

Running Head: STRATEGIES TO REDUCE COOKING FIRES

Leading Community Risk Reduction

Strategies to Reduce Home Cooking Fires

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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Abstract

The problem is that the City of Homewood has suffered a large number of residential fires due to cooking, which has resulted in significant property loss and numerous injuries. The purpose of this research was to develop and submit for approval a program to reduce the number of cooking fires in the City of Homewood. By conducting a comprehensive literature review and performing action research, the results are three different strategies designed to reduce the number of cooking fires. The first strategy is to embrace and encourage the integration of engineering controls in the home through technology. The second strategy is to develop a universal fire safety message aimed at reducing dangerous behaviors attributed to cooking fires in the home. The third and final strategy is to identify target groups and design specific fire safety messages and initiatives aimed at reducing the number of injuries and deaths from cooking fires.

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Introduction

One of the leading causes of residential fires in the United States is due to cooking. It accounts for thousands of injuries and nearly one hundred deaths every year. Tragically, most of these fires are preventable. Although these fires represent one of the largest causes of fires in residential structures, it generally results in a low monetary loss as compared to other causes, such as heating or electrical distribution (United States Fire Administration [USFA], 2006). Unfortunately, cooking fires do top the chart when it comes to injuries. In 2002, twenty-five percent of all fire related injuries were a result of cooking fires (USFA, 2006). According to Acting United States Fire Administrator Charlie Dickinson, “Simply being more attentive to the use of cooking material and equipment would greatly reduce these types of fires and injuries” (¶2, USFA, 2006).

The best approach to reducing these numbers is a proactive one that reaches out into the community through engineering, education or enforcement activities. The research problem is that the City of Homewood has suffered a large number of residential fires due to cooking, which has resulted in significant property loss and numerous injuries. The purpose of this research is to develop and submit for approval a program to reduce the number of cooking fires in the City of Homewood. Action research will be used to answer the following questions:

1. Identify what trends are common to cooking fires in the United States, Alabama and the City of Homewood.
2. What current interventions are in place to reduce the cooking fire problem?

3. How are other fire departments working to reduce the number of cooking fires in their community?
4. What interventions should be initiated to reduce the number of cooking fires in the City of Homewood?

Background & Significance

The City of Homewood is a community of 25,000 residents that lies nestled between Red Mountain and Shades Mountain in Jefferson County, Alabama. The residents of Homewood pride themselves in being part of a prestigious suburban community with quaint neighborhoods, spacious parks and a top ranked school system. Homewood has been in existence since 1926 when the communities of Hollywood, Edgewood and Oak Grove joined together. The first paid fire department was established with the purchase of a 1926 American LaFrance fire truck. Since that time, the fire department has grown to meet the needs of a robust suburban city that now consists of several major shopping centers, Samford University, Brookwood Hospital and Interstate 65 which runs through the heart of the city.

The City of Homewood is protected by a seventy member career fire department operating out of four fire stations that are geographically spaced throughout its eight square mile municipal boundary. Its suppression force consists of three engine companies, one truck company, one rescue company, one hazardous materials company and one shift commander. These crews rotate 24 hours on duty and 48 hours off duty. The Homewood Fire and Rescue Service responds to approximately 3000 calls for service per year ranging from fires to emergency medical service and hazardous materials

response. The Fire Prevention Bureau is staffed with one fire marshal and two fire inspectors. They have the responsibility of code enforcement and fire prevention.

Throughout the years, there have been many lives saved and many fires fought to protect this vibrant community. However, there is recurring fire that continues to plague this modern day suburb. Almost weekly, members of the Homewood Fire and Rescue Service are called out to investigate cooking fires. Most of the time, these fires are small and confined to the cookware or stove top. Sometimes, these fires escape the confines of the stove top and quickly spread throughout the structure, often with devastating effects. In December of 2004, firefighters were summoned to Valley Ridge Apartments where just such a fire was raging out of control. An unattended pan of grease had caught fire and spread throughout the apartment. As fire crews arrived, the fire was threatening several adjacent apartments and trapping residents. Although it only took firefighters a few minutes to bring the fire under control, the damage was significant. A careless act had caused thousands of dollars in damage and resulted in several injuries.

This problem is not unique to the City of Homewood. The cooking fire is one of the nations leading causes of residential fires. According to the United States Fire Administration [USFA], there were more than 185,000 cooking fires in 2002 alone. This accounted for 80 civilian deaths and \$481 million in property damage (USFA, 2006). In accordance with the efforts of the National Fire Academy's Leading Community Risk Reduction course, this research project is aimed at achieving the operational objective of the USFA to reduce the loss of life from fire by fifteen percent within five years. It also aims to assist the City of Homewood to develop a comprehensive risk reduction program (Department of Homeland Security [DHS], 2005). The Leading Community Risk

Reduction course is taught as part of the Executive Fire Officer Program, which is the premiere educational program of the National Fire Academy and provides leadership development to solve real problems and operationalize the initiatives set by the United States Fire Administration.

Literature Review

The purpose of the literature review is to establish some background and historical context for the topic of cooking fires. This began while the researcher was attending the National Fire Academy's Leading Community Risk Reduction course and visiting the Learning Resource Center located on campus. By using the internet and on-line catalog, several articles were retrieved that provide a picture of the problem on a national scale. Further internet searches revealed several additional publications that offer recommended fire safety messages and emerging technology designed to reduce cooking fires. The course manual from Leading Community Risk Reduction also provided information on the community risk reduction model.

One of the nation's leading organizations working toward risk reduction initiatives is the National Fire Protection Association [NFPA]. This private organization funds several research efforts each year aimed at identifying causes of fires. It further champions many risk reduction initiatives such as National Fire Prevention Week and Risk Watch, a comprehensive risk reduction program for school age children. One significant source of literature produced by the NFPA is the NFPA Journal where author Michael J. Karter Jr. provides an overview of the national fire problem by stating "In 2005, public fire departments responded to 1,602,000 fires in the United States" which is an increase of 3.3% over 2004 (p.46, Karter, 2006). A significant fact is that fire

departments responded to only 511,000 structure fires in 2005 compared to 1977 when fire departments responded to 1,098,000 structure fires (Karter, 2006). This is a 53% drop in nearly 20 years. Fire prevention efforts and improved building codes have made a significant impact on this overall reduction in fires. Fire deaths have also dropped dramatically over this same period. In 1977, there were 6,015 fire deaths in the home compared to only 3,030 in 2005. This represents a 50% reduction in total fire deaths in the home (Karter, 2006).

This still represents a significant number of preventable deaths. According to Karter, 82% of all fire deaths occur in the home and fire safety initiatives should target reducing these deaths. Karter recommends five major strategies:

1. More widespread public information on preventing fires with information on common causes of fatal home fires designed into fire safety messages.
2. Maintain smoke detectors and practice escape plans.
3. Aggressively pursue residential sprinklers.
4. Improve home products to reduce flammability.
5. Address the fire safety needs of high risk groups such as children and older adults.

In addition to the significant number of deaths that occurred in 2005, there was a slight increase in fire related injuries by 0.3% over 2004 to 17,925. Although, the encouraging fact is that from 1977 to 2005, overall fire injuries have dropped 43% from 31,275 reported in 1983 (Karter, 2006).

Author John Nicholson writes that cooking fires in the home are the leading cause of home fires and home fire injuries (Nicholson, 2006). In 2006, NFPA targeted its

annual Fire Prevention Week toward reducing cooking fires in the home. Titled “Prevent Cooking Fires: Watch What You Heat,” this initiative is aimed at preventing unattended cooking fires, which is the leading cause of home cooking fires (Nicholson, 2006).

Nicholson says that most cooking fires start with the ignition of common household items such as food or grease, cabinets, wall coverings and paper or plastic bags. Most of these fires are a result of human error rather than equipment malfunction (Nicholson, 2006). In addition to the home fire problem itself, Nicholson reports that 55% of civilians who were injured between 1999 and 2003 were injured while attempting to fight the fire themselves. Although most cooking fires remain small with 71% of cooking fires classified as confined to the container, 38% of all fire injuries and 8% of fire deaths are attributed to cooking fires (Nicholson, 2006).

Nicholson reports that most residents state they only left the food unattended for a few minutes when the fire started. However, it only takes a few minutes for a fire to start and get out of control (Nicholson, 2006). Nicholson makes several recommendations to prevent cooking fires:

1. Always use approved cooking equipment.
2. Never leave cooking food unattended.
3. Keep cooking area clean and clear of combustibles.
4. Enforce a three foot “kid-free zone” around stove.
5. Avoid loose fitting clothes that can catch fire around burners.
6. Never use wet oven mitts to avoid scald burns.
7. Keep potholder, oven mitt and lid close by in case of fire. If a fire starts, put on the oven mitt and slide the lid over the pot to smother the flames. Turn off

the stove and wait until it is completely cool to touch. Never use water or discharge an extinguisher into grease as it could splatter and spread the fire.

8. In the event of an oven fire, turn off the oven and keep the door closed.
9. In the event of a microwave fire, unplug the microwave and call the fire department.

Some patterns emerge in NFPA's research into cooking fires. First, most cooking fires are never reported to the fire department. Between 1983 and 1984, the Consumer Product Safety Commission conducted a one month survey to estimate the number of unreported cooking fires. The results were an astounding 12,244,000 fires that occurred but were never reported. Of these fires, 642,000 injuries or illnesses were reported (Nicholson, 2006). Nicholson also discusses that alcohol or drugs contributed to as much as 20% of cooking fire deaths. In addition, leaving food unattended while sleeping was attributed to 41% of home cooking fire deaths between 1999 and 2003 (Nicholson, 2006).

Several other factors represent disproportionate numbers related to cooking fire deaths. First, older adults and children under five suffered more deaths while those age 15-64 suffered more injuries (Nicholson, 2006). Another large target group is people with disabilities. Nicholson provides these ten design elements to help make kitchens a safer place for those with disabilities:

1. Universal Design – Make space to accommodate everyone.
2. Room to Move – Allow space for wheelchairs and walkers.
3. Extreme Makeover – Install appliances with easy access and controls.
4. Easy to Reach – Lower cabinets for easier access.
5. Lots of Light – Ensure sufficient lighting is available.

6. Adding Options – Consider a section of counter space 30” off floor.
7. A La Carte – Place common items on a rolling cart with pull-out drawers.
8. Side-by-Side – Consider a side-by-side refrigerator/freezer for easy access.
9. Hardware Helpers – Install easy-to-grasp “D” handles.
10. Remote Control – Add remote control lighting for easy access from anywhere.

Author Amy Lebeau offers up some additional tips for preventing cooking fires in the home. As she states, “We need to give people safety advice they can use and the blanket statement of never leaving cooking fires unattended just doesn’t work anymore” (p.44, Lebeau, 2006). Lebeau states that cooking fires are the leading cause of home fires and home fire injuries. Of these fires, unattended food tops the list as causes of cooking fires (Lebeau, 2006). Additional recommendations include the fact that you should always stay in the kitchen when frying, grilling or broiling. If you must leave the kitchen for any length of time, turn off the stove. When simmering, boiling, baking or roasting, check it regularly and always remain in the home. Using timers can also help remind you the oven or stove is on (Lebeau, 2006). Children are also very vulnerable to injury around the kitchen. In addition to keeping a three foot safety zone around the stove, Lebeau recommends using back burners on the stove and turn pot handles back to reduce the possibility of food being knocked over. Also, never cook while holding a small child (Lebeau, 2006).

The USFA has performed extensive data analysis to determine the causes of fire throughout the United States. In 2007, the USFA released a joint report with the NFPA titled “Behavioral Mitigation of Cooking Fires through Strategies Based on Statistical Analysis.” This report highlights some trends and identifies some critical causes of

cooking fires between 1999 and 2003. According to the USFA, unattended cooking equipment was a factor in 37% of overall cooking fires and 42% of cooking fire deaths (USFA, 2007a). Even more alarming, unattended deep fryer accounted for 45% of cooking fires and range fires accounted for 43%. People that are drowsy or impaired by alcohol or drugs when cooking begins are more likely to stop paying attention to their cooking (USFA, 2007a). Other significant causes of cooking fires include combustibles too close to the heat source. This was the case in 13% of cooking fires during this same time period. These combustibles include loose clothing, potholders, oven mitts, wooden utensils, paper or plastic bags, food packaging, towels or curtains (USFA, 2007a). According to the USFA, clothing was low in frequency but caused a disproportionate number of fire related injuries and deaths in the older adult population.

Prevention of cooking fires is a paramount goal for the USFA. In the report, the authors describe strategies that should be employed by local fire departments to help reduce these numbers. Although there are many messages about how to confront cooking fires throughout the country, the consensus is that water should never be used on grease fires or fires that involve electrical components. The most acceptable approach to a small fire is to place the lid over the pan and smother the fire (USFA, 2007a). In Europe and Australia, fire blankets are often recommended but are rare in the United States. Another important tool for fighting cooking fires is the fire extinguisher. Unfortunately, if used improperly, a fire extinguisher can actually spread the fire. Training is most effective for properly extinguishing cooking fires with extinguishers (USFA, 2007a).

Regardless of the techniques used to fight the home cooking fire, the best approach is to prevent it from occurring in the first place. The USFA recognizes that

traditional fire safety messages have been effective in reducing the numbers of cooking fires but recommends a more holistic approach to prevention methods. In the long term, technology may be the best solution to reducing cooking fires such as stoves that shut down burners before fires start (USFA, 2007a). Overall, the USFA offers these recommended safety messages based on their research of fire prevention programs:

1. Choose the right cooking equipment. Install it and use it properly.
2. Watch what you heat!
3. Stay alert. Avoid alcohol and drugs while cooking.
4. Use equipment for intended purposes only.
5. Keep things that can catch fire and heat sources apart.
6. Know what to do if your clothes catch fire.
7. Know what to do if you have a cooking fire.
8. Prevent and treat scalds and burns.
9. Protect children from scalds and burns.
10. Install and use microwave ovens safely.
11. Use barbeque grills safely.
12. Have working smoke alarms.

The 2006 Fire Safety Census conducted by Liberty Mutual and the International Association of Firefighters [IAFF] revealed most Americans are more concerned about a fire in their home than a terrorist attack or any other form of natural disaster (Liberty Mutual, 2006). According to Paul Condrin, Liberty Mutual President, 82% of the 3675 of total fire deaths in 2005 occurred in the home (Liberty Mutual, 2006). Disturbingly, 85% of respondents acknowledged that most fires start in the kitchen, yet 26% admitted

leaving unattended food cooking on the stove or in the oven. Another 16% of respondents also admitted disabling the smoke detector while cooking (Liberty Mutual, 2006). IAFF General President Harold Schaitberger says, “There are fundamental safety measures that everyone should be practicing. These precautions can really prevent tragedies, and they’re not that difficult to do at all” (¶6, Liberty Mutual, 2006).

There are several emerging technologies designed to better combat the cooking fire problem in the United States. Author Jim Crawford discusses one such technological advance in the area of stove top fire prevention. Crawford acknowledges that the fire service has delivered cooking fire prevention messages for years. The use of baking soda and fire extinguishers in the home are two techniques that can be used to extinguish a cooking fire (Crawford, 2005). However, these methods increase the potential for fire spread and injury or death. A new option on the market shows tremendous promise at preventing cooking fire before they start, called the SafeTelement. Crawford explains that this device is a stovetop cover that dissipates heat and eliminates cooking fires all together. This cast-iron device was shown to make water boil but would not ignite a piece of paper (Crawford, 2005).

Fire extinguishers have also undergone an evolution toward better suppression of cooking fires. As author Jerry Rosendahl describes, a relatively new type of fire extinguisher has made a big impact on fighting cooking fires involving animal or vegetable oil, fat and grease. The Class K fire extinguisher contains a clear, odorless liquid foam mixture of potassium acetate, potassium citrate and potassium carbonate salt (Rosendahl, 2006). This chemical agent mixture is discharged in a fine mist that eliminates splashing, which can cause the fire to spread. An additional benefit from the

Class K extinguisher is that it has been tested to 100,000 volts to assure safety when using around electrical components (Rosendahl, 2006). Rosendahl further explains that Class K extinguishers are effective tools in combating cooking fires when used in conjunction with ventilation systems and hood suppression systems (Rosendahl, 2006).

Other products currently being developed are StoveTop FireStops and smart stoves. StoveTop FireStop is a 12-ounce automatic fire extinguisher that attaches magnetically to the hood above the range. These products are currently installed in homes, apartment complexes, military bases providing 24 hour a day, seven day a week passive protection (Williams-Pyro, 2007). The StoveTop FireStops use gravity to release a fire suppression powder onto the range to extinguish a cooking fire. Another product is the “smart stove,” also known as a fire safe oven, and it is designed to shut itself off before food starts to burn. This doesn’t completely solve the problem but it does reduce the potential to start a fire (Carson, 1999).

Solutions 2000 addresses the methodology behind effective fire safety messages. This combined effort of North America’s foremost authorities in fire protection and prevention identifies three target populations that should be addressed with fire safety messages. These are young children, older adults and people with disabilities. These messages should be designed around the following universal initiatives:

1. Promote the installation of home fire sprinklers.
2. Form a coalition that is concerned with fire safety for young children, older adults and people with disabilities.
3. Mandate built-in fire safety in new construction because it is less expensive than later retrofitting.

4. Promote life safety, not just fire safety, for all audiences.

These messages should follow the recommended risk reduction methodology called the three E's: Engineering, Education and Enforcement (DHS, 2005). Solutions 2000 provides an example of preventing fires from smoking material using the three E's method. The first E, engineering, involves designing ignition resistant cigarettes. The second E, education, involves educating smokers to be more careful. The third E, enforcement, is to strictly enforce no-smoking regulations (Carson, 1999). The three E's were first coined by President Harry S. Truman in 1947 at a conference on fire prevention. Since that time, two additional E's have been added, economic incentive and emergency response (DHS, 2005).

This literature review details how significant the cooking fire problem is in the United States. The next section of this paper describes how the research was conducted to provide further information about how to build an effective prevention program for home cooking fires.

Procedures

Definition of Terms

Survey Monkey – This is a free web service that offers subscribers the ability to conduct limited surveys through the internet.

TRADENET – The Training Resources and Data Exchange (TRADENET) program is a regionally based network designed to foster the exchange of fire-related training information and resources among Federal, State, and local levels of government (USFA, 2007b).

Automatic Alarm Systems - An active fire protection system that detects fire or smoke and notifies the occupants, summons the fire service, and controls all the fire alarm components in a building (Wikipedia, 2007).

Smart Stoves – Cooking appliances designed to automatically detect ignition characteristics and automatically turn themselves off (Carson, 1999).

StoveTop FireStop – Magnetic canisters mounted above the range designed to release a fire suppression powder by gravity when activated (Williams-Pyro, 2007).

This action research project was selected after the researcher responded to several significant residential fires in the City of Homewood where cooking was determined to be the cause. The cooking fires were determined to be preventable in most cases. In addition, the Leading Community Risk Reduction course at the National Fire Academy provided an insightful look at initiatives that could be taken to reduce loss from fire and injuries and deaths.

The Learning Resource Center at the National Fire Academy provided a wealth of resources such as articles and research papers directed at reducing the numbers of cooking fires. There were tremendous amounts of prior research that provided the researcher with many sources to conduct a thorough literature review. To extend the knowledge base further, a questionnaire was developed based on the Leading Community Risk Reduction course's recommended methodology of engineering, education and enforcement. This questionnaire was designed through a free internet web survey site called Survey Monkey.

This web service offered the researcher a free method to retrieve responses through the internet via email. The email link was forwarded to the USFA Training

Resources and Data Exchange Network [TRADENET] email service for distribution to a broad cross section of the fire service. On September 22, 2007, the researchers request was broadcast out through TRADENET. This was done to capture knowledge from a wide range of fire service experts from all across the United States.

The questions were grouped according to the methodology recommended by the Leading Community Risk Reduction course of engineering, education and enforcement. To address the first research question, the first three questions attempted to assess the respondent's perspective on cooking fire trends in their respective community by asking the following question, "How do you rate the residential cooking fire problem in your community?" The respondent was provided a five point scale from severe to negligible. Question two asked, "What factors do you feel contribute to the majority of residential cooking fires in your community?" The answer choices were, "unattended food, children cooking, elderly cooking and equipment malfunction." Finally, question three of the first section assessed the financial impact of cooking fires in their respective communities. The answer choices were, "under \$50,000, \$50,000 to \$100,000, \$100,000 to \$500,000, \$500,000 to \$1 million and over \$1 million."

Section two of the questionnaire is aimed at assessing engineering controls being employed in the respondent's respective community. Question one asked, "What engineering controls are in use by a majority of residents to reduce the effects of cooking fires?" The answer choices were, "fire sprinklers, automatic alarms systems, smart stoves, FireStop canisters, and fire extinguishers." The respondents had the opportunity to select all that apply and add additional items not included in the list. Question two asked if their community offered discounted insurance rates as incentives to residents for

installing engineering controls to reduce the effects of cooking fires. The answer choices were, “yes, no and I’m not sure.”

Section three of the questionnaire is aimed at assessing the educational efforts of their respective departments toward reducing cooking fires. Question one asked, “How does your department rate the importance of education as a tactic to reduce cooking fires?” The respondents were given a range to select from very important to no education performed. Question two assessed what target groups their department addresses for education to reduce cooking fires. The answer choices were, “young children, older adults, people with disabilities, college students or Hispanic population.” The respondents were also given the opportunity to add additional groups not listed.

The final section of the questionnaire asked questions related to enforcement activities in their respective departments. Question one asked, “Which type of residence does your community require to be inspected?” The answer choices were, “single family dwellings, hotels, college dormitories, multi-family dwellings, group homes and retirement/assisted living facilities.” Again, the respondents were given the opportunity to add additional comments not listed in the answer choices. Question two assesses who is responsible for enforcement activities at residences and how often do they receive training related to this activity. The respondent was given a matrix to select “fire marshal, fire inspectors, company officers, firefighters or civilian inspectors.” In addition to the selected category, the respondent was asked to indicate how often they received training which ranged from no formal training to annual training. The questionnaire is included as Appendix A of the report.

There were several limitations to this type of research. The method of delivery for the questionnaire made it difficult to determine the percentage of return. Although, there were seventy seven surveys started and seventy four (96%) were completed. Another limitation was the ability for the respondent to skip certain questions throughout the questionnaire. The researcher was also unable to determine the identities of the respondents to the questionnaire.

Results

The results of the research helped reinforce information gained in the literature review related to research question one, which was to identify what trends are common to cooking fire in the United States, Alabama and the City of Homewood. Section one of the questionnaire aimed at identifying trends in cooking fires in the respondent's respective community. Question one asked how they would rate the residential cooking fire problem in their community. Of the 85% of respondents that answered this question, the majority, or 40.9%, rated the cooking fire problem as moderate. Other responses 28.8% rated it as slight, 19.7% rated it as serious, 9.1% rated it as negligible and 1.5% rated it as severe.

The second question was aimed at determining some common factors that lead to the majority of cooking fires in their respective communities. Of the 97% of respondents that answered the question, 97.3% identified unattended food as the top factor causing home cooking fires. Elderly cooking was ranked second at 21.3% and children's cooking was ranked third, with 6.7%. Five additional comments were added to this question with four identifying alcohol or drug impairment as causes. One additional comment included unfamiliarity with cooking equipment from weekend tourists.

The third and final question aimed at determining common cooking fire trends was an assessment of the financial impact from home cooking fires in 2006. Respondents ranked “under \$50,000” as the top category with 34.7% followed closely by “\$100,000-\$500,000” at 30.7%. The third ranking was “\$50,000-\$100,000” at 22.7% and “\$500,000-\$1 million” came in fourth at 9.3%. Two respondents or 2.7% selected “Over \$1 Million” category. This question was also answered by 97% of total respondents to the questionnaire.

In accordance with the recommended methodology of assessing effective fire prevention programs through the three E’s, the second section of the questionnaire was aimed at assessing what engineering controls were most prevalent in the respondent’s respective community. This section was also aimed at answering the second research question, “What current interventions are currently in place to reduce the cooking fire problem?” Question one was answered by 60% of respondents to the overall questionnaire. Eighty-nine percent ranked fire extinguishers at the most prevalent engineering control followed by automatic alarms systems at 26.1%. Fire sprinklers were ranked third at 8.7% and no responses were given to smart stoves or FireStop canisters. Five additional responses indicated smoke detectors and one response indicated lids and baking soda.

To determine if economic incentives were in effect to encourage engineering controls, the second question asked if the respondent’s respective community offered discounted insurance rates. Of the 97% that answered the question, a majority or 53.3% indicated that discounted insurance rates were not offered in their community. A

significant number or 34.7% were not sure about the discounts and only 12% indicated there were economic incentives available in their community.

The third section of the questionnaire follows the next E of education. In addition, it is aimed at answering the third research question of how other departments are working to reduce the numbers of cooking fires in their community. Question one asked the respondent to rank the importance that education plays in their respective department as a tactic to reducing cooking fires. Ninety-one percent of total respondents answered this question and ranked “Very Important” as the top choice with 58.6%. This was followed by “Somewhat Important” as second with 27.1%, “Not Very Important” as third with 8.6% and 5.7% responded that no education was performed.

Question two in the education section asked which target groups did the respondents department address for education to reduce cooking fires. Eighty-three percent of respondents answered this question. The top two target groups were “Young Children” and “Older Adults” with 73.4% and 71.9% respectively. The third highest target group was “People with Disabilities” with 25% of responses followed by “College Students” at 18.8% and, finally, “Hispanics” at 6.3%. Additional comments included four responses that no program is currently in place and three responses that all age groups were targeted.

The third and final section addresses enforcement. It is the third E in the assessment of risk reduction activities and, again, contributes to the third research question of how other department s are working to reduce the numbers of cooking fires in their community. Question one asks respondents to indicate which type of residence in their community is required to be inspected. Ninety-one percent of respondents answered

this question and ranked “Retirement/Assisted Living” at the top with 92.9% followed by “Hotels” at 84.3% and “Group Homes” at 82.9%. “Single Family Dwelling” and “Multi-Family Dwelling” were rated at 2.9% and 54.3% respectively. “College Dormitories” also had a strong indication at 45.7%.

Question two in the enforcement section was a matrix design that asked two questions. The first part asked who was responsible for conducting enforcement activities and how often they receive training related to this activity. The top ranked category was “Fire Inspectors” at 90.2%. Respondents indicated that 62.7% of personnel that fall into this category receive annual training followed by 25.5% that receive monthly training. Finally, 9.8% of fire inspectors have no formal training.

The second highest category was, not surprisingly, “Fire Marshal” with 85.7%. Of the personnel that fall into this category, 52.4% receive annual training related to this activity. Nineteen percent receive monthly training and 9.5% have no formal training. “Company Officer” received a strong rating at 50% having inspection responsibilities. Of these, 50% receive annual training and 8.8% receive monthly training. Surprisingly, 44.1% of respondents indicated that company officers have not received any formal training related to their inspection responsibilities. “Firefighters” are used 44.1% of the time to conduct inspection responsibilities. Training seemed evenly split with 47.1% with annual training and 47.1% with no formal training. Finally, “Civilian Inspectors” are used 64.3% of the time to inspect. Fifty percent of these civilians receive annual training and 42.9% have no formal training.

Discussion

Home cooking fires are the leading cause of structure fire in the United States. Each year hundreds of deaths and thousands of injuries are attributed to cooking fires. The NFPA reports that overall fires have risen 3.3% from 2004 to 2005. However, since 1977, structure fires have declined by almost 50% (Karter, 2006). The majority of these structure fires have been caused by cooking. Results from the researcher's questionnaire tends to agree with the literature considering 60.6% of respondents indicated that cooking fires present a serious or moderate risk in their respective community. In addition to the significant numbers that cooking fires represent, these types of fires are responsible for hundreds of deaths and thousands of injuries each year. The USFA and the NFPA agree that 82% of all fire deaths occur in the home and cooking remains the leading cause of fires (USFA, 2007a).

Other organizations such as Liberty Mutual and the IAFF have also weighed into the discussion by presenting research that points to cooking fires as the leading cause of home fire deaths in the United States. According to Liberty Mutual and the IAFF, 82% of the 3675 total fire deaths in 2005 occurred in the home. Twenty-six percent admitted leaving unattended food cooking on the stove or in the oven. Another 16 percent of respondents also admitted disabling the smoke detector while cooking. Fortunately, most of these fires are preventable by following some very simple common sense guidelines (Liberty Mutual, 2006).

To address the first research question, the common trend that prevails in the literature and the research results points to unattended food being a leading cause of cooking fires. According to the USFA, unattended cooking equipment was a factor in

37% of overall cooking fires and 42% of cooking fire deaths (USFA, 2007a). This directly correlates to the research where respondents reported unattended food as the number one cause of home cooking fires at a rate of 97.3%. The NFPA also reports a significant number of cooking fires are caused by impairment from drugs or alcohol (Nicholson, 2006).

Author John Nicholson writes that most residents state they only left the food unattended for a few minutes when the fire started (Nicholson, 2006). Author Amy Lebeau agrees by offering that simply providing a blanket statement it is unacceptable to leave unattended food cooking just doesn't work any more (Lebeau, 2006). People should be given more specific guidelines when leaving food unattended such you should always stay in the kitchen when frying, grilling or broiling. If you must leave the kitchen for any length of time, turn off the stove. When simmering, boiling, baking or roasting, check it regularly and always remain in the home. Using timers can also help remind you the oven or stove is on (Lebeau, 2006).

Although the number of cooking fires is very large throughout the United States, the financial impact remains very low with 71% of cooking fires classified as confined to the container (Nicholson, 2006). This agrees with the research responses that 57.4% of all cooking fires in the respondent's respective community fall under \$100,000 in damages. Unfortunately, hundreds of fire deaths and thousands of fire related injuries still occur as a result of these cooking fires.

The second research question asks what interventions are currently in place to reduce the number of cooking fires. This also addresses the first E, engineering, in the Risk Reduction Strategy recommendation by the National Fire Academy. Several journal

authors offer some technical options currently available on the market today. Author Jim Crawford discusses the SafeTelement device designed to dissipate heat and prevent ignition of cooking fires (Crawford, 2005). Author Jerry Rosendahl discusses a new type of fire extinguisher that has been specifically designed to combat the cooking fire without splashing or conducting electricity. The new Class K extinguisher has made a big impact on fighting cooking fires involving animal or vegetable oil, fat and grease (Rosendahl, 2006). Finally, internet searches have revealed products such as smart stoves that turn off when fire is detected (Carson, 1999) and FireStop StoveTop canisters that release fire suppression powder through gravity to extinguish range fires (Williams-Pyro, 2007).

The research questionnaire indicates that of all of the technology available on the market, the most prevalent engineering control available in their respective community is the fire extinguisher by 89.1%. Automatic alarm system followed behind at 26.1%. Unfortunately, none of the respondents reported smart stoves or FireStop canister in their communities. Finally, 53.3% respondents reported that there were no economic incentives available for having engineering controls installed.

The third research question aims to assess how other fire departments are working to reduce the number of cooking fires in their communities. Following the National Fire Academy's Risk Reduction Strategy, this question addresses the second E, education. Several journal authors have offered recommendations on designing universal fire safety messages and targeting specific behaviors related to preventing cooking fires. First, author Michael J. Karter Jr. recommends five major strategies aimed at reducing the number of fires in the home. These strategies are to provide the public information on the most common causes of fatal home fires, maintain smoke detectors and practice escape

plans, pursue residential sprinklers, improve products to reduce flammability and, finally, target high risk groups, such as young children and older adults, with specific fire safety messages.

Karter's strategies agree with Solutions 2000's universal initiatives to promote home sprinkler installation, form coalitions to promote fire safety in young children, older adults and people with disabilities, mandate built-in fire safety in new construction and promote life safety, not just fire safety (Carson, 1999). These recommendations are reflective in the research responses obtained from the questionnaire that 85.7% of respondents rate public education as extremely important or somewhat important as a tactic to reduce the number cooking fires. Respondents also agree that the recommended target groups of young children, older adults and people with disabilities should be addressed.

The common educational recommendations from journal authors and professional organizations cited in the literature review include the following:

1. Watch what you heat! Never leave cooking food unattended.
2. Stay alert. Avoid alcohol and drugs while cooking.
3. Have working smoke alarms and test them regularly.
4. Keep cooking area clean and clear of combustibles.
5. Enforce a three foot "kid-free zone" around stove.
6. Avoid loose fitting clothes that can catch fire around burners and know what to do if your clothes catch fire.
7. Never use wet oven mitts to avoid scald burns.

8. Keep potholder, oven mitt and lid close by in case of fire. If a fire starts, put on the oven mitt and slide the lid over the pot to smother the flames. Turn off the stove and wait until it is completely cool to touch. Never use water or discharge an extinguisher into grease as it could splatter and spread the fire.
9. In the event of an oven fire, turn off the oven and keep the door closed. In the event of a microwave fire, unplug the microwave and call the fire department.
10. Use barbeque grills safely.

The final E in the Risk Reduction Strategy is enforcement. The literature review reveals several recommendations to pursue developing technologies aimed at reducing the number of cooking fires. Further research indicates that single family dwelling have a very small number of inspection requirements at only 2.9%. Considering this is the location of most fatal home fires, it indicates there may be a disparity that could be addressed through voluntary inspections.

This leads the researcher to answer the last research question, “What interventions should the Homewood Fire and Rescue Service initiate to reduce the number of cooking fires in the City of Homewood?”

Recommendations

As a result of the research conducted for this paper, the researcher recommends that the Homewood Fire and Rescue Service take a proactive approach to preventing cooking fires in the home. Based on the literature review and the research, cooking fires have been reduced in recent years but still present a significant problem across the United States and in the City of Homewood. The Leading Community Risk Reduction

recommends following the three E's of engineering, education and enforcement when developing strategies.

In response to the first research question concerning the common trends in cooking fires, several have been identified. The most prevalent trend is unattended cooking fires that include people impaired by alcohol and drugs or sleeping. Other trends involved have been identified that cause disproportionate number of deaths and injuries in young children, older adults and people with disabilities. Based on the literature review and the research, three recommended strategies have been developed to reduce the number of cooking fires.

The first strategy is to embrace and encourage the integration of engineering controls in the home. The utilization of technology has been discussed as the best long-term solution to reducing cooking fires in the home. These engineering controls should include the following recommendations:

1. Smoke Detectors
 - a. Ensure smoke detectors installed near kitchen.
 - b. Test smoke detector monthly.
 - c. Change batteries annually.
 - d. Never disable smoke detector when cooking
2. Fire Extinguisher
 - a. Install a Class K extinguisher in an accessible location.
 - b. Attend training in proper use of extinguisher.
3. Fire Sprinklers
 - a. Recommend retrofitting kitchens with sprinklers

- b. Require new construction to install kitchen sprinklers
 - c. Encourage economic incentives for sprinkler installation.
4. Retrofit kitchens with these products designed to reduce cooking fires.
- a. StoveTop FireStop canisters.
 - b. SafeTelement stove top covers.
 - c. Smart Stoves.

The second strategy is to develop a universal fire safety message aimed at reducing dangerous behaviors attributed to cooking fires in the home. This message should consist of the following recommended behaviors:

1. Never leave cooking food unattended.
 - a. Never leave the kitchen when frying, grilling or broiling.
 - b. Never leave the home when simmering, boiling, baking or roasting.
 - c. Use kitchen timers to remind you about cooking food.
 - d. If you must leave, turn off the stove or oven.
2. Stay alert. Avoid cooking food when...
 - a. Impaired by alcohol
 - b. Impaired by medications or drugs
 - c. Sleepy or drowsy

The third strategy is to identify target groups and design specific fire safety messages and strategies aimed at reducing the number of injuries and deaths from cooking fires. The following target groups should be included:

1. Young Children (under age 5)
 - a. Enforce a “kid-free” zone of three feet around the stove.

- b. Use back-burners and turn pot handles back when cooking.
 - c. Never cook while holding small children.
- 2. Older Adults (over age 65)
 - a. Avoid cooking food when impaired by medication
 - b. Utilize kitchen timers as reminders that food is cooking.
 - c. Avoid loose fitting clothing around burners while cooking food.
- 3. People with Disabilities
 - a. Universal Design – Make space to accommodate everyone.
 - b. Room to Move – Allow space for wheelchairs and walkers.
 - c. Extreme Makeover –Install appliances with easy access and controls.
 - d. Easy to Reach – Lower cabinets for easier access.
 - e. Lots of Light – Ensure sufficient lighting is available.
 - f. Adding Options – Consider a section of counter space 30” off floor.
 - g. A La Carte – Place common items on a rolling cart with pull-out drawers.
 - h. Side-by-Side – Consider a side-by-side refrigerator/freezer for easy access.
 - i. Hardware Helpers – Install easy-to-grasp “D” handles.
 - j. Remote Control – Add remote control lighting for easy access from anywhere.

One of the most important aspects of creating a successful cooking fire prevention program is obtaining support from stakeholders in the community. These stakeholders may include, but not limited to, elected officials, business professionals, insurance

agencies and advocacy groups. Together, these stakeholders and fire service professionals can form critical coalitions designed to reduce cooking fires within the city of Homewood. These coalitions can be used to influence residents to take these recommendations and apply them inside their own homes.

In conclusion, to achieve a measurable reduction in the number of cooking fires, it will take a holistic and comprehensive approach. This approach must include a strong coalition that is fully informed of the facts surrounding the severity of this problem. By addressing the three recommended strategies of embracing technology, and by changing dangerous behaviors and targeting high risk groups, significant progress can be achieved toward reducing the stated operational goals of the United States Fire Administration.

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Appendix A - Residential Cooking Fires Questionnaire

Introduction Letter

September 22, 2007

Dear Fire Service Professional,

My name is Brian Bonner and I am currently a student in the National Fire Academy's Executive Fire Officer Program. I am conducting research on reducing residential cooking fires in my community. Please take a few minutes of your time to complete a short survey to assist me in my research. Please click the link below or copy and paste it in your address bar.

http://www.surveymonkey.com/s.aspx?sm=x33qAuikbXSe5Ipu_2feKPzw_3d_3d

Thanks in advance for your time and effort in completing the survey.

Lt. Brian C. Bonner
Homewood Fire and Rescue Service
Homewood, AL 35209
205-945-9848 – Fire Station #3
205-332-6154 – Administration
205-332-6956 – Fax
205-283-2956 – Mobile
brian.bonner@homewoodal.org

Appendix A - Residential Cooking Fires Questionnaire

Section 1 – Cooking Fire Trends

1. How do you rate the residential cooking fire problem in your community?

Severe _____ Serious _____ Moderate _____ Slight _____ Negligible _____

2. What factors do you feel contribute to the majority of residential cooking fires in your community?

_____ Unattended Food

_____ Children Cooking

_____ Elderly Cooking

_____ Equipment Malfunction

Other _____

3. In 2006 what was the financial impact of cooking fire loss in your community?

_____ Under \$50,000

_____ \$50,000 - \$100,000

_____ \$100,000 - \$500,000

_____ \$500,000 - \$1 Million

_____ Over \$1 Million

Appendix A - Residential Cooking Fires Questionnaire

Section 2 – Engineering Controls

1. What engineering controls are in use by a majority of residents to reduce the effects of cooking fires? (Check all that apply)

_____ Fire Sprinklers

_____ Automatic Alarms Systems

_____ Smart Stoves

_____ StoveTop FireStop canisters

_____ Fire Extinguishers

Other _____

2. Does your community offer discount insurance rates as incentives to residents for installing engineering controls to reduce the effects of cooking fires?

_____ Yes

_____ No

_____ I'm not sure

Appendix A - Residential Cooking Fires Questionnaire

Section 3 – Education Efforts

1. How does your department rate the importance of education as a tactic to reduce cooking fires?

_____ Very Important

_____ Somewhat Important

_____ Not Very Important

_____ No Education Performed

2. What target groups does your department address for education to reduce cooking fires?

_____ Young Children

_____ Older Adults

_____ People with Disabilities

_____ College Students

_____ Hispanics

Appendix A - Residential Cooking Fires Questionnaire

Section 4 – Enforcement Activities

1. Which type of residence does your community require to be inspected (Check all that apply)

_____ Single Family Dwelling

_____ Multi-Family Dwelling

_____ College Dormitories

_____ Retirement/Assisted Living

_____ Group Homes

_____ Hotels

2. Who is responsible for conducting enforcement activities at residences and how often do they receive training related to this activity?

	Inspection Responsibility	No Formal Training	Monthly Training	Annual Training
Fire Marshal	_____	_____	_____	_____
Fire Inspectors	_____	_____	_____	_____
Company Officers	_____	_____	_____	_____
Firefighters	_____	_____	_____	_____
Civilian Inspector	_____	_____	_____	_____