities) | 78% | 80% | 96% | 57% | **78%** |
| Leading ethnic group in the homes (percent of homes) | African-American (78%) | White (55%) | White (90%) | African-American (43%) | - |
| **SITUATION FOUND** | | | | | |
| Percent of homes with no working smoke alarm | 30% | 69% | 9% | 32% | **35%** |
| Percent of smoke alarms not working | 30% | 58% | 13% | 26% | **33%** |
| Percent of homes with no fire escape plan | 27% | 57% | 43% | 25% | **38%** |
| **ACTIONS TAKEN** | | | | | |
| Total number of smoke alarms installed | 440 | 200 | 4738 | 9062 | **14440** |
| Average number of smoke alarms installed per home | 2.7 | 3.7 | 5.3 | 1.7 | **2.2** |
| Percent of homes given one-on-one instruction on maintaining smoke alarms | 66% | 100% | 97% | 90% | **88%** |

| | Amherst et al | Lexington | Madison | Philadelphia | Total |
|---|---|---|---|---|---|
| Percent of homes given written safety materials (escape planning / general home safety) | 52%/67% | 100% | 92%/88% | 63%/72% | **78%** |
| **RESULTS AFTER THE VISITS** | | | | | |
| Percent of homes with at least one working smoke alarm | 100% | 100% | 99% | 91% | **98%** |
| Average number of working smoke alarms per home | 4.3 | 4.3 | 7.3 | 3.0 | **4** |
| Percent of homes meeting code for alarms | 99% | 98% | 95% | 81% | **94%+** |

## Changes in Approaches to Prevention

This project promoted the dual strategy of a) getting more firefighters involved in prevention, especially in making home fire safety visits, and b) working synergistically with other municipal agencies and community organizations. This approach has proven to be highly effective in reducing fire deaths by as much as 40-60% in cities in Canada and the United Kingdom. Getting line firefighters and other organizations more involved in prevention allows many more high-risk homes to be reached than is possible with the relatively few personnel in the prevention bureau alone. In a time with tight municipal budgets, this project demonstrated a way that the fire service can deliver more value for money.

Another feature of this project was getting the communities to use their data to identify high-risk households, and to think in terms of integrated risk management. They used statistics on fire incidence and risk demographics to identify areas or types of homes (e.g. mobile homes) at high-risk in their community. Some individual and groups of homeowners or occupants (e.g. older adult associations) self-identified themselves as needing fire department assistance.

The body of the report describes the approach used by each city, and the variety of approaches by which the basic concepts can be implemented. There are many ways of moving toward the goal of having all homes equipped with working smoke alarms in adequate numbers and locations. Efforts are ongoing toward the longer term goals of having fire departments institutionalize the concepts of Community Risk Reduction after grant funds are expired, and having citizens change behaviors to maintain their own fire safety—but this all will be challenging in some communities. Longer term study and support are needed for these concepts to take hold in the U.S.

Still, other communities hopefully can learn from this project's experience, and make adaptations to fit their own environments but reach the same end of making homes safer from fire.

# I. INTRODUCTION

This report describes how a group of three cities and a cluster of five smaller communities implemented an integrated risk management (IRM) program that featured visits to high-risk homes for smoke alarm testing and installation. The primary purpose of the project was to further demonstrate how an innovative approach used in England could be adapted to the United States, and reduce risk in homes.

Integrated risk management is increasingly called Community Risk Reduction (CRR) in the United States. The terms are generally interchangeable here.

This project was supported by a grant from the FEMA Assistance to Firefighters Grant (AFG) program to the USA Branch of the Institution of Fire Engineers. The grant supported several initiatives under Vision 20/20, a grassroots effort to define and help implement a national strategy for fire prevention. The grant was awarded in 2010 and ended in June 2011. The project budget was $789,000 of which the largest part supported this IRM project.

This project built upon the results of a project funded by an AFG grant the previous year to the Washington State Association of Fire Marshals (WSAFM) to test the IRM concepts in five cities. The present IFE project expanded the repertoire of IRM implementation strategies with a number of innovative variations, and in a wider variety of communities. The IFE project made use of the lessons learned from WSAFM for refining the methodology and data collection. The home visit form used by IFE and the analysis of the data collected with it followed essentially the same approach as in the WSAFM project, so the results are compatible for comparison, and can be used together as a large data set.

## Background

A series of research reports that described international best practices in residential fire prevention was funded by the FEMA AFG program in 2006-2009.[1] The research was undertaken by the Centers for Disease Prevention and Control (CDC) Division of Injury Prevention, and the TriData Division of System Planning Corporation.

The single best practice found to significantly reduce fire deaths and injuries was an IRM approach that started with identification of areas and individual households at highest risk from fire, and continued with home visits to test smoke alarms and install new ones where needed. During each home visit, personal, tailored safety education was provided to the household in addition to testing and installing smoke alarms where needed. When implemented on a city-wide scale, such programs were found to reduce fire deaths by as much as 40-60 percent, for example

[1] *Global Concepts in Residential Fire Safety, Best Practices from other nations, Volumes I, II, and III*, TriData Division, System Planning Corporation, Arlington, VA, 2007-2009.

in Liverpool, England; Ottawa, Ontario; and Longueil, Quebec. These cities started with fire death rates lower than their counterparts in the United States, so making further reductions was difficult and especially noteworthy.

One of the key concepts in IRM is for fire stations to help plan and implement the prevention program in their area. Households in the highest risk areas are the first visited, usually by line firefighters and/or volunteers from the community who test the existing smoke alarms, install new ones where needed, or replace batteries. The goal is to bring at least the highest risk homes up to the code requirements for smoke alarms.

About the same time this international research was being undertaken, Vision 20/20 came to life. It is a grassroots effort to develop a national fire prevention strategy, and includes increasing the level of fire prevention activity within the fire service's culture.

***Participating Communities*** – In the preceding WSAFM project the IRM concept was tried in five cities: Dallas, TX; Portland, OR; Tucson, AZ; Vancouver, WA; and Wilmington, NC.

In the present IFE project, the concept was further tested in Lexington, KY; Philadelphia, PA; Madison, WI; Amherst, MA; and a cluster of four other smaller communities including Niceville, FL; Northampton, MA; Huntington, WV; and Williamsburg, KY, which stepped in after one jurisdiction could not continue the project for internal reasons. Belchertown (MA), a neighbor of Amherst, started the project but had to drop out entirely shortly after the project began for internal reasons that had nothing to do with the project. Amherst had to scale back its scope, also for internal reasons.

The reduction in Amherst and Belchertown opened the opportunity to try the concept in the smaller departments, which serendipitously broadened the range of the testing. The local project coordinator in Amherst was able to expand the concept to other departments to meet the deliverables of the grant, and to spread the concepts to other areas of the nation. Procedures used by the small communities are not described individually; rather, data is grouped together with that of Amherst because the absolute numbers are small for each community. The IRM procedures used in Amherst are documented here as representative of the group.

Lexington was also added to the project after the grant was received, to broaden the range of cities tested and because of the national leadership role of its chief. They wound up providing another excellent example of IRM implementation.

***Basic Idea*** – The core of this project was the identification of individual high-risk households or groups of such households by each participating city, followed by visits to them by fire service representatives. On the visit, which usually was made by a two-person team of fire department representatives, the existing smoke alarms were tested and new ones installed or batteries replaced so that at the end of the visit the home was equipped with a set of smoke

alarms that met code (or at least the home was advised on what in addition was necessary to meet code.) The two-person team gave fire and injury prevention advice to the household, and provided safety brochures or other written material. The teams making the visits were drawn from line firefighters, prevention personnel, and/or community volunteers.

The participating cities had the opportunity to comment on every aspect of the project as it proceeded. They had leeway as to how they implemented the concept so long as the core of the project was maintained: installation of the grant-purchased smoke alarms in high-risk households, and the collection of data on the visits. We discuss later the variations used by each participating city to implement the project.

***Project Management*** – Jim Crawford, who helped coordinate the previous project for WSAFM, was asked to head this follow-on project for IFE. Philip Schaenman, lead researcher of the global best practices research on which the project was based, was asked to assist in advising the IFE project and evaluating its results, as he had for the WSAFM project. Mr. Schaenman also is a member of the Vision 20/20 steering committee. Ed Comeau helped guide the project in Amherst and the four smaller cities; he also provided advice to the entire project. Peg Carson, a noted contributor to public education programs nationally, assisted on the project. Together this team served as a bridge between the two test projects and Vision 20/20.

This project management team provided continuity on a host of research and evaluation issues, and was able to build on previous lessons learned. The continuity of leadership also facilitated the data collection and analysis, and the development of this final report, which is modeled on the WSAFM final report to facilitate comparison of the findings.

CDC, which had participated in the predecessor international research and also had conducted its own home smoke alarm program for several years, agreed to advise this project on evaluation as it had the WSAFM project, and ran its own longer range evaluation.

The IFE project manager held monthly conference calls involving the participating cities and the evaluation team. This kept the project coordinated, answered procedural and budget questions, shared experiences and solutions to problems encountered, and ensured that the project was proceeding satisfactorily in each city. Unique problems were addressed in one-on-one calls to each city. In addition, a Google discussion group was established to help facilitate communications among the various communities

***Goals*** – An important goal was to directly benefit thousands of high-risk households by installing smoke alarms to bring them up to code and by giving them safety education in their homes. The publicity surrounding the project in each community probably helped many other households not visited, by reminding them of the importance of having and maintaining smoke alarms.

A second goal of the IFE project was to further determine how the IRM concept could be adapted to a variety of U.S. fire department environments. There are many ways to implement the basic IRM concepts. This report describes an expanding range of implementation approaches.

A third goal was to explore station-based risk management, and use of line firefighters in implementing a major prevention program directed at home fire safety. This IFE project was even more successful than its predecessor in meeting this goal, with the majority of the home visits being conducted by line firefighters.

A fourth goal was to explore doing IRM in smaller communities. (In the previous grant, the communities selected were larger, metropolitan cities with paid fire department personnel on duty 24/7.) This goal, too, was met.

## Evaluation Concept

The AFG program requires that all grantees have a plan to evaluate the outcomes of their project. The plan must be part of the grant application. In addition, AFG funded CDC to provide guidance on evaluating the collective results of the AFG program.

The evaluation concept for this project was initially formulated by TriData in the IFE grant application. It was further developed with feedback from the participating cities and CDC. For the most part the evaluation concept here was the same as in the WSAFM project, to allow meta-evaluation across projects—a larger, consistently collected database.

The heart of the evaluation concept was to measure changes wrought by the project in the household safety environment, safety education outreach, and ultimately the bottom line of fires, deaths and injuries. The results were to be evaluated in light of the relative risk levels of the households visited. Also to be evaluated was whether the project helped stimulate any changes in the fire department's approach to prevention, especially the role of line firefighters.

***Changes to Physical Household Safety Environment*** – The principal aspect measured was the pre- and post-visit status of the system of smoke alarms in the residences visited—how many were working, how many not working. Also noted were the number of alarms that needed to be installed or have batteries replaced to meet code. Over the past 30 years smoke alarms repeatedly have been proven to significantly improve home fire safety, and to reduce the death rate from residential fires. It is fair to assume that if a household has an adequate set of working smoke alarms, and knowledge of what to do when the alarm sounds, it will be safer than it is without a set of smoke alarms that meet modern codes.

***Changes in Safety Knowledge*** – The fire safety information delivered during each visit verbally or with written materials was reported for each visit. The occupants also were asked whether the household had an escape plan, was it practiced, and where was their meeting place. We did not measure comprehension of the safety information, nor what they already knew. But

the one-on-one nature of the presentation, including the ability of the household members to ask questions on the spot, was presumed to improve comprehension.

***Human Risks in the Households*** – Most of the households selected were in areas or types of residences (e.g. mobile homes) known to have higher than average risk of fires. In addition, the relative risk of the households were measured by the numbers of young children, older adults, smokers, and people with disabilities—all known to increase likelihood of fire incidence or severity of casualties. The ethnicity of the household members also was reported.

***Changes in Fire Incidence and Casualties*** **–** The ideal evaluation metrics for this project are the changes in fires, deaths, injuries and dollar loss that resulted from the physical changes made in the household environment (more working smoke alarms) and the provision of safety education to the household.

It would also be desirable as a control to see if there were changes to the fire experience of the area of the city not targeted, and in other like cities. Sometimes a program has a global effect beyond the households visited. Publicity about the program may raise safety awareness and cause some households not visited to test and maintain their smoke alarms, get new ones, or otherwise improve their safety. Also desirable are anecdotes of saves to households after they were visited.

It was understood from the outset that because the number of households that could be visited was a small fraction of the total in each participating community, and with the short time between completion of installations and the end of the project, it was unlikely to be able to show much impact on fire incidence and casualties during the grant period. The national residential annual fire rate is a little over one fire per thousand residents, so one might expect only two or so reported fires in 5000 households in the one or two months remaining in the grant period after all smoke alarms were installed. Even if the fire incidence rate for high-risk households is double the average, there is not enough data in so short a time period to tell much about impact on fire incidence let alone fire deaths. However, all of the participating cities agreed to continue to monitor the effects of this project in the years beyond the grant period, and they collected some of the baseline data to do so.

The international programs that gave impetus to this effort typically had the goal of visiting half to all of the households in the community over a five-year period, starting with the highest risk areas. So a one-year grant could not test the long range approach, but was essential to stimulate the start of the process in some of the participating cities, and then to use them as an example to stimulate other communities to implement an integrated risk management approach.

***Home Visit Questionnaire*** **–** To collect data on the information above, the project used a questionnaire which was filled out by the team visiting the household. The questionnaire was almost identical to the one used in the previous WSAFM project, except for the question on

ethnic composition of the household which now allowed for multiple choices. The questionnaire and instructions for completing it may be found in the appendix.

The WSAFM questionnaire was based largely on a form used by the City of Dallas in its previous CDC-sponsored smoke alarm home installation program. Each community added its own liability release for the household to sign.

The data was put into either a Microsoft Access database or Excel spreadsheet by the participating fire department and then forwarded to TriData for analysis.

***Data Quality*** – Overall, the data had good face validity, and provided reliable information for analysis, plus or minus a few percent. However, typically 5-10 percent of the questionnaires in various cities had blank or inconsistent information. We offer recommendations on improving the household visit form in the last chapter.

***Unreported Fires*** – Having working smoke alarms affects the likelihood of reporting a fire. Many small fires detected by smoke alarms are dealt with by the homeowner or occupant and not reported to the fire department. The project funding and time scale did not allow for a survey of the residences before and after smoke alarm installation as to whether they had unreported fires, which ideally should be tracked along with reported fires to get the total impact of the smoke alarms.

***Changes in Fire Department Approach to Prevention*** – In every international city visited which had an integrated risk management program, line firefighters and/or volunteers were critical if the program was to visit large numbers of households. So a key aspect of this project was to see if the fire department changed its culture or approaches to providing fire prevention, and to involve the line firefighters more in prevention.

Of special interest was whether there was any change in the way in which prevention was organized and delivered by the participating fire departments, and the attitude of the line firefighters about prevention. These issues were to be described at least qualitatively by each participating city.

It is not possible to implement a household visit program on a large scale using just the prevention bureau of a fire department—prevention bureaus are too small to do this on their own. In the United States, line fire fighters on duty often are not used (or not used much) for fire prevention programs. Some line firefighters do simple inspections, and participate in school visits and visits by the community to fire stations. But by and large fire prevention is often perceived as not being a part of their regular duties.

***Working with other Community Organizations*** – Some of the most successful integrated risk management programs have leveraged fire department resources by working with other community organizations. The community organizations may provide members of particular ethnicities to go with the fire service to visit homes of similar ethnicity, or to undertake

the visits themselves. Thus another qualitative measure of effectiveness is the extent to which other organizations are recruited and assist the fire department prevention effort. Examples in this project include a Cambodian assistant in the Amherst health department helping in visits to Cambodian households, and Madison firefighters referring homes with non-fire hazards to the appropriate agency for follow up.

***Use of iPad or Similar Data Tool*** – Data can be collected during home visits the old-fashioned way, using a one-page paper questionnaire from which the data is later manually entered into an Excel spreadsheet or Access database. Another method that has been available for decades is to use stainable paper for the questionnaires to save the data entry effort. This approach was used by Philadelphia.

A newer approach is to use an electronic data entry tool such as a tablet computer like iPad, as was tried in Amherst. Ed Comeau pioneered the use of the iPads there by the teams making the household visits. The information was entered using a Google form which immediately put the information into a cloud-based Google spreadsheet that could be accessed in real-time by the project administrators. This saved the time of having to enter data from forms into a database, as does scanning, and also made the data immediately accessible.

Another bonus of using the iPad was that it allowed firefighters making a home visit to show a safety video to household members with no other equipment needed, and no set up time. This gets around the problem of people not reading the safety literature left with them, and is especially valuable for those with low English comprehension or disinclination to read safety materials. The videos effectively illustrate a fire safety problem such as what happens when you put water on a grease fire in a pan on the stove. The videos are likely to make the instruction more memorable. Since the videos did not have any narration and relied on strong visuals, it was possible to overcome language issues as well.

The videos and the data entry forms (Google forms) were all web-based tools that are freely available and very easy to use. They could be configured as needed throughout the life of the project. If changes needed to be made to the forms, for example, an administrator could make the changes from his or her computer and the changes would show up immediately in the field.

The iPad used in this project cost $629. The AT&T cell phone service it used cost $20 per month. (The price of both the device and service is expected to come down with mass use.) Use of the iPad required some training, and someone had to take the time to write the program to collect the data and put videos together, versus just using a paper questionnaire. However, since this was done using existing cloud-based Google forms, it was minimal and easily accomplished.

The iPad might also be used to show firefighters how to conduct an interview, and how to do a simple home safety inspection once in the home. It is also possible that use of this new technology might make it more engaging for line firefighters to collect data, and to see how people react to the video safety demonstrations.

The use of the iPad generated a great deal of interest in the fire service. Apple Computer asked that Vision 20/20 put on a seminar in one of their stores in Holyoke, Massachusetts, which was done jointly by a member of the Vision 20/20 leadership team and a fire inspector located remotely in Addison, Illinois. In addition, a webinar on this topic was hosted by Vision 20/20 as well as a podcast on Fire Marshal's Corner on Firehouse.com. (Links to these online programs are available at www.strategicfire.org.)

## Remainder of this Report

The next chapter describes the baseline approach suggested to each participating fire department and how they adapted it for their own environment. The final chapters discuss the results of the data collected, and makes recommendations for the future.

# II. IMPLEMENTATION APPROACHES TAKEN

In this chapter we discuss how the project was implemented in each city. We also discuss some dead ends and lessons learned along the way.

## Kickoff Meeting

Early in the project, the IFE project manager and evaluation staff held a kick-off meeting near the Baltimore-Washington Airport in Maryland with the project coordinators from each of the initial four cities (Amherst, MA; Belchertown, MA; Madison, WI; and Philadelphia, PA). The purpose was to review the approach to be taken, and the available degrees of freedom in implementing the project. The meeting also allowed the participating project managers to meet each other, setting the stage for networking later in the project.

The IFE project manager explained the overall concept of the project, how the grant would be operated, and the records that needed to be kept. The meeting explained in detail how the project would be evaluated. The draft questionnaire to be used in the home visits was distributed.

As noted earlier, Belchertown had to drop out, and four small communities plus Lexington, KY were added. They were individually briefed to bring them up to speed in the project.

## Focus on High-Risk Households

All participating communities were asked to focus on high-risk residences for installation of the alarms provided by the grant. Some cities canvassed households door to door in selected high-risk areas. Some cities focused on individual households or groups of households that had been flagged as high-risk by the local social, health, or fire department, or self-selected by the household. The high-risk households were selected in each city on the following basis:

- **Amherst**
  - Cambodian immigrant population (about 200 families)
  - University students living off campus
  - Seniors living at home

  In addition, the general population was informed of the project and some requested an installation.

- **Lexington**
  - Mobile homes

  Lexington had 52 fires in 1110 mobile homes in the past five years, based on NFIRS data. In only 4 of these fires were the occupants alerted by a smoke alarm. The Fire Department's Community Services Bureau contacted a sample of 100 mobile home owners and found that they had many alarms not working, inadequate numbers of alarms, and lack of escape plans. They then selected two mobile home parks to focus on with the resources available in this project, to have a real impact on a well-defined set of high-risk households.

- **Madison**

  The original plan was to focus on:

  - 1,000 lowest assessed homes in Madison (using Assessor's Office data).
  - Homes owned by the same person(s) for more than 30 years (also based on Assessor's data).
  - Homes identified by service organizations who visit people with special needs.
  - Areas or streets with a higher than average rate of structural fires.

  This was a sound and innovative approach to identifying potentially high-risk homes. Homes of older adults, which often fit in the above categories, became a particular focus after four senior coalitions in Madison contacted their members and their service providers to stimulate interest for scheduling visits. Several off-campus housing units also were identified as high-risk. (Following a fatal off-campus fire in 2007, Madison passed an ordinance requiring the installation of smoke alarms in all residential properties by August 2010.)

- **Philadelphia**
  - Homes with high fire incidence or considered high-risk by fire companies, which have much knowledge of their neighborhood.

  Toward the end of the grant period, the IFE project staff arranged for Philadelphia to try a new, more advanced, concept for identifying high-risk households. Philadelphia was the first fire department in the nation to use psychodemographic data from the Buxton Company to identify characteristics of households experiencing fires in the past year, and then to identify other households with similar characteristics. Philadelphia provided Buxton with the street addresses of homes that had fires. Buxton took that data and ran it against household data from 250 marketing and other data bases. Out of 60 categories used to classify households, two accounted for about

three -quarters of the home fires in Philadelphia. Buxton then identified the locations (specific addresses) of many other households in the city that have a similar profile to those that had fires. This set of households will be the target for future smoke alarm and public education programs.

## Pre-visit and Other Publicity

Each city used a variety of venues to advertise this project before visits were made and during the project.

Some cities distributed flyers to inform the citizens of the availability of the program, and then installed smoke alarms in households that made appointments. Some cities used both appointments (requests by households) and canvassing (cold calls) after publicizing the program.

Media used to advertise the program included TV and radio PSAs; newspaper articles, bus ads; social networking web sites, and even pizza delivery boxes. The project was also boosted by ads advocating use of smoke alarms.

***Amherst*** – Amherst used an imaginative array of means to inform the public and specific subgroups about the project and how to get a home safety visit by the fire department. Amherst was assisted by Ed Comeau, a nationally known public educator who is expert in use of various media to reach target populations. Amherst used all of the following:

- Press releases about the program.
- Newspaper articles about the program (stimulated by the press releases). An article that appeared early in the project included pictures from one of the first home visits.
- Free ads on city buses
- Stickers advertising the program on pizza boxes, especially from pizza parlors that delivered to student residences.
- Door hangers about the program, left at homes when people were not home, and given to homes visited for them to disseminate to people they knew.
- Letters published in church bulletins (thought especially useful to reach older adults).
- Flyers with announcement of the program and smoke alarm safety tips, put on a table in a central student meeting and foot traffic point (the Campus Center Concourse at the University of Massachusetts.)
- You Tube, Event Brite, Twitter, and Facebook sites used by the Amherst fire department.

- PSA developed by Amherst FD firefighters working with University of Massachusetts students. It discussed smoke alarms and starred both students and firefighters. A banner erected at Central Fire Station.
- Cambodian social worker, who made calls to Cambodian homes informing them about the project

***Lexington*** – Fliers were given to the operators of the two mobile home parks selected for the project, to pass on to each of their homes. The flier announced the availability of the program in their park on specific dates.

***Madison***

- Video PSA – Developed by the firefighters as part of the project. It showed the need for smoke alarms to meet the new Madison code, and promoted the project. The PSA was estimated to have run on TV at least 250 times. Fire Chief Amesqua strongly supported the project and appeared in the PSA. The video was posted on line along with "Peter's Story" about a life lost in Madison. The PSAs served as motivators for the prevention efforts, and as points of reference as firefighters went to homes. The project coordinator said that the firefighters were more enthusiastic about making the PSA than almost any other project in memory.
- Advertisements were run in the University of Wisconsin student news (The Onion).

***Philadelphia***

- Media Conference – Conducted to kick off the project. It involved the mayor, the fire commissioner, a representative of the Vision 20/20 project and other national and local officials. The first smoke alarm of the project was presented to the mayor who immediately installed it in an area home. Firefighters then immediately walked to a nearby block to start installing alarms. This all drew TV, radio, and print media attention to the project.
- Monthly Radio Program – The fire commissioner discussed the project in his monthly program.
- One-Page Flyers – described the project and informed citizens when the fire department would be visiting their area. The flyers were left in mailboxes in the blocks targeted by each station. The firefighters canvassed households in the targeted blocks (no pre-arranged visits). There was a relatively high rate of finding someone home and conducting the visit—54%. This process was deemed highly efficient.

## Composition of Home Visit Teams

Two- person teams were used in most of the visits to households. Having at least two representatives instead of one adds to the "official" appearance of the team at the doorstep. It also provides a witness should any impropriety be claimed, makes installation of the smoke alarms easier, and facilitates data recording (one can ask questions while the other records). The team compositions were as follows

**Amherst and four smaller communities**

- Two-three firefighters; or a firefighter plus either a volunteer, social worker, health worker, prevention officer, or Vision 20/20 project coordinator
- Some firefighters did the installations while off-duty.
- For Cambodian households, a firefighter and a Cambodian outreach worker from the health department made the visits. The social worker helped interpret and served as a cultural link, providing reassurance to households seeing a firefighter at the door.

**Lexington**

- One firefighter and one prevention official from the community services (public education) unit.

**Madison**

- Two firefighters

**Philadelphia**

- Two firefighters

  All 56 engine and 27 truck companies participated. This was one of the largest if not the largest effort by a single community's line fire companies to participate in a prevention program in the United States.

## What Was Done During the Visit

Most of the household visits made by the above teams were to one- or two-family dwellings or mobile homes, because multi-family dwellings fall under codes that require smoke alarms to be installed and maintained by the owner, with significant penalties if not done, as well as liability to the owners.

***Smoke Alarm Testing and Installation*** – In most homes visited (except those relatively few with private alarm systems) the team tested all of the smoke alarms in the household. The team then installed smoke alarms to replace ones that were faulty or over ten years old, replaced batteries if needed, and installed additional alarms as needed to bring the total system up to code.

***Verbal and Written Information*** – The team visiting the household verbally presented fire and home safety information, and left one or more handouts that addressed fire or home safety. In some cities the same information was given to each household, and in other cities the information was tailored to the apparent needs of the household (e.g. information on juvenile fire safety if children were present; information on safety for older adults if any were senior citizens). In Amherst, each team was provided with written fire safety materials covering a broad range of topics. They were instructed to leave behind information focusing on the top three hazards identified during the visit in order to avoid information overload.

The safety information was delivered to the person acting as head of household, or to whichever members of the household gathered to hear what was going on. The teams queried the household about whether they had escape plans and practiced them, because having a working smoke alarm does little good if people do not take advantage of the early warning to escape quickly or extinguish the fire if small.

Most participating communities had the policy that the households should be up to code when they left, both as good safety practice and to avoid liability. This usually meant installing multiple smoke alarms in the household. The alarms were installed in bedrooms, hallways outside of bedrooms, and on each floor. Even where private alarm systems existed, additional alarms were sometimes needed to bring the residence up to code.

***Data Form*** – For each home visited the visiting team completed a standard core of information on a home visit questionnaire provided by the project. The data was stored it in either an Access data base or Excel spreadsheet. Each department was responsible for populating its own data base, and TriData was responsible for analyzing the data. Cities were allowed to add data elements beyond the required core. For example, Amherst added the time of entry and exit of the home visit, so that the length of the visits was recorded. This was helpful both for estimating time needed to make visits, and to see if down the road there was a correlation between the time spent in the home and the outcomes achieved. Amherst also noted whether the home visited was off-campus housing.

The questionnaire form included a “release of liability” section signed by the household, indicating they were accepting the alarm and understood there was no warranty on its effectiveness.

We asked that the first part of the standard form be completed on attempted visits where entry was not possible, and the reason for non-completion. Some visits could not be completed because no one was home, or the address was bad, or the occupants refused the visit. Some visits were not completed because there was no one over 18 present, or a language barrier.

***Safety Check*** – Amherst firefighters did a safety check using the NFPA Home Fire Safety Inspection form, in addition to the smoke alarm tests and installations. The safety review included the heating plant, cooking practices, means of egress, use of candles, and smoking. Amherst also checked the status of carbon monoxide detectors. They left the home safety questionnaire for the occupant to complete. While risking resistance to allowing firefighters entry to homes if they were perceived as doing an "official" fire inspection, the safety check usually was viewed as a big positive by the homes visited. It was found that there was a general lack of knowledge about kitchen fire safety and CO detectors, and that contrary to expectations, there was no problem with candles on home religious altars. This initial information was used to adjust the messages used in the remainder of the homes visited.

In one home, the firefighter team found a highly dangerous situation involving a wood stove, so dangerous that the fire department ordered its use stopped immediately as an imminent danger. It was felt that this action almost surely stopped a serious fire. It was also a situation that had been discussed while planning the project. Fire fighters did not want to be perceived as coming to do official inspections, hence the broad use of the term "home fire safety visits" instead of inspections. However, if a serious problem was encountered, then the fire fighters would be obliged to take action. In this case, the homeowner was appreciative of the problem being identified and promised that her husband would take action immediately.

In Madison, a number of the homes visited were referred to social service agencies for follow up when firefighters saw conditions that created hazards other than for fire.

## Number and Type of Smoke Alarms Installed

Smoke alarms were purchased centrally on behalf of the project to get the best price by economy of scale. Bids were requested from several providers. Some participating cities used funds from other sources to purchase extra smoke alarms, which increased the breadth of impact and statistical validity of the tests.

Most of the smoke alarms purchased in this grant were ionization alarms with long life lithium, tamper- proof batteries. Some were dual chamber with long life lithium batteries. Table 1 shows the number of alarms and type of smoke alarms installed and reported on home visit forms in each city. The table also shows the city's policy for adding or replacing alarms. All cities followed the latest smoke alarm code requirement, which calls for alarms in each bedroom, in hallway outside of bedrooms, and at least one on each living level. Some also changed batteries.

There were several hundred smoke alarms that were either not yet installed when this report was closed, or no form filled out on their installation visits.

**Table 2: Alarm Installations via AFG Grant**

| Participating City | Number of Alarms Installed or Provided from Grant | Type of Alarm | Replaced Non-Working Alarm? | Enough Total Alarms to Meet Current Code? |
|---|---|---|---|---|
| Amherst and four smaller communities | 440 | Half were ionization long life lithium tamper-proof batteries; half photoelectric | Yes | Yes |
| Lexington | 200 | Dual Chamber with long life lithium tamper-proof batteries | Yes | Yes |
| Madison | 3,000 (+ 1738 from another grant) | Ionization long life lithium tamper-proof batteries (with a few hard-wired 110-volt with battery back-up) | Yes | Yes |
| Philadelphia | 9062[2] | Ionization long life lithium tamper-proof batteries (with a few photoelectric) | Yes | Yes |
| **Total** | **12,640 +1,800 = 14,440** | | | |

## Additional Comments on Approaches and Findings by City

Below are comments on the experience of each city that were not covered above. These are intended as useful lessons or hints for other cities considering home visit programs.

### *Amherst*

**Length of Visit:** In Amherst, firefighters were instructed to take adequate time once inside a household to provide information and answer questions. This helped get useful feedback from the citizens and firefighters about the visits.

**Overtime:** To get the installations completed within a short calendar time, Amherst used 25 teams on overtime at 4-6 hours a session to supplement the line firefighters doing this in regular hours.

[2] 62 alarms were installed from stock not purchased under the grant.

### *Lexington*

**Firefighter Acceptance:** The project coordinator for Lexington reported that the fire companies that participated in this project were a little apprehensive at first, but then seemed to really enjoy participating in the program. The department plans to continue the program and visit all mobile homes and selected additional areas. This project helped make a break-through in firefighter attitudes about prevention. The project coordinator concluded by saying, "We are just getting warmed up."

### *Madison*

**Revisits:** Some homes were visited twice, after being flagged as needing more smoke alarms than were available, or when there was insufficient time to finish all installations.

**Firefighter Acceptance:** The firefighters were excited about the prospect of going to the homes and gratified that they were able to help people in need. The firefighters' enthusiasm was increased by the feedback they received from citizens during the home visits. They also enjoyed making a PSA.

At the conclusion of the project, Madison's fire marshal said, "We changed perceptions about fire prevention and what fire prevention can do in the community. We improved fire safety in hundreds of Madison homes. We engaged the community in their homes. WOW!"

**Feedback from Citizens:** The feedback from Madison citizens was described as "incredible" by their project coordinator. No fewer than 20 thank you notes were received. Roughly the same number came as telephone calls. Citizens were "very appreciative. Their response has been tremendous."

### *Philadelphia*

**Leadership:** Fire Commissioner Lloyd Ayers is highly enthusiastic about prevention, and believes it should be part of the normal duties of line firefighters. Commissioner Ayers already had a policy of having his district commanders report their previous month's prevention activities quantitatively each month at his staff meetings. Adding the reporting of smoke alarms installed in this project was therefore not a large extra step, and helped keep the project on track across the department.

The project started with a surge of home visits the first week. The Commissioner requested participation by all of the engine and ladder companies, and asked his district commanders to explain any shortfalls in meeting their allotted installation numbers. The result was that in one month, November 2010, the Philadelphia fire department installed 7221 smoke alarms. The goal was 90 per company or 8-12 per week for two months, spread across three shifts.

The point person and coordinator of the project was the Fire Prevention Division Battalion Chief.

Philadelphia already had been installing smoke alarms in homes of the needy, and this program allowed them to extend their outreach to more high-risk homes, of which there are many in the city. It also was a more systematic approach.

**Firefighter Acceptance:** As might be expected with a large organization and many people involved, there was a range of enthusiasm about the project across the department. Generally, all firefighters did a professional job on the project as part of their expected duties, and many were enthusiastic about doing the visits and getting the feedback they did. Some fire companies at first complained about the time it took to do a visit, but after the first week there were few complaints. This project was undertaken at a time of labor dissatisfaction with the absence of a contract, which made the positive feedback from firefighters all the more impressive, and a tribute to the firefighters and department leadership—both were needed for success.

**Citizen Feedback:** The firefighters generally received very positive comments from the homes visited. They fielded many questions, and had longer conversations with the households than expected. (This indicates high interest by the high-risk households, which is very good.) In some areas of the city, the length of the visit was increased to translate questions into Spanish, Russian or other languages.

# III. DATA ANALYSIS

This chapter discusses the analysis of the data collected on the home visits in each city. A comparison across communities of the key data was given in the Executive Summary.

## Amherst and Four Small Communities (Niceville, FL; Northampton, MA; Huntington, WV; Williamsburg, KY)

***Households Visited*** – A total of 167 homes were visited in six communities (including one in Greenfield, MA). Almost three -quarters of them (71%) were single family dwellings. The rest were mostly apartments (15%), duplexes (7%), or mobile homes (4%). Over a third of the households were off-campus student housing, mostly in subdivided private homes but others spread across all of the housing categories. All of the selected homes were entered.[3] Visits were by appointment.

Teams of firefighters made just under half of all the visits (63%), and teams of volunteers made 2% of the visits. The remainder of the visits comprised at least one firefighter and a volunteer, social worker, prevention officer, or Vision 20/20 project coordinator.

**Type of Home**:

| | Apartment* | Duplex | Mobile home | Single family | Other | Total** |
|---|---|---|---|---|---|---|
| Number of homes | 25 | 12 | 6 | 119 | 5 | **167** |
| Percent of homes | 15% | 7% | 4% | 71% | 3% | **100%** |

* Three or more units per building

** One household had two categories listed: Duplex and Other

**Of the types of homes, how many were off-campus student housing?**

| | Apartment* | Duplex | Mobile home | Single family | Other | Total |
|---|---|---|---|---|---|---|
| Number of homes | 4 | 3 | 5 | 46 | 2 | **60** |
| Percent of homes | 2% | 2% | 3% | 28% | 1% | **36%** |

* Three or more units per building

[3] One home marked not entered on the form had information on the status of the smoke alarms and was presumed to have been entered—probably just a simple data entry mistake. It is possible that some homes are not entered initially and then revisited. It also is possible that the homeowner does not allow entry but provides data and even tests smoke alarms that can be heard—this is an approach used often in Ontario home visit programs.

**If entry to residence not possible, why not?**

| | No one home | Minor only | Language barrier | Vacant home/lot | Entry refused? | Total |
|---|---|---|---|---|---|---|
| Number of homes | 1 | 0 | 0 | 0 | 0 | **1** |
| Percent of homes | 100% | 0% | 0% | 0% | 0% | **100%** |
| | | | | | **Total number of homes visited** | **166** |
| | | | | | **Total number of homes not entered** | **0*** |
| | | | | | **Total number of homes entered** | **166** |

* The one home that was marked "No one home" had information on the number of working smoke alarms and demographics, so the data recorded for this home is included in the rest of the analysis.

**Positions of representatives making the visit (check all that apply):**

| | Firefighter | Volunteer | Social Worker | Vision 20/20 | Prevention Officer | Other | Total* |
|---|---|---|---|---|---|---|---|
| Number of homes | 162 | 38 | 16 | 14 | 6 | 1 | **237** |
| Percent of homes | 98% | 23% | 10% | 8% | 4% | 1% | **143%** |

* 57 homes were visited by team of Firefighter + 1 or 2 other types of representatives

***Situation Found*** – Nineteen percent of the homes had no smoke alarm (working and/or non-working). On average there were 2.1 smoke alarms per household. One single-family home used for off-campus student housing had 14 working smoke alarms, but two other smoke alarms needed batteries and two additional alarms were needed to meet code.

Thirty percent of the homes visited had no working smoke alarm. On average, there were about 1.5 working smoke alarms per home. Twenty-nine homes (17%) had a private alarm system.

Forty percent of the homes had at least one non-working smoke alarm. Overall, 30% of the alarms tested were not working.

This data indicates that a large portion of these homes really did need attention to improve their alerting system. Only 22 out of 166 homes (13%) did not require at least one new alarm.

**Number of smoke alarms (working and/or non-working)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 32 | 28 | 47 | 35 | 14 | 10 | 0 | **166** |
| Percent of homes | 19% | 17% | 28% | 21% | 8% | 6% | 0% | **100%** |
| | | | | | | | **Total number of smoke alarms** | **355** |

**Number of working smoke alarms (based on testing)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 50 | 48 | 38 | 19 | 4 | 7 | 0 | **166** |
| Percent of homes | 30% | 29% | 23% | 11% | 2% | 4% | 0% | **100%** |
| | | | | | | | **Total number of working smoke alarms** | **249 (70%)** |

**Number of non-working smoke alarms (based on testing)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 99 | 38 | 21 | 6 | 2 | 0 | 0 | **166** |
| Percent of homes | 60% | 23% | 13% | 4% | 1% | 0% | 0% | **100%** |
| | | | | | | | **Total number of non-working smoke alarms** | **106 (30%)** |

**Private alarm system present (do not test)**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 29 | 137 | 0 | **166** |
| Percent of homes | 17% | 83% | 0% | **100%** |

***Installations*** – 144 of the 166 homes visited (87%) had one or more smoke alarms installed during the visit. A total of 440 alarms were installed, an average of 2.7 per home. Half of the alarms were dual chamber ionization, and half were photoelectric, all battery powered. 21 of these homes had batteries replaced, an average of two per home where battery replacements were needed.

The 22 (13%) homes that did not receive any new smoke alarms already had 1-5 working smoke alarms. Smoke alarm batteries were replaced in two of these homes, and three s had a private alarm system.

After the visits, all of the homes had working smoke alarms, an average of 4.4 per home. All but two homes met the smoke alarm code, and they were informed as to what was needed. The majority of smoke alarms installed were to bring homes up to code that already had some working smoke alarms.

**Number of smoke alarms installed during the visit?**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 22 | 27 | 40 | 29 | 20 | 28 | 0 | **166** |
| Percent of homes | 13% | 16% | 24% | 17% | 12% | 17% | 0% | **100%** |
| | | | | | | | **Total number of smoke alarms installed** | **440** |

**Number of working smoke alarms after the visit?**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 0 | 15 | 32 | 35 | 19 | 65 | 0 | **166** |
| Percent of homes | 0% | 9% | 19% | 21% | 11% | 39% | 0% | **100%** |
| | | | | | | | **Total number of working smoke alarms after the visits** | **731** |

**Type of alarm(s) installed:**

| | Dual Chamber | Ionization | Photo-electric | Blank | Total |
|---|---|---|---|---|---|
| Number of homes | 97 | 0 | 92 | 0 | **189*** |
| Percent of homes | 51% | 0% | 49% | 0% | **100%** |

*46 homes had at least 1 dual chamber and 1 photo-electric smoke alarm installed

**Number of smoke alarm batteries replaced?**

| | 0 Alarms | 1+ Alarms | Blank | Total |
|---|---|---|---|---|
| Number of homes | 145 | 21 | 0 | **166** |
| Percent of homes | 87% | 13% | 0% | **100%** |
| | | | **Total number of smoke alarm batteries replaced** | **42** |

**Did the home end up with the number of smoke alarms required by code?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 164 | 2 | 0 | **166** |
| Percent of homes | 98.8% | 1% | 0% | **100%** |

**If no, was the occupant advised of the number required?** Yes, the two homes were notified of the number required by code.

***Education Provided During the Visit*** – The education provided by firefighters during the visit varied from home to home depending on the results of the safety inspection and risks found. The wide array of safety topics addressed is shown below. Two-thirds of the homes received information on smoke alarm maintenance, and almost that many on escape planning. Almost all homes received information on fire or injury subjects that seemed most needed. A common topic discussed in over half the homes was kitchen safety. Other common risk areas discussed were carbon monoxide, electrical, chimney/woodstoves, candles, and dryers.

A quarter of the households said they had no escape plan, which was factored into the education delivered. Almost all of those who said they had an escape plan were able to note a credible meeting place outside, and over 80% who had a plan said they practiced it. These are much higher than average for having and practicing escape plans.

Written information was given to half the homes on escape planning, and to two-thirds of the homes on a variety of topics noted in the tables below.

**Occupant instructed on (check all that apply):**

| | Testing and maintaining smoke alarms | Other fire or injury safety subjects* |
|---|---|---|
| Number of homes | 109 | 162 |
| Percent of homes | 66% | 98% |

* Cooking Safety (91), Home escape plans (89), Carbon Monoxide Safety (82), Electrical fire safety (39), Candle Fire Safety (29), Chimney and Woodstove (29), Dryer (15), Lighters and matches (8), Escape Planning (7), Oxygen (7), Testing and maintaining smoke alarms (7), Winter fire safety (4), Smoking safety (3), Heating Safety (2), Fire extinguisher (1), Scalds and burns (1)

**Ask occupant: Do you have a fire escape plan?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 122 | 44 | 0 | **166** |
| Percent of homes | 73% | 27% | 0% | **100%** |

**If yes….**

**Was the fire escape plan practiced in the last year?**

| | Yes | No | Unknown | Total |
|---|---|---|---|---|
| Number of homes | 101 | 19 | 2 | **122** |
| Percent of homes | 83% | 16% | 2% | **100%** |

**Where is your meeting place? (check if any credible place cited)**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 117 | 5 | 0 | **122** |
| Percent of homes | 96% | 4% | 0% | **100%** |

**Occupant given written fire or injury safety materials on:**

| | Escape planning | General home safety | Specific causes or hazards* |
|---|---|---|---|
| Number of homes | 87 | 0 | 112 |
| Percent of homes | 52% | 0% | 67% |

* Carbon Monoxide (69), Smoke alarms (39), Cooking (38), Fire safety tips (27), Candles (25), Chimney and woodstove (12), None (11), Electrical (7), Smoking safety (5), Oxygen (4), Dryer (3), Escape planning (2), Lighters and matches (2), Winter fire safety (2), Alarm (1), Detector (1)

***Demographics*** –Three-quarters of the homes visited were owner-occupied, the rest rented. They had on average 2.3 occupants.

45% of the homes had an older adult occupant (65 or older), a high proportion relative to other cities in the projects. 13% had young children, 14% had people with disabilities, and 34% had smokers. Overall, 78% of the homes had one or more of these four risk factors.

Among the homes with smokers, half had no working smoke alarm in the home at the start of the visits. Because fires started by smoking materials is the leading cause of fire deaths

nationally, and smoke alarms catch many incipient smoldering fires, it was especially important to improve the alarm system in these smokers' homes. At the end of the visits, all 56 homes with a smoker had anywhere from 1-5 working smoke alarms in the home.

Almost all of the homes visited were occupied by minorities (96%). Over three quarters of the households were African American.

**Do you own or rent your home?**

| | Own | Rent | Blank | Total |
|---|---|---|---|---|
| Number of homes | 123 | 43 | 0 | **166** |
| Percent of homes | 74% | 26% | 0% | **100%** |

**How many people live in your home?**

| | 0 People | 1 Person | 2 People | 3 People | 4 People | 5+ People | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 0 | 52 | 65 | 24 | 11 | 14 | 0 | **166** |
| Percent of homes | 0% | 31% | 39% | 14% | 7% | 8% | 0% | **100%** |
| | | | | | | | **Total number people living in the homes** | **382** |

**How many children living in your home are under age 5?**

| | 0 Children | 1 Child | 2 Children | 3 Children | 4 Children | 5+ Children | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 144 | 14 | 7 | 0 | 0 | 1 | 0 | **166** |
| Percent of homes | 87% | 8% | 4% | 0% | 0% | 1% | 0% | **100%** |
| | | | | | | | **Total number and percent of occupants** | **34 (9%)** |

**How many people living in your home are age 65 or older?**

| | 0 Older adults | 1 Older adult | 2 Older adults | 3 Older adults | 4 Older adults | 5+ Older adults | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 91 | 53 | 22 | 0 | 0 | 0 | 0 | **166** |
| Percent of homes | 55% | 32% | 13% | 0% | 0% | 0% | 0% | **100%** |
| | | | | | | | **Total number and percent of occupants** | **97 (25%)** |

**How many people living in your home are disabled?**

| | 0 Disabled | 1 Disabled | 2 Disabled | 3 Disabled | 4 Disabled | 5+ Disabled | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 142 | 20 | 4 | 0 | 0 | 0 | 0 | **166** |
| Percent of homes | 86% | 12% | 2% | 0% | 0% | 0% | 0% | **100%** |
| | | | | | | | | **28 (7%)** |

**How many people living in your home are smokers?**

| | 0 Smokers | 1 Smoker | 2 Smokers | 3 Smokers | 4 Smokers | 5+ Smokers | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 110 | 28 | 23 | 4 | 1 | 0 | 0 | **166** |
| Percent of homes | 66% | 17% | 14% | 2% | 1% | 0% | 0% | **100%** |
| | | | | | | | **Total number and percent of occupants** | **90 (24%)** |

**Number of Risk Factors**

| | 0 Risks | 1 Risk | 2 Risks | 3 Risks | 4 Risks | Blank | Total |
|---|---|---|---|---|---|---|---|
| Number of homes | 37 | 87 | 36 | 6 | 0 | 0 | **166** |
| Percent of homes | 22% | 52% | 22% | 4% | 0% | 0% | **100%** |

**The people in this household are: (can check more than one: e.g., White and Hispanic)**

| | African Amer. | Asian | Hispanic / Latino | Indian | Mixed | Native Amer. | Pacific Islander | White | Declined to answer | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of homes | 132 | 18 | 4 | 1 | 6 | 1 | 1 | 2 | 4 | **169** |
| Percent of homes | 78% | 11% | 2% | 1% | 4% | 1% | 1% | 1% | 2% | **100%** |

* 3 homes had 2 types selected: home checked African American + White

***Carbon Monoxide Detectors*** – Unique to Amherst was testing of carbon monoxide (CO) detectors as well as smoke alarms. Sixty-one percent of the occupancies were required by local code to have CO detectors. Forty-three percent of the homes with this requirement did not have the required number of CO detectors. Most of the CO detectors found were working.

**Are CO detectors required in this occupancy?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 101 | 64 | 1 | **166** |
| Percent of homes | 61% | 39% | 1% | **100%** |

**Did the occupancy have the number of required CO detectors?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 58 | 43 | 0 | **101** |
| Percent of homes | 57% | 43% | 0% | **100%** |

## Lexington

***Households Visited*** **–** Lexington visited 54 households of which 52 were in mobile homes. All visits were made by a firefighter paired with someone from the prevention bureau.

**Type of Home:**

| | House | Mobile home | Duplex/ Townhouse | Multi-family | Other | Blank | Total |
|---|---|---|---|---|---|---|---|
| Number of homes | 2 | 52 | 0 | 0 | 0 | | **54** |
| Percent of homes | 4% | 96% | 0% | 0% | 0% | 0% | **100%** |

**If entry to residence not possible, why not?**

| | No one home | Minor only | Language barrier | Vacant home/lot | Entry refused? | Total |
|---|---|---|---|---|---|---|
| Number of homes | 0 | 0 | 0 | 0 | 0 | **0** |
| Percent of homes | 0% | 0% | 0% | 0% | 0% | **0%** |
| | | | | | **Total number of homes visited** | **54** |
| | | | | | **Total number of homes not entered** | **0 (0%)** |
| | | | | | **Total number of homes entered** | **54 (100%)** |

**Positions of representatives making the visit (check all that apply):**

| | Firefighter* | Health-care worker | Volunteer | Prevention | Social worker | Other | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 54 | 0 | 0 | 54 | 0 | 0 | 0 | **108** |
| Percent of homes | 100% | 0% | 0% | 100% | 0% | 0% | 0% | **200%** |

* Career or volunteer

** All homes were visited by Firefighter + Prevention team

***Situation Found*** – Almost one-third of the homes visited (30%) had no smoke alarm (working or not working.) There were a total of 69 smoke alarms in all the homes, an average of 1.3 per home. Only 1 home had a private alarm system

Over two-thirds of the homes (69%) had no working smoke alarm. Across all homes visited, 58% of the smoke alarms were not working. One home had 5 smoke alarms, none working. Clearly the visits were needed.

**Number of smoke alarms (working and/or non-working)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 16 | 15 | 18 | 3 | 1 | 1 | 0 | **54** |
| Percent of homes | 30% | 28% | 33% | 6% | 2% | 2% | 0% | **100%** |
| | | | | | | **Total number of smoke alarms** | | **69** |

**Number of working smoke alarms (based on testing)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 37 | 7 | 9 | 0 | 1 | 0 | 0 | **54** |
| Percent of homes | 69% | 13% | 17% | 0% | 2% | 0% | 0% | **100%** |
| | | | | | | | **Total number of working smoke alarms** | **29 (42%)** |

**Number of non-working smoke alarms (based on testing)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 30 | 12 | 10 | 1 | 0 | 1 | 0 | **54** |
| Percent of homes | 56% | 22% | 19% | 2% | 0% | 2% | 0% | **100%** |
| | | | | | | | **Total number of non-working smoke alarms** | **40 (58%)** |

**Private alarm system present (do not test)**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 1 | 53 | 0 | **54** |
| Percent of homes | 2% | 98% | 0% | **100%** |

***Installations*** – One home had no alarms installed, one had one alarm install, and the rest required two or more. Five homes each required five smoke alarms to be installed. A total of 200 smoke alarms were installed, an average of 3.7 per home. Including the alarms found working upon arrival, there was an average of 4.3 alarms per home at the completion of the visits. All of the alarms installed were dual-chamber with tamper-proof ten year batteries. Batteries were replaced in the detectors in one home.

At the conclusion of the visits, all of the homes but one met code for smoke alarms, and that home was advised of what was needed to bring up to code.

**Number of smoke alarms installed during the visit?**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 0 | 1 | 5 | 9 | 33 | 6 | 0 | **54** |
| Percent of homes | 0% | 2% | 9% | 17% | 61% | 11% | 0% | **100%** |
| | | | | | | | **Total number of smoke alarms installed** | **200** |

**Number of working smoke alarms after the visit?**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 0 | 0 | 1 | 5 | 31 | 17 | 0 | **54** |
| Percent of homes | 0% | 0% | 2% | 9% | 57% | 31% | 0% | **100%** |
| | | | | | | | **Total number of working smoke alarms after the visits** | **232** |

**Type of alarm(s) installed:**

| | Dual Chamber | Ionization | Photo-electric | Blank | Total |
|---|---|---|---|---|---|
| Number of homes | 54 | 0 | 0 | 0 | **54** |
| Percent of homes | 100% | 0% | 0% | 0% | **100%** |

**Power source of alarm(s) installed:**

| | Tamper-proof 10-year battery | Hard-wired | Replaceable battery | Combination (battery and hard-wired) | Blank | Total |
|---|---|---|---|---|---|---|
| Number of homes | 54 | 0 | 0 | 0 | 0 | **54** |
| Percent of homes | 100% | 0% | 0% | 0% | 0% | **100%** |

**Number of smoke alarm batteries replaced?**

| | 0 Alarms | 1+ Alarms | Blank | Total |
|---|---|---|---|---|
| Number of homes | 53 | 1 | 0 | **54** |
| Percent of homes | 98% | 2% | 0% | **100%** |
| | | | **Total number of smoke alarm batteries replaced** | **3** |

**Did the home end up with the number of smoke alarms required by code?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 53 | 1 | 0 | **54** |
| Percent of homes | 98.1% | 2% | 0% | **100%** |

*If no*, was the occupant **advised of the number required**? Yes, the one home was notified of the number required by code.

***Education Provided*** **–** All of the homes were instructed on testing and maintaining smoke alarms and other fire and injury subjects as well, mainly escape planning. All were given the NFPA pamphlet "Fire In Your Home." Fifty-seven percent of the homes said they did not have an escape plan, and three-quarters of those homes did not have working smoke alarms either. Most of the homes that had an escape plan had not practiced it in the past year. So the installation of smoke alarms and the instruction on escape planning should make a significant difference in their fire safety.

**Occupant instructed on (check all that apply):**

| | Testing and maintaining smoke alarms* | Other fire or injury safety subjects** |
|---|---|---|
| Number of homes | 54 | 54 |
| Percent of homes | 100% | 100% |

* NFPA Fire in Your Home pamphlet
** Escape planning

**Ask occupant: Do you have a fire escape plan?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 23 | 31 | 0 | **54** |
| Percent of homes | 43% | 57% | 0% | **100%** |

**If yes….**

**Was the fire escape plan practiced in the last year?**

| | Yes | No | Unknown | Total |
|---|---|---|---|---|
| Number of homes | 7 | 16 | 0 | **23** |
| Percent of homes | 30% | 70% | 0% | **100%** |

**Where is your meeting place? (check if any credible place cited)**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 23 | 0 | 0 | **23** |
| Percent of homes | 100% | 0% | 0% | **100%** |

**Occupant given written fire or injury safety materials on:**

| | Escape planning | General home safety | Specific causes or hazards |
|---|---|---|---|
| Number of homes | 54 | 54 | 0 |
| Percent of homes | 100% | 100% | 0% |

***Demographics*** – There were almost 4 people per home. Almost half the homes (44%) had one or more children under 5. A quarter of the homes had one or more older adults. Almost a third (31%) had one or more people with disabilities. About 39% of the homes had one or more smokers. Eighty percent of the homes had one or more of these risk factors.

Five homes had three smokers each. An astounding 95% (20 out of 21) of the homes with a smoker had no working smoke alarm at the start of the visits. At the end of the visits, these homes had 3-6 working smoke alarms.

About 45% of the homes had a minority; 42% of the homes identified themselves as Hispanic/Latino.

**Do you own or rent your home?**

| | Own | Rent | Blank | Total |
|---|---|---|---|---|
| Number of homes | 44 | 10 | 0 | **54** |
| Percent of homes | 81% | 19% | 0% | **100%** |

**How many people live in your home?**

| | 0 People | 1 Person | 2 People | 3 People | 4 People | 5+ People | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 0 | 4 | 13 | 8 | 17 | 12 | 0 | **54** |
| Percent of homes | 0% | 7% | 24% | 15% | 31% | 22% | 0% | **100%** |
| | | | | | | | **Total number people living in the homes** | **196** |

**How many children living in your home are under age 5?**

| | 0 Children | 1 Child | 2 Children | 3 Children | 4 Children | 5+ Children | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 30 | 17 | 6 | 0 | 1 | 0 | 0 | **54** |
| Percent of homes | 56% | 31% | 11% | 0% | 2% | 0% | 0% | **100%** |
| | | | | | | | **Total number children living in the homes** | **33 (17%)** |

**How many people living in your home are age 65 or older?**

| | 0 Older adults | 1 Older adult | 2 Older adults | 3 Older adults | 4 Older adults | 5+ Older adults | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 40 | 11 | 3 | 0 | 0 | 0 | 0 | **54** |
| Percent of homes | 74% | 20% | 6% | 0% | 0% | 0% | 0% | **100%** |
| | | | | | | | **Total number older adults living in the homes** | **17 (9%)** |

**How many people living in your home are disabled?**

| | 0 Disabled | 1 Disabled | 2 Disabled | 3 Disabled | 4 Disabled | 5+ Disabled | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 37 | 14 | 3 | 0 | 0 | 0 | 0 | **54** |
| Percent of homes | 69% | 26% | 6% | 0% | 0% | 0% | 0% | **100%** |
| | | | | | | | **Total number disabled living in the homes** | **20 (10%)** |

**How many people living in your home are smokers?**

| | 0 Smokers | 1 Smoker | 2 Smokers | 3 Smokers | 4 Smokers | 5+ Smokers | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 33 | 10 | 6 | 5 | 0 | 0 | 0 | **54** |
| Percent of homes | 61% | 19% | 11% | 9% | 0% | 0% | 0% | **100%** |
| | | | | | | | **Total number smokers living in the homes** | **37 (19%)** |

**Number of Risk Factors**

| | 0 Risks | 1 Risk | 2 Risks | 3 Risks | 4 Risks | Blank | Total |
|---|---|---|---|---|---|---|---|
| Number of homes | 11 | 18 | 17 | 8 | 0 | 0 | **54** |
| Percent of homes | 20% | 33% | 31% | 15% | 0% | 0% | **100%** |

**The people in this household are: (can check more than one: e.g., White and Hispanic)**

| | African Amer. | Asian | Hispanic / Latino | Native Amer. | Pacific Islander | White | Mixed | Other | Blank | Total* |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of homes | 1 | 0 | 23 | 1 | 0 | 30 | 0 | 0 | 0 | **55** |
| Percent of homes | 2% | 0% | 42% | 2% | 0% | 55% | 0% | 0% | 0% | **100%** |

* 1 home selected Hispanic/Latino + White

## Madison

***Homes Visited*** – Madison visited 902 homes. All were prearranged and there were no refusals. The vast majority of the homes (90%) were single family houses. The rest were mobile homes (3%), duplex/townhouse (3%), and a smattering of others.

711 (79%) of the homes were visited by a team of firefighters; 133 (15%) by team of prevention personnel; and 17 (2%) by a team of volunteers. The remaining 41 (5%) homes were visited by a firefighter working with a community volunteer, prevention officer, or Red Cross representative, or by a team comprised of a community volunteer and prevention officer.

| Type of Home: | House | Mobile home | Duplex/ Townhouse | Multi-family | Other | Blank | Total |
|---|---|---|---|---|---|---|---|
| Number of homes | 810 | 30 | 27 | 7 | 25 | 3 | **902** |
| Percent of homes | 90% | 3% | 3% | 1% | 3% | 0% | **100%** |

**If entry to residence not possible, why not?**

| | No one home | Minor only | Language barrier | Vacant home/lot | Entry refused? | Total |
|---|---|---|---|---|---|---|
| Number of homes | 0 | 0 | 0 | 0 | 0 | **0** |
| Percent of homes | 0% | 0% | 0% | 0% | 0% | **0%** |
| | | | | | **Total number of homes visited** | **902** |
| | | | | | **Total number of homes not entered** | **0 (0%)** |
| | | | | | **Total number of homes entered** | **902 (100%)** |

**Positions of representatives making the visit (check all that apply):**

| | Firefighter | Health-care worker | Volunteer | Prevention | Social worker | Other | Type not selected | Total* |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 747 | 0 | 48 | 154 | 0 | 2 | 0 | **951** |
| Percent of homes | 83% | 0% | 5% | 17% | 0% | 0% | 0% | **105%** |

*711 homes were visited by team of firefighters only; 17 homes were visited by team of volunteers only; 133 homes were visited by team of prevention personnel only; 36 homes were visited by a firefighter plus a volunteer, prevention, or Red Cross; and 5 homes were visited by team of volunteer and prevention personnel.

***Situation Found*** – At least 93% of the homes had one or more smoke alarms (working or non-working), with the most being 11 in one home, all of which worked. Only 40 homes (4%) had no smoke alarm, and information was not provided on another 3%. The home visits found a total of 2015 smoke alarms in all the homes, or an average of 2.2 per home.

At least 9% of the homes had no working smoke alarms at all, and alarm status was not noted in another 4%. Twenty percent of the homes had at least one smoke alarm not working. Also, 13% of all the smoke alarms tested were not working, a higher than desirable proportion but lower than any other city here, and lower than the 20-30% usually found in national studies. However, while Madison had much lower percentages of homes with no alarm protection than the other cities of the previous WSAFM and present IFE projects, there were still many households, including off-campus housing, that were far short of meeting the code for smoke alarms. Thus the visits even in this relatively affluent community proved needed.

Only 4% of the homes had private alarms systems, and they did not affect the overall statistics much.

**Number of smoke alarms (working and/or non-working)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 40 | 198 | 346 | 178 | 49 | 66 | 25 | **902** |
| Percent of homes | 4% | 22% | 38% | 20% | 5% | 7% | 3% | **100%** |
| | | | | | | | **Total number of smoke alarms** | **2015** |

**Number of working smoke alarms (based on testing)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 79 | 231 | 322 | 152 | 44 | 42 | 32 | **902** |
| Percent of homes | 9% | 26% | 36% | 17% | 5% | 5% | 4% | **100%** |
| | | | | | | | **Total number and percent of working smoke alarms** | **1749 (87%)** |

**Number of non-working smoke alarms (based on testing)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 648 | 123 | 35 | 17 | 3 | 2 | 74 | 902 |
| Percent of homes | 72% | 14% | 4% | 2% | 0% | 0% | 8% | 100% |
| | | | | | | | **Total number and percent of non-working smoke alarms** | **266 (13%)** |

**Private alarm system present (do not test)**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 37 | 796 | 69 | **902** |
| Percent of homes | 4% | 88% | 8% | **100%** |

***Installations*** – Almost every home visited (97%) required at least one additional smoke alarm to meet code. Seven homes each required 10 smoke alarms to be installed! A total of 4738 smoke alarms were installed, an average of 5.3 per home! Many of the homes with large numbers installed were off-campus housing with many subdivided rooms.

After the visits, 99% of the homes (all but 9) had at least one working alarm; a couple of the 9 did not have data fully reported. There were a total of 6543 working smoke alarms in the homes after the visits, or an average of 7.3 per home. Most of the alarms installed were ionization with 10-year tamper proof batteries; a small number were hardwired or combination smoke alarms. Fifty-six homes had batteries replaced in their smoke alarms.

At the conclusion, over 95% of the homes visited met code requirements for smoke alarms. Two percent were reported not to meet code, but most of them (18 out of 19) had 1-5 working smoke alarms.

**Number of smoke alarms installed during the visit.**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 2 | 4 | 10 | 46 | 119 | 697 | 24 | **902** |
| Percent of homes | 0% | 0% | 1% | 5% | 13% | 77% | 3% | **100%** |
| | | | | | | | **Total number of smoke alarms installed** | **4738** |

**Number of working smoke alarms after the visit**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 7 | 1 | 9 | 18 | 34 | 831 | 2 | **902** |
| Percent of homes | 1% | 0% | 1% | 2% | 4% | 92% | 0% | **100%** |
| | | | | | | | **Total number of working smoke alarms after the visits** | **6543** |

**Type of alarm(s) installed:**

| | Dual Chamber | Ionization | Photo-electric | Type not selected | Total |
|---|---|---|---|---|---|
| Number of homes | 0 | 880 | 0 | 22 | **902** |
| Percent of homes | 0% | 98% | 0% | 2% | **100%** |

**Power source of alarm(s) installed:**

| | Tamper-proof 10-year battery | Hard-wired | Replaceable battery | Combination (battery and hard-wired) | Blank | Total |
|---|---|---|---|---|---|---|
| Number of homes | 829 | 24 | 2 | 54 | 8 | **917** |
| Percent of homes | 90% | 3% | 0% | 6% | 1% | **100%** |

*15 homes had more than one type of smoke alarm installed

**Number of smoke alarm batteries replaced?**

| | 0 Alarms | 1+ Alarms | Blank | Total |
|---|---|---|---|---|
| Number of homes | 782 | 28 | 92 | **902** |
| Percent of homes | 87% | 3% | 10% | **100%** |
| | | | **Total number of smoke alarm batteries replaced** | **56** |

**Did the home end up with the number of smoke alarms required by code?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 859 | 19 | 24 | **902** |
| Percent of homes | 95.2% | 2% | 3% | **100%** |

**If no, was the occupant advised of the number required?** (This question not included in the data analysis spreadsheet returned to TriData.)

***Education Provided*** – Almost all homes visited (97%) were given information on maintaining smoke alarms and on other fire or injury safety subjects. Only half the homes said they had an escape plan, and half of those had not practiced it in the past year. Most of the homes were given written information on escape planning.

**(Occupant instructed on (check all that apply):**

| | Testing and maintaining smoke alarms | Other fire or injury safety subjects* |
|---|---|---|
| Number of homes | 875 | 336 |
| Percent of homes | 97% | 37% |

**Ask occupant: Do you have a fire escape plan?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 444 | 384 | 74 | **902** |
| Percent of homes | 49% | 43% | 8% | **100%** |

**If yes….**

**Was the fire escape plan practiced in the last year?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 227 | 195 | 22 | **444** |
| Percent of homes | 51% | 44% | 5% | **100%** |

**Where is your meeting place? (check if any credible place cited)**

| | Yes | No | Total |
|---|---|---|---|
| Number of homes | 315 | 129 | **444** |
| Percent of homes | 71% | 29% | **100%** |

**Occupant given written fire or injury safety materials on:**

| | Escape planning | General home safety | Specific causes or hazards |
|---|---|---|---|
| Number of homes | 834 | 790 | 180 |
| Percent of homes | 92% | 88% | 20% |

***Demographics*** – Virtually all of the homes visited were owner-occupied. There were almost two people per household. Almost all the homes (96%) had at least one risk factor: 6% had a child under 5; 85% had at least one older adult (because of the concentration on homes with older adults); 28% had at least one person with a disability; and 12% had at least one smoker (a very low average). This was the highest of any of the participating cities (mainly because of the focus on older adults).

Of the homes with a smoker, 16 homes had 0 or 'blank' working smoke alarms on arrival. At the end of the visits, only 2 of these homes had 0 or 'blank' working smoke alarms, and the rest had anywhere from 3-13 working smoke alarms.

**Do you own or rent your home?**

| | Own | Rent | Blank | Total |
|---|---|---|---|---|
| Number of homes | 897 | 1 | 4 | **902** |
| Percent of homes | 99% | 0% | 0% | **100%** |

## How many people live in your home?

| | 0 People | 1 Person | 2 People | 3 People | 4 People | 5+ People | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 2 | 359 | 409 | 60 | 45 | 21 | 6 | **902** |
| Percent of homes | 0% | 40% | 45% | 7% | 5% | 2% | 1% | **100%** |
| | | | | | | | **Total number people living in the homes** | **1659** |

## How many children living in your home are under age 5?

| | 0 Children | 1 Child | 2 Children | 3 Children | 4 Children | 5+ Children | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 837 | 28 | 23 | 2 | 0 | 0 | 12 | **902** |
| Percent of homes | 93% | 3% | 3% | 0% | 0% | 0% | 1% | **100%** |
| | | | | | | | **Total number children living in the homes** | **80 (5%)** |

## How many people living in your home are age 65 or older?

| | 0 Older adults | 1 Older adult | 2 Older adults | 3 Older adults | 4 Older adults | 5+ Older adults | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 130 | 428 | 335 | 2 | 2 | 0 | 5 | **902** |
| Percent of homes | 14% | 47% | 37% | 0% | 0% | 0% | 1% | **100%** |
| | | | | | | | **Total number older adults living in the homes** | **1112 (67%)** |

## How many people living in your home are disabled?

| | 0 Disabled | 1 Disabled | 2 Disabled | 3 Disabled | 4 Disabled | 5+ Disabled | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 646 | 225 | 24 | 2 | 0 | 0 | 5 | **902** |
| Percent of homes | 72% | 25% | 3% | 0% | 0% | 0% | 1% | **100%** |
| | | | | | | | **Total number disabled living in the homes** | **279 (17%)** |

## How many people living in your home are smokers?

| | 0 Smokers | 1 Smoker | 2 Smokers | 3 Smokers | 4 Smokers | 5+ Smokers | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 790 | 91 | 11 | 2 | 0 | 0 | 8 | **903** |
| Percent of homes | 87% | 10% | 1% | 0% | 0% | 0% | 1% | **100%** |
| | | | | | | | **Total number smokers living in the homes** | **119 (7%)** |

## Number of Risk Factors

| | 0 Risks | 1 Risk | 2 Risks | 3 Risks | 4 Risks | Blank | Total |
|---|---|---|---|---|---|---|---|
| Number of homes | 29 | 604 | 225 | 39 | 1 | 4 | **902** |
| Percent of homes | 3% | 67% | 25% | 4% | 0% | 0% | **100%** |

## The people in this household are: (can check more than one: e.g., White and Hispanic)

| | African American | Asian | Hispanic/ Latino | Native American | Pacific Islander | White | Mixed | Other | Not selected | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of homes | 25 | 14 | 10 | 7 | 2 | 832 | 4 | 2 | 24 | **920** |
| Percent of homes | 3% | 2% | 1% | 1% | 0% | 90% | 0% | 0% | 3% | **100%** |

**The people in this household speak the following languages:**

| | English | Spanish | Hmong | Other (list) | Not selected | Total |
|---|---|---|---|---|---|---|
| Number of homes | 889 | 12 | 3 | 23 | 9 | **936*** |
| Percent of homes | 95% | 1% | 0% | 2% | 1% | **100%** |

* 32 homes selected more than one language; 1 home selected 3 languages

## Philadelphia

***Households Visited*** – Philadelphia completed 5418 home visits in this project, more than any other participating community in this or the preceding WSAFM project. All but one of the visits were made by line firefighters (one was by a firefighter and health worker.)

The vast majority of the homes visited (92%) were single family dwellings. There also were some duplexes or townhouses (3%) and multifamily dwellings (1%). (A category not included on the questionnaire was homes above stores, of which there were many in Philadelphia. That category should be added to future forms for communities where there are significant numbers of those types of residences.

The firefighters entered over half (54%) of the households they attempted to visit (in round numbers, 5400 successes out of 10,000 attempts). Almost all of the visits came from canvassing selected high-risk areas rather than by appointment. The main reason for not getting into some homes was no one home (86% of non-entries) or vacant ( 6% ). "Entry refused" was the reason in only 7% of non-entries. Having only a minor at home and language barriers were reasons for less than 1% of the non-entries.

**Type of Home Entered**

| | House | Mobile home | Duplex/ Townhouse | Multi-family | Other | Blank | Total* |
|---|---|---|---|---|---|---|---|
| Number of homes | 4996 | 2 | 175 | 54 | 22 | 206 | **5455** |
| Percent of homes | 92% | 0% | 3% | 1% | 0% | 4% | **100%** |

* 37 home visit questionnaires selected House + another category; the number of individual homes visited was 5418.

**If entry to residence not possible, why not?**

| | No one home | Minor only | Language barrier | Vacant home/lot | Entry refused? | Total* |
|---|---|---|---|---|---|---|
| Number of homes | 4053 | 15 | 25 | 273 | 340 | **4706** |
| Percent of homes | 86% | 0% | 1% | 6% | 7% | **100%** |
| | | | | | **Total number of homes visited** | **10082** |
| | | | | | **Total number of homes not entered** | **4664 (46%)** |
| | | | | | **Total number of homes entered** | **5418 (54%)** |

* 40 attempts had two reasons for non-entry and one had three reasons.

NOTE: The home survey questionnaires for 284 homes were marked as "not entered" but then had information on the number of smoke alarms or alarms or batteries installed. After consultation with the Philadelphia project manager, these homes were counted as "entered". Contrariwise, some households marked as entered had blanks in some or all other data fields; we report the number of blanks separately for each data element below.

**Positions of representatives making the visit (check all that apply):**

| | Firefighter | Health-care worker | Volunteer | Prevention | Social worker | Other | Type not selected | Total* |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 5230 | 4 | 0 | 0 | 0 | 0 | 185 | **5419** |
| Percent of homes | 97% | 0% | 0% | 0% | 0% | 0% | 3% | **100%** |

* 1 home was visited by a team of Firefighter + Health-care worker

***Situation Found*** – Of the 5418 homes entered, at least 1029 (20%) had no smoke alarm at all (working or not working). The true total probably was somewhat higher because some of the 'blank' entries on this data item probably meant no alarm.

There was an average of 1.6 smoke alarms per home (some not working). 115 homes had five or more alarms, and two had 12 alarms each.

About a third of the homes (32%) had no working smoke alarm; that is, they either had no smoke alarm or none working. Here too the percentage probably was even higher, depending on how many of the homes where the working smoke alarm question was left blank but meant "no working alarm".

Of the 8484 smoke alarms found in the homes, at least 2239 (26%) were not working. There may have been some additional smoke alarms not working among the 216 private alarm systems in the households visited; private alarm systems were not to be tested in this project.

While 26% not working is far higher than desirable, it was not quite as high as the percentage found in other cities' high-risk households.

**Number of smoke alarms (working and/or non-working)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank* | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 1075 | 1043 | 1329 | 1080 | 217 | 115 | 559 | **5418** |
| Percent of homes | 20% | 19% | 25% | 20% | 4% | 2% | 10% | **100%** |
| | | | | | | | **Total number of smoke alarms** | **8484** |

* 216 homes had a private alarm system. Of these, 46 had "0" alarms reported and 26 had "blank" alarms. These homes must have at least one smoke alarm, so the true total number of smoke alarms would be at least 8484+46+26=8556. Just to complicate matters further, some homes with private alarms have additional ones not part of the system.

**Number of working smoke alarms (based on testing)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 1717 | 1195 | 1013 | 741 | 119 | 57 | 576 | **5418** |
| Percent of homes | 32% | 22% | 19% | 14% | 2% | 1% | 11% | **100%** |
| | | | | | | | **Total number of working smoke alarms** | **6245 (74%)** |

144 of the 216 homes with a private alarm system reportedly had one or more working smoke alarms. Some or all of the rest may also have had working alarms but were not tested.

**Number of non-working smoke alarms (based on testing)**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 2888 | 761 | 533 | 113 | 6 | 8 | 1109 | **5418** |
| Percent of homes | 53% | 14% | 10% | 2% | 0% | 0% | 20% | **100%** |
| | | | | | | | **Total number of non-working smoke alarms** | **2239 (26%)** |

34 of the 216 homes with a private alarm system reported one or more non-working smoke alarms. These alarms may or may not have been part of the private alarm system.

**Private alarm system present (do not test)**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 216 | 3492 | 1715 | **5423** |
| Percent of homes | 4% | 64% | 32% | **100%** |

* 5 homes selected Yes and No

***Installations*** – Over three-quarters of the homes visited (77%) had one or more smoke alarms installed during the visit. Three homes each had 8 smoke alarms installed. A total of 9062 smoke alarms were installed, an average of 1.7 per home entered.

In addition to the smoke alarms, at least 487 homes (9%) had one or more batteries replaced in alarms.

Of the 555 (10%) homes where no smoke alarm was installed:

- 503 had at least one working alarm in the home already. Fifty-seven of the 503 homes had batteries replaced in at least one smoke alarm and another 46 had a private alarm system.
- 52 homes had no working smoke alarms or the data on smoke alarms was blank. Of these, 7 had batteries replaced in at least one smoke alarm; another 7 had a private alarm system; 4 homes were marked as “lot”; 1 home “did not want to be bothered”; and 1 was a store front. The reason for not installing smoke alarms in the remaining 32 households is unknown.

Of the 678 households with blanks for the number of alarms installed, 210 had at least one working smoke alarm, 35 had batteries replaced in at least one smoke alarm, and 37 had a private alarm system. Reasons for the rest were not provided. (We recommend in the next chapter that reasons for not installing smoke alarms be collected in future home visit programs.)

At the conclusion of the home visits, at least 4923 homes visited (91%) had one or more working smoke alarms. Another 2 percent (118) were reported as not have any working smoke alarms after the visits, but 10 of these had a private alarm system. The rest of the homes (7%) had blanks in fields that precluded computing the total.

There were a total of at least 16080 working smoke alarms in the homes after the visits, an average of 3 per home. Eighty-one percent of the homes met the smoke alarm codes, 3% did not, and 17% did not have this information reported (4% were homes with private alarm systems). Most of the homes that were not compliant were advised on what it would take to meet code.

**Number of smoke alarms installed during the visit?**

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 555** | 1008 | 1664 | 1363 | 128 | 22 | 678* | **5418** |
| Percent of homes | 10% | 19% | 31% | 25% | 2% | 0% | 13% | **100%** |
| | | | | | | | **Total number of smoke alarms installed** | **9062** |

* 37 of these homes had a private alarm system

** 57 of these homes had a private alarm system

Of the 678 'blank' homes, 210 homes had at least one working smoke alarm in the home, and an additional 24 homes had a private alarm system.

**Number of working smoke alarms after the visit?**[4]

| | 0 Alarms | 1 Alarm | 2 Alarms | 3 Alarms | 4 Alarms | 5+ Alarms | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 118 | 143 | 838 | 2503 | 867 | 572 | 377 | **5418** |
| Percent of homes | 2% | 3% | 15% | 46% | 16% | 11% | 7% | **100%** |
| | | | | | | | **Total number of working smoke alarms after the visits** | **16080** |

**Type of alarm(s) installed:**

| | Dual Chamber | Ionization | Photo-electric | Type not selected | Total |
|---|---|---|---|---|---|
| Number of homes | 8 | 5011 | 0 | 400 | **5419** |
| Percent of homes | 0% | 92% | 0% | 7% | **100%** |

* 1 home had two types: Dual Chamber + Ionization

[4] Working smoke alarms + Number of smoke alarms installed + Batteries replaced = Number of working smoke alarms after the visit

**Power source of alarm(s) installed:**

| | Tamper-proof 10-year battery | Hard-wired | Replaceable battery | Combination (battery and hard-wired) | Blank | Total* |
|---|---|---|---|---|---|---|
| Number of homes | 4961 | 40 | 5 | 0 | 422 | **5428** |
| Percent of homes | 91% | 1% | 0% | 0% | 8% | **100%** |

* Two types of power sources were selected for 10 homes: 7 Tamper-proof + Hard-wired; 3 Tamper-proof + Replaceable battery

**Number of smoke alarm batteries replaced?**

| | 0 Alarms | 1+ Alarms | Blank | Total |
|---|---|---|---|---|
| Number of homes | 3927 | 487 | 1004 | **5418** |
| Percent of homes | 72% | 9% | 19% | **100%** |
| | | | **Total number of smoke alarm batteries replaced** | **773** |

**Did the home end up with the number of smoke alarms required by code?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 4381 | 139 | 899 | **5419** |
| Percent of homes | 80.8% | 3% | 17% | **100%** |

*1 home selected Yes and No

**If no, was the occupant advised of the number required?** Yes: 90; No: 22; Not answered 26

**Education Provided**

Of the 5418 homes entered, 90% were given one-on-one instructions on testing and maintaining smoke alarms. About 1% were given instruction on other safety topics.

Just a little over half of the homes (56%) said they had a fire escape plan; 25% said they did not, and no data was given on the rest. Two-thirds of the homes that had a plan said they practiced it. A little over half could name a credible meeting place. So more than half the homes needed information or motivation to develop and practice escape plans.

Almost two -thirds of the homes were given written fire safety information, and three quarters given written information on more general safety issues.

**Occupant instructed on (check all that apply):**

| | Testing and maintaining smoke alarms | Other fire or injury safety subjects |
|---|---|---|
| Number of homes | 4898 | 41 |
| Percent of homes | 90% | 1% |

**Ask occupant: Do you have a fire escape plan?**

| | Yes | No | Blank | Total |
|---|---|---|---|---|
| Number of homes | 3022 | 1358 | 1043 | **5423** |
| Percent of homes | 56% | 25% | 19% | **100%** |

* 5 homes selected Yes and No

**If yes….**

**Was the fire escape plan practiced in the last year?**

| | Yes | No | Blank | Total* |
|---|---|---|---|---|
| Number of homes | 1932 | 780 | 310 | **3022** |
| Percent of homes | 64% | 26% | 10% | **100%** |

* 1 home selected YES and NO

**Where is your meeting place? (check if any credible place cited)**

| | Yes | No | Total |
|---|---|---|---|
| Number of homes | 1666 | 1356 | **3022** |
| Percent of homes | 55% | 45% | **100%** |

**Occupant given written fire or injury safety materials on:**

| | Escape planning | General home safety | Specific causes or hazards |
|---|---|---|---|
| Number of homes | 3394 | 3918 | 118 |
| Percent of homes | 63% | 72% | 2% |

**Demographics of Households**

Over two-thirds (68%) of the householders entered were owner-occupied. Another 20% were occupied by renters. The renter status of the rest was not reported.

There was an average of 2.5 occupants per household. Over 13,000 residents were reached. Twenty-one percent of the households had at least one child under 5. Twenty-five percent had an older adult (65 or older). Nine percent had at least one person with a disability.

At least 25% of the homes had one or more smokers (two homes each had 6 smokers). At the start of the visits, 40% (551) of these smoker households had no working smoke alarm. At the end of the visits, that number dropped to 2% (23).

More than half of the homes (57%) had one or more of the risk factors above.

About 43% of the homes were African American, 9 % Hispanic and 6% other minorities—a total of 58% minority.

## Do you own or rent your home? (ask resident)

| | Own | Rent | Blank | Total |
|---|---|---|---|---|
| Number of homes | 3673 | 1061 | 688 | **5422** |
| Percent of homes | 68% | 20% | 13% | **100%** |

* 4 households selected OWN and RENT

## How many people live in your home?

| | 0 People | 1 Person | 2 People | 3 People | 4 People | 5+ People | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 59 | 719 | 1331 | 1053 | 840 | 682 | 734 | **5418** |
| Percent of homes | 1% | 13% | 25% | 19% | 16% | 13% | 14% | **100%** |
| | | | | | | | **Total number people living in the homes** | **13749** |

## How many children living in your home are under age 5?

| | 0 Children | 1 Child | 2 Children | 3 Children | 4 Children | 5+ Children | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 3445 | 716 | 300 | 71 | 27 | 11 | 848 | **5418** |
| Percent of homes | 64% | 13% | 6% | 1% | 0% | 0% | 16% | **100%** |
| | | | | | | | **Total number children living in the homes** | **1726 (13%)** |

## How many people living in your home are age 65 or older?

| | 0 Older adults | 1 Older adult | 2 Older adults | 3 Older adults | 4 Older adults | 5+ Older adults | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 3208 | 903 | 432 | 19 | 3 | 3 | 850 | **5418** |
| Percent of homes | 59% | 17% | 8% | 0% | 0% | 0% | 16% | **100%** |
| | | | | | | | **Total number older adults living in the homes** | **1869 (14%)** |

## How many people living in your home are disabled?

| | 0 Disabled | 1 Disabled | 2 Disabled | 3 Disabled | 4 Disabled | 5+ Disabled | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 4029 | 457 | 40 | 9 | 1 | 0 | 882 | **5418** |
| Percent of homes | 74% | 8% | 1% | 0% | 0% | 0% | 16% | **100%** |
| | | | | | | | **Total number disabled living in the homes** | **568 (4%)** |

## How many people living in your home are smokers?

| | 0 Smokers | 1 Smoker | 2 Smokers | 3 Smokers | 4 Smokers | 5+ Smokers | Blank | Total |
|---|---|---|---|---|---|---|---|---|
| Number of homes | 3149 | 1017 | 280 | 43 | 22 | 5 | 901 | **5418** |
| Percent of homes | 58% | 19% | 5% | 1% | 0% | 0% | 17% | **100%** |
| | | | | | | | **Total number smokers living in the homes** | **1820 (13%)** |

## Number of Risk Factors

| | 0 Risks | 1 Risk | 2 Risks | 3 Risks | 4 Risks | Blank | Total |
|---|---|---|---|---|---|---|---|
| Number of homes | 1526 | 2020 | 887 | 167 | 16 | 802 | **5418** |
| Percent of homes | 28% | 37% | 16% | 3% | 0% | 15% | **100%** |

**The people in this household are: (can check more than one: e.g., White and Hispanic)**

| | African American | Native American | Mixed | Asian | Pacific Islander | Hispanic-Latino | White | Other | Not selected | Total* |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of homes | 2350 | 8 | 66 | 156 | 7 | 502 | 1493 | 86 | 797 | **5465** |
| Percent of homes | 43% | 0% | 1% | 3% | 0% | 9% | 27% | 2% | 15% | **100%** |

* (5) household selected three, (35) households selected 2

# IV. FUTURE DIRECTIONS

## Further Evaluation

The safety environment and safety education were significantly improved for thousands of homes. How this translates into the desired outcomes of fewer deaths, injuries and dollar loss from fire and other injuries in these homes remains to be tracked in the longer term. As noted earlier, the grant period (somewhat over one year) was not long enough to allow enough time following the installation of the smoke alarms to measure with statistical significance the bottom line results.

So perhaps the most important follow-on is the evaluation of the impact of the home visits over the next year, especially in terms of their reported fire death rates and fire incidence relative to the rest of their city.

## Further Testing of Concepts

In the midst of this project, additional grant proposals for similar projects were submitted to the AFG program by the IFE and two state-level fire marshal's organizations. They would continue testing and refining the concepts of integrated risk management and home visits in the United States, as well as act as being seed programs for their emulation in various regions and types of departments.

Because the project manager, advisor and evaluator have remained the same, there already has been excellent continuity across the WSAFM and IFE projects. Use of the lessons learned in this IFE project and the previous WSAFM project are likely to improve the next ones.

Lexington noted that as a result of the success of their small trial, they are planning to now visit to all 1000 of their mobile homes, and then to select high-risk areas, all using line firefighters to assist in the visits. Philadelphia is planning to continue the home visits as they obtain funds for additional smoke alarms. It is likely the other cities will do something similar.

## Improvement to the Household Visit Form

We offer the following recommendations to improve data quality and provide more details if questionnaires are used in the future for similar projects.

**Data Recommendation 1. Reduce the Number of Blanks:** Firefighters or others who fill out home visit questionnaires should be advised to fill out all of the data fields accurately, and not leave blanks. They should not use a blank to mean "zero". Participating communities should have some quality control process for reviewing forms for blanks and illogical entries, and to correct them before submitting them for analysis.

There were hundreds of forms where one or more data elements was left blank, such as the number of alarms installed in the home, or the number not working. A few home visit questionnaires report the visit as a non-entry. nevertheless provided information on the smoke alarms in the home. While theoretically possible—for example, by collecting information on the doorstep from the occupant—they were most likely reporting errors. And the opposite sometimes occurred: households marked as entered had no data on the status of the smoke alarms. Again, theoretically possible—such as if the occupant allowed you in but did not allow you to test or install anything —but these, too, are most likely errors of omission, or the entry was not made. There also were numerous questionnaires on which some data fields were left blank. Sometimes this was appropriate, such as when a private alarm system was present and could not be tested. But many of the blanks were just omissions.

**Data Recommendation 2. Private Alarm Systems:** Provide more explicit instructions on how to deal with private alarm systems. Add an extra column s to the question on the number of alarms installed to record separately the number of alarms added to households with private alarm systems.

Private alarms are usually hard-wired and tied to automatic monitoring in a private firm or the fire department. The number of alarms in private alarm systems should be included in the count of total alarms. However, these private alarms should not be tested and should not be included in the number of working or not working alarms unless there they can be tested without triggering an alert, or is information on a recent test is available. If the number of alarms in the private system is not sufficient to meet code, the home may require additional alarms.

**Data Recommendation 3. Reasons for Non-compliance:** For households not meeting the smoke alarm standard at the conclusion of the visit, add a question as to why.

Reasons might include: household refused to have the alarms installed because of noise, time, or other factors; firefighters had to terminate the visit to respond to an emergency call; firefighters ran out of alarms to install; storefront, or other reasons (write in).

**Data Recommendation 4. Battery and Smoke Alarm Replacements for Working Smoke Alarms:** Add questions on whether battery installation or smoke alarm replacement is for a working smoke alarm.

Some batteries or alarms are changed just because they are old, even if the alarm is still working. The total number of working alarms at the end of the visit usually is the number working at the start of the visit plus the number of new alarms installed and the number of alarms made to work by changing batteries. If some alarms were working and had the battery changed or were replaced entirely, you get an over count with this formula. We need to know when this occurs.

**Data Recommendation 5. Type of Household:** Add the category “home above store” to the types of homes visited.

Homes above stores are fairly common in older cities, especially in the Northeast. They may have different codes applicable because of being part of a commercial building.

## APPENDIX: HOME VISIT QUESTIONAIRE AND INSTRUCTIONS

### Home Visit Questionnaire
FEMA Assistance to Fire Fighters Grant (AFG) Program

Date of visit: _____

Name of occupant: _____ Home phone: _____

Street address: _____ Apt No. _____

City and state: _____ ZIP: _____

1. **Type of Home:**
   - ☐ House ☐ Mobile home ☐ Other _____
   - ☐ Duplex/Townhouse ☐ Multifamily
2. **If entry to residence not possible, why not?**
   - ☐ No one home ☐ Minor only ☐ Entry refused, why?
   - ☐ Language barrier ☐ Vacant home/lot _____
3. **Name(s) of Fire Dept reps making the visit:** _____
4. **Positions of representatives making the visit** *(check all that apply)*:
   - ☐ Firefighter (career or volunteer) ☐ Healthcare worker ☐ Volunteer
   - ☐ Prevention ☐ Social worker ☐ Other _____

**INSPECTION**

5. Number of **working** smoke alarms *(based on testing)* _____
6. Number of **non-working** smoke alarms *(based on testing)* _____
7. **Private alarm system** present *(do not test)* ☐ Yes ☐ No

**INSTALLATION**

8. Number of smoke **alarms installed** during the visit? _____
9. **Type of alarm**(s) installed:
   - ☐ Dual chamber ☐ Ionization ☐ Photoelectric
10. **Power source** of alarm(s) installed:
    - ☐ Tamper-proof 10-year battery ☐ Hard-wired
    - ☐ Replaceable battery ☐ Combination (battery and hard-wired)
11. Number of smoke alarm **batteries replaced**? _____
12. Did the home end up with the number of smoke alarms required by **code**? ☐ Yes ☐ No
    *If no,* was the occupant **advised of the number required**? ☐ Yes ☐ No

## Home Visit Questionnaire

FEMA Assistance to Fire Fighters Grant (AFG) Program

### EDUCATION PROVIDED

13. **Occupant instructed on** *(check all that apply):*
    - ☐ Testing and maintaining smoke alarms
    - ☐ Other fire or injury safety subjects: *(Please list)*_____

14. ***Ask occupant:*** **Do you have a fire escape plan?** ☐ Yes ☐ No
    *If yes….*
    Was the fire escape plan practiced in the last year? ☐ Yes ☐ No
    Where is your meeting place? *(check if any credible place cited)* ☐ Has & credible

15. **Occupant given written fire or injury safety materials on:**
    - ☐ Escape planning
    - ☐ General home safety
    - ☐ Specific causes or hazards: *(Please list)*_____

### DEMOGRAPHICS *(ask resident)*

16. Do you **own or rent** your home? ☐ Own ☐ Rent
17. How many **people** live in your home? _____
18. How many children living in your home are **under age 5**?_____
19. How many people living in your home are **age 65 or older**?_____
20. How many people living in your home are **disabled**? _____
21. How many people living in your home are **smokers**? _____
22. The people in this household are: *(can check more than one: e.g., White and Hispanic)*
    - ☐ African American
    - ☐ Asian
    - ☐ Hispanic/Latino
    - ☐ Native American
    - ☐ Pacific Islander
    - ☐ White
    - ☐ Mixed
    - ☐ Other_____

### AGREEMENT/RELEASE OF LIABILITY (if installation made)

I hereby request installation of a smoke alarm by fire operations personnel or their associates. I will not hold the City of _____ or its employees liable for injury to persons arising out of the installation, malfunction, or removal of the smoke alarms installed or given batteries. Further, I agree that I will not bring any claim against sponsors, employees, or volunteers of the city, and hold them harmless and release them from all claims, actions, damages, and liability resulting from the use or malfunction of the smoke alarm(s) installed. Further, I understand that the smoke alarm provided by this program is done for public safety. The sponsors or installers are not dealers of this type of goods and make no warranty on the smoke alarm. I agree to allow program representatives to inspect and verify the function of the alarm at a later date

Signed:_____ Date:_____

Program representative/witness:_____

# EVALUATION PLAN FOR
# IFE Home Visit Project, AFG grant

## (revised 8/17/10)

By Philip Schaenman, TriData/SPC

A key part of each grant made under the FEMA Assistance to Firefighters Grant (AFG) Program is the evaluation of what it accomplished. The tentative evaluation plan is outlined in the grant application.

This paper summarizes the evaluation plan for the integrated risk management/home visit project involving the cities of Philadelphia, Madison, and Amherst and Belchertown under the current AFG IFE grant. Each jurisdiction needs to provide the data discussed below (or as close to it as feasible) to Philip Schaenman or Maria Argabright at TriData, who will pull it together for the final report.

## Evaluation Concept

The general evaluation concept or model used here is described below. This evaluation plan was approved by an evaluation subcommittee for the previous similar project, and included representatives of the U.S. Centers for Disease Control and Prevention (CDC) , the University of Washington, and the IFE AFG project director (Jim Crawford). It is based on an adaptation of the approach and home visit form already used by Dallas, and what was outlined by TriData in the grant application. It is compatible with the larger, longer range plan for evaluation of AFG programs, and probably will be a touchstone for improving their evaluation further in the future, so we should try to do a good job here—it is not just punching a bureaucratic requirement, but trying to show whether the prevention concept can be applied nationally and perhaps save 1,000 lives a year, a proportional reduction achieved in many cities in other nations when the approach is fully implemented, and half or more households are visited.:

**Use of Grant Money** —First priority in the evaluation is to show AFG that the grant monies were spent on what we said they would be, namely purchasing smoke alarms and getting them installed in high-risk residences via home visits that also deliver some safety education directly to each home visited. The number purchased and the number installed will be important to cite.

Data needs to be collected on each home visit to document what was found and what was done—the number of working smoke alarms before and after the visit, and what information was delivered. We discuss the form to use for the data collection below.

**Targeting of Smoke Alarm Installations-** Description of how the homes visited were selected. Were they in high fire rate areas, e.g. determined from GIS maps of fire experience? Characteristics of the household known to be linked to fire incidence, e.g. low income, immigrant, elderly, college student residence or other factors? Requests from health or social agencies? Homes that requested visits? References from other people, or households visited? Proximity to other targeted households (e.g., we were on the block so we hit every household)?

**Baseline fire statistics and impact on them** --Information will be collected by each city on its past trends in fires, deaths, and injuries and any visible initial impacts on them to see if the smoke alarms provided and information conveyed during home visits

make any difference in the bottom line of fires, deaths, injuries, and dollar loss. Most of this impact would follow the grant period.

The ideal baseline data is the fire experience of the particular households to which visited are made, and then their subsequent fire experience, tracked over the next several years. Any anecdotes of a save attributable to a newly installed smoke alarm would also be excellence to report.

**Change in Fire Department Attitudes and Approaches to Prevention**--We are to describe if anything changed with respect to how the fire department approaches prevention or thinks about prevention as a result of this project; new ways of doing prevention, new allies in the city, etc. For example, were volunteers from the neighborhood or service organizations used? Were line firefighters used, and if so how was that received? Failures are also to be noted; e.g., some departments tried to use line firefighters but were rebuffed by the union or the firefighters; others did not give them a choice, but simply requested they proceed; still others worked cooperatively with stations or the union to get concurrence on the project goals and methodology..

***When Required*** – The home visit data and the baseline data in each city is needed two months before the end of the project, to allow time for analyzing it, writing the draft report, getting each city and the evaluation subcommittee and the IFE to review it, and then putting out the final report. The report is the lasting knowledge about the project nationally. Knowing now what is required and doing a little advanced preparation will hopefully avoid a mad scramble by each city and TriData at the end of this project.

***Two Data Sets to be Submitted***– There are two sets of evaluation information for each city to amass. First is a database with information on each household visited. The core set of data needed on each home visit is shown on the home visit questionnaire. After the data is collected in the field using the questionnaire, the data should then be entered into the database. (Another, new approach is to collect the data electronically using an I-Pad or similar tool, and directly create the data base. The participating cities are free to add more data elements to the questionnaire to collect locally desired information, but we need to be sent just the core here. We provide guidance on how to fill out the questionnaire below.

The second set of data needed includes the information noted above—how the households were selected, fire experience, trends, changes in outcomes, changes in department approach to prevention, etc. . We provide more guidance on these, too, below.

## Home Visit Questionnaire

The questionnaire is to be completed for each home visit made in this project. It is one double-sided sheet of paper, including the release of liability paragraph if any smoke alarms are installed in the home. (See attached questionnaire.)

The questionnaire is based largely on the form that has been used by Dallas in the past several years, with some edits, rearrangements, additions, and deletions. Each city should enter the data from the hand-filled forms into the Access database. A city can add additional elements, but we only want the core data numbered consistently across cities. A city also can use record the data directly into an electronic pad or directly into a computer.

The homes to be visited are to be selected by each city. The intent of this project was to focus on high-risk homes (e.g., known to have elderly or people with disabilities) or homes in high fire risk neighborhoods.

The first line of the form is the **address of the home visited**, and the **name of the principal person** who acted as head of household or lead respondent during the visit. This person must be at least 18 years of age or older.

The type of home is one-family dwelling, duplex, mobile home, multifamily, or other. If the entry here or elsewhere on the form is "Other", meaning none of the check boxes, then write in what it is.

The "FD reps" are whomever the fire department had make the visit. They may be line firefighters, prevention personnel, volunteers not in the fire department, social or healthcare workers, or others. (Volunteer firefighters would be reported as firefighters. ) Usually a pair will be sent to each home to support each other and have witnesses to what transpired. Check the box or boxes that describe the team. We distinguish prevention personnel from line firefighters; prevention is anyone whose prime job is prevention or public education. Prevention personnel may be firefighters but we want to see where line personnel as opposed to prevention personnel are used for the home visits.

More than one box can be checked here; so if one person is a volunteer and another a firefighter, both boxes would be checked. If both were firefighters, only one box would be checked. If any city allows other than a pair to make the visit, that should be part of its description of its program approach.

The form then asks how many **smoke alarms** were **working,** and how many were **not working**. Obviously this requires testing them by pushing the test button on each. If the home has a private, hard-wired alarm system, do not test it, to avoid false alarms; rather, indicate how many smoke alarms were on the private system. If **batteries** are provided for any non-working alarms, note the number replaced. If any **smoke alarms are installed,** note the number, **type of alarm**, and **power source**. This will yield data to show the improvement in home safety in terms of increased smoke detection. Even if we have nothing else to show, this data is important because of the known high impact of working smoke alarms on life safety.

Some cities may wish to install all the smoke alarms required by local code, which might be as much as one per bedroom and hallway area. Others may wish to install one alarm and ask the household to get the rest themselves. The form asks if the number of smoke alarms at the conclusion of the visit **meets code**, and if not, was the occupant advised.

The form then asks about the **safety information delivered verbally** or with **written materials.** One item that should always be addressed by those conducting the visit is **how to test and maintain** the type of smoke alarms present. Another topic to always address is whether the household has a **home escape plan** and if they **practice** it. As a rough validity check, ask where their meeting place is; you don't have to write in what they say, just that they have some credible answer. Generally this would be a place outside like the mailbox in front of a house. If not a sensible place, like a particular room in the house, they should be so instructed.

Besides the block of questions on smoke alarms and escape plans, the form asks to write in any **other safety topics addressed verbally**, and to check what types of **safety literature** is left for the household. . The information provided may include injury safety as well as fire safety. This data on messages provided can later be used to see if this one-on-one public education during home visits makes a difference, and whether this mode has

greater impact than more general safety programs using the media, posters in public places, etc.

The last block of questions is on the demographics of the household. The questions on **own/rent**, **number of people living in the household, number 5 or younger, number 65 or older, and number disabled** should be self-evident. Disabilities can be physical or mental; it is up to the resident to say whether a person or persons in the household has a disability.

The question on **race/ethnicity** is sensitive. We ask the respondent about the racial and ethnic composition of the household. Multiple boxes can be checked if more than one category applies. Note that one response is "mixed" for people whose heritage includes more than one category.

### Entering Data into the Database

The data from the questionnaire needs to be entered into a simple Access database for analysis, which is enclosed. The questions and their order in the database match the questionnaire. Some fields are for numbers only (e.g., number of working smoke alarms in the home) and will not accept text in the answer. When finished entering data for a particular home visit, click "Enter New Record" at the top of the form to start a new record. This database is to be sent to TriData for analysis two months before the end of the project, as noted above. We also request that after about 50 or so smoke alarms are installed, you send that partial data base to TriData to make sure you are on the right track, and we can analyze the data.

### Baseline Fire Safety Data

The bottom line impact of this program should be a reduction in reported fires, deaths, injuries, and dollar loss. To assess whether such impacts occur, each city needs to provide the following for several years prior to starting the program, and then for several years after the programs.

**Trends in fires, deaths, injuries, and dollar loss citywide,** and preferably for the higher risk areas of the city to which the program is targeted, should be provided prior to the start of the program. That is, if you focus visits on an area of the city with low income households, we would like to see the trends in that area before and after the program. (Ideally, it would be for three years prior to installation, and as many months as possible after installation.) However, because installations tend to run late into the latter part of the grant period, and the numbers of installations are only in the thousands, it is unlikely that there will be adequate data to measure the impact of the smoke alarms during the grant period. But at least we should be able to say at the end of the grant that we have the baseline data for each city to continue the evaluation beyond the grant period.

Even better is to collect data on the fire experience of the particular households visited before and after the visit. Cities using NFIRS should be able to do this by address of the households. You should be able to evaluate over time whether there is a change in the fire experience of the particular households visited.

Note that the trend data should be expressed in the rates of incidence and casualties per 1,000 (or 100,000) population, or the raw totals for a fixed group of residences.

***Smoke Detector Usage Rates*** – It also would be desirable to provide data on the percent of households that have smoke alarms in your city, and how this varies by risk area

of the city, if you have that data. It is beyond the scope of this project to collect that data if you don't have it; we will collect data on the smoke alarm usage and status in the households visited, but it would be good to show that data in context of the overall city. For example, in your city 95% of households might have at least one smoke alarm, and 20% of the alarms are not working at a given time. In the high risk area, there might be only 80% of households with at least one smoke alarm, and 30% of them not working. In the high-risk households visited, the percent with working alarms should be 100% at the end of the visits.

***Number of Homes with Attempted Visits-*** While it is desirable to fill out the top part of the home visit form for every visit attempted, to record the address and reasons for non-admission, some departments or personnel will not do that. At a minimum, track the **total number of visits attempted**. This will show the magnitude of the effort made, and will allow computation of the percent of attempts that are successful. That can be used to shape future efforts. It is also useful to know if there are repeated attempts made to visit some homes. Each department can tally this information any way it wishes- just report the total number of attempts and number of households with multiple attempts..

## Qualitative Information

Qualitative information describing how the home visit program was implemented in each city is important to provide insights on changing the culture of the fire service with respect to prevention, and the targeting of programs, and the use of partnerships under an integrated risk management concept. The following information should be provided at the end of the project year for the evaluation report.

***How were the households chosen to receive home visits?*** – Was there an integrated risk management approach taken? (e.g., citywide analysis of geographic areas with highest residential fire rates; areas with known concentrations of elderly, or low income households, or selected ethnic/racial groups?) Was the choice of households or blocks left to local stations, which focused on higher risk areas they knew of? Was the program advertised in certain areas or citywide, and then households asked to request a visit if interested?

***How was the program run?*** – Was it run centrally, from the prevention bureau, or by the public educator or by a particular officer? Or was it decentralized, with each station or district deciding where to go? Other combinations are possible too.

***What was the receptivity of the line firefighters to implement this program?*** – How was the program explained to the firefighters? What was their willingness to participate before and after implementation? (e.g., were they reluctant then enthusiastic; reluctant and more reluctant). Any insights in how to change the culture to get the prevention job done and accepted?

***Was there any attempt to coordinate the program with other city or private agencies, such as social services and health services?*** – We know that in many cities internationally, the fire service liaised with local health and social services and police to identify specific high fire risk households, and even do testing of smoke alarms in the course of visits by nurses, meals on wheels, social workers and others .City mangers and citizens like synergism of services in tight budget times.

***Need help?*** – The above information should meet what we promised AFG in the proposal. We would be glad to answer questions on the data needed; contact Philip Schaenman at pschaenman@sysplan.com or (703) 351-8300.

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