Evaluation of the K-1st Grade Juvenile Fire Safety Education Program in Margate, Florida

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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.

Signed: _____

Abstract

The problem is that Margate Fire Rescue (MFR) has not evaluated its current kindergarten and 1st grade education program to determine if it has led to a reduction in the number of juvenile related fire incidents. The purpose of this research was to evaluate the current kindergarten and 1st grade fire education program used by the MFR Fire Prevention Division, in terms of pre- and posttest learning and fire incident data. The descriptive research method will be used to answer the following questions: (a) What were the results of the kindergarten fire education program pre and posttests used by the MFR Fire Prevention Division? (b) What were the results of the first grade fire education program pre- and posttests used by the MFR Fire Prevention Division in terms of learning retention? (c) What was the number of juveniles referred to the Juvenile Fire Setter Program since 2003 from the City of Margate? (d) What was the number of juveniles referred to the Juvenile Fire Setter Program since 2003 from other Broward County cities? (e) What were the demographics of the juveniles referred by MFR and the other cities within Broward County, Florida? The procedures used for this research included a literature review, analysis of kindergarten and 1st grade pre- and posttest scores and collection and analysis of juvenile referrals to a county juvenile fire setters program by MFR and other departments

within Broward County, Florida. Results indicated that the pretest scores were lower than the posttest scores for both age groups. Additionally, MFR showed a reduction in juvenile referrals while several other departments showed an increase. Recommendations included developing a more reliable pre- and posttest and continuing to monitor and analyze data from both the prevention education program as well as juvenile referrals.

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Introduction

The city of Margate has a population of 54,602, of which 10.8% are between the ages of five and fourteen. (2007 Census estimate) These children are served by three public schools and three private schools within the city limits. Margate Fire Rescue (MFR) is the sole provider of fire, EMS and fire prevention for the city. One of the focuses of the fire prevention division is the presentation of fire prevention education and intervention to the younger population.

The problem is that Margate Fire Rescue (MFR) has not evaluated the current kindergarten and first grade education program to determine if it has led to a reduction in the number of juvenile related fire incidents.

The purpose of this research was to evaluate the current kindergarten and first grade fire education program used by the MFR Fire Prevention Division, in terms of pre- and posttest learning and fire incident data.

The descriptive research method will be used to answer the following questions: (a) What were the results of the kindergarten fire education program pre- and posttests used by the MFR Fire Prevention Division? (b) What were the results of the first grade fire education program pre- and posttests used

by the MFR Fire Prevention Division in terms of learning retention? (c) What was the number of juveniles referred to the Juvenile Fire Setter Program since 2003 from the City of Margate? (d) What was the number of juveniles referred to the Juvenile Fire Setter Program since 2003 from other Broward County cities? (e) What were the demographics of the juveniles referred by MFR and the other cities within Broward County, Florida?

To answer these questions, data was collected and analyzed from pre- and posttests administered to the kindergarten and first grade classes during fire education presentations. The data was compiled and entered into the SPSS statistical analysis program. Pearsons Correlation coefficient was used to examine the reliability of the administered program data.

After this, data on juvenile referrals to the Broward County Juvenile Fire Setter Prevention and Intervention Program (JFPIP), was collected and analyzed. Included were the number and demographics of the juveniles referred to the program from the City of Margate as well as other participating cities. The resulting data values were compared in an attempt to determine if MFR’s fire education programs are making a difference in the number of juveniles referred to the program.

Background and Significance

Margate Fire Rescue has been providing fire and EMS services to the citizens of Margate since the early 1970s. During that time, the Fire Prevention Division has also been responsible for the public education programs. Programs were presented on an irregular basis and consisted of presentations of Stop, Drop and Roll and calling 911 for emergency. Beginning in 2006, after MFR received a grant for the purchase of a mobile classroom, the Fire Prevention Division began an organized program to reach the school age children of Margate. This program drew heavily on the NFPA Learn Not to Burn program. The program was presented over a 3-year period, beginning with preschool aged children.

Every year, during September, all the preschool and day care facilities in the city of Margate are visited by an MFR fire engine. The engine company personnel present simple concepts such as Stop, Drop and Roll, call 911 and crawl low in a fire. The children are then shown a firefighter in firefighting gear. This is done to help relieve their fears of the firefighters.

Next, between October and December, all the kindergarten classes visit a “Safety Town” in Margate. During their visit they participate in safety demonstrations presented by MFR Prevention staff and Margate Police Department (MPD). While the

MPD personnel present such topics as bike safety, stranger danger and the like, the MFR personnel present a fire safety program. It consists of a review of Stop, Drop and Roll, call 911 and stay low. They are then introduced to the sound of a smoke detector and explained the importance of an exit plan. Finally they are shown the difference between tools and toys with matches, axes, and bolt cutters being tools.

The first graders all participate in a prevention program during January and February. A member of the MFR Fire Prevention staff visits the Margate area schools with the mobile classroom. Again, assistance is provided by MPD School Resource Officers(SRO). The children are expected to demonstrate knowledge in Stop, Drop and Roll, calling 911, stay low, exit and assemble at a meeting place, and recognition of a smoke detector. In addition, they are shown kitchen safety in the front portion of the mobile classroom.

In 2006 the kindergarten and first grade classes were given a pre- and posttest as part of the program. These tests were developed with the assistance of a first grade teacher from a local public school. The results were kept in a file but never analyzed for use in evaluating the effectiveness of the program.

In addition to the school prevention programs, MFR participates in a Juvenile Fire Setter Prevention and Intervention Program (JFPIP), which falls under the direction of

the Fire Chief’s Association of Broward County. While the Broward Sheriff’s Office (BSO) Fire Rescue Division manages the operation of the JFPIP with the provision of administrative staff, the other participating fire agencies throughout the county provide part-time personnel to supplement the few staff members that BSOFR provides. Monetary funding for the program is provided by grant money from local children’s assistance organizations. (Broward Sheriff's Office, n.d.) A juvenile’s participation in the JFPIP can be voluntary or court ordered depending on the nature and intent of the offense. While MFR has participated in this program since its inception, the number or type of referrals has never been tracked. Additionally, no attempt has been made to compare MFR referrals against other Broward County cities to determine if there are any trends that should be addressed.

By studying and analyzing these programs, MFR will come into agreement with the first of the five operational objectives of the United States Fire Administration- to “reduce risk at the local level through prevention and mitigation.” (United States Fire Administration, 2003) The programs administered by the MFR Fire Prevention Division play a large role in reducing the risks to juveniles and all citizens within the city of Margate. They are designed to reduce the frequency and number of fire related incidents and injuries within Margate, Florida.

The Executive Analysis of Community Risk Reduction Student Manual identifies three areas in which a risk can be addressed to reduce or eliminate it. The first one is primary prevention, or the process of preventing incidents before they occur.

The manual continues with the idea that in order for an educational prevention program to reduce an undesirable behavior, it has to contain certain elements: that it be continual and directed at the identified individuals. Additionally, the educational interventions must raise awareness and provide information and knowledge in order to change the individual's behavior. (National Fire Academy, January, 2009)

The MFR Fire Prevention Division has committed itself to accomplishing this by introducing a fire prevention program designed to reach pre-K through first grade children, as well as participating in the BSOFR JFPIP. The evaluation of the programs will allow MFR to ensure the effective presentation to those who will benefit the most from the programs.

Literature Review

The Literature Review section of this research paper was completed by conducting research of journal articles, periodicals, books and web sources. Some information included was obtained from a study completed in 1973. Although completed 35 years ago, this piece of work was still considered relevant for this research as it identified several key reasons the fire

loss was so high within the United States. These problems and issues were identified and addressed in subsequent works, which were also included in the literature review section. A publication produced by the U.S. Fire Administration contains the following thought. “Some of the greatest value delivered by the US fire services comes in activities that prevent fires and other emergencies from occurring or that moderate their severity when they do occur.” (U.S. Fire Administration, October 2006, p. 51)

This thought has been brought forth numerous times throughout the history of the US fire service. One of the first times was when, after realizing that the United States was leading other countries in the number of fires, a report was drafted to help identify the reason. A major factor that was uncovered was that not enough attention and resources were being directed to the problem of fire loss. Besides lack of resources, the Commission cited a lack of adequate federal assistance being provided to local fire departments. According to the Commission, the federal assistance should include collecting and analyzing data as well as providing financial assistance to the communities that could not afford the functions necessary to reduce the devastating effects of fire. (The National Commission on Fire Prevention and Control, 1973)

The authors also related that while people fear fire, they ignore or do not understand the role prevention plays in lessening the number of fires that occur every day. (The National Commission on Fire Prevention and Control, 1973) Fire departments have an “obligation to bring fire safety education, not only into schools and private homes, but also into occupancies with greater than average fire potential or hazard to people.” (The National Commission on Fire Prevention and Control, p. 28)

Seeking to determine if the Commission findings and recommendations were followed, or if the report needed to be revisited, a follow-up report was initiated. This report also found that fire risk was a significant danger to the American population. The recommendations of the previous report had not been followed and the results were that the rate of loss of life and property to fire had continued to increase. To combat this, the report recommended that the fire prevention activities of local fire departments should increase with respect to children. Authors felt that this was one of the only ways that the loss trend could be reversed. (USFA, 2000)

Children were identified as a higher risk group than the other population groups because of some noted trends. In 2001 alone, just less than 600 children less than 14 years of age were killed and just over 2900 were injured as a result of fire.

Over half of these deaths occurred to children under the age of five. Over 30% of the fatalities occurred in the age five to nine category (United States Fire Administration, 2004). Similarly in 2004, exactly 50% and 32% of the fire fatalities occurred in the under five years of age and aged five to nine categories respectively (United States Fire Administration, 2008). These statistics show that the national trend was continuing along the same statistical line.

In spite of these Commission reports, fire and burn injuries continued to plague and burden society. Some of these injuries and deaths can be prevented with fire safety education from the local fire agencies (Gielen, McDonald, & Piver, 2007). While some departments have not developed fire prevention programs because of economic issues, others simply do not know where to direct their prevention efforts.

While children under the age of five are generally not in the school system, they can be reached by fire prevention education programs in the preschool setting. Therefore, further recommendations included having the fire department representatives' work with the schools to deliver fire prevention education directly to the preschool-age children (United States Fire Academy, 2000).

According to one study, approximately 80% of all fire departments conduct some type of public education activities in

elementary schools. However, these prevention education programs are presented using different curriculums. To ensure that children receive the fire prevention education message the following must have been met:

> The public education approach should be mindful of two essential elements: first, the public education must make the target audience aware of the hazards on both an intellectual and emotional level. Second, the target audience must receive and accept the message that the hazard or problem is within its control. (USFA, 2000, p. 34)

Less than 20% of the fire departments reported using the Learn Not to Burn curriculum established by the National Fire Protection Agency (NFPA). Less than 10% reported using NFPA's Risk Watch curriculum.(Gielen et al., 2007)

The Learn Not to Burn program was developed in an attempt to educate preschool-aged children in fire safety. The program was designed around eight separate fire safety behaviors that lead to a majority of fire injury and deaths which again affect the under-five category. Behaviors addressed include staying away from hot things; tell a grown up when you find matches or lighters; Stop, drop, and roll; cool a burn; stay low in a fire; know what detectors sound like; practice escaping fire; and go to a firefighter. The program is designed so that a teacher can conduct the instruction using materials such as songs that can be taught. However the program is most effective if presented in

concert with a fire department representative. (National Fire Protection Association, 1991)

Another issue that was identified in a survey report was the fact that not every department conducts evaluations on the programs that they deliver. This was considered important because in order to accomplish the fire prevention activities, the “analysis of data should underlie funding and public policy decisions that address problems or issues identified in the data.” (Federal Emergency Management Agency, 2000, p 19) Fire prevention programs should not be developed and supported just because it seems like they are working. Programs need to be in place when evidence demonstrates that they improve public safety. Besides being validated, programs should be refined through evaluations and shared with other agencies. (Crawford, 2008)

In spite of this, only 52% of departments responding to another survey reported that they evaluated their fire prevention education programs. Only about 25% of those who conduct evaluations reported using pre- and posttests in the validation process. (Gielen et al., 2007)

All fire prevention education programs have a single element in common. They attempt to teach a behavior to children and in the process have them learn how to react to fire-related situations. According to one source, “the process of learning is

a series of actions and behavior that lead toward a desired result such as clear communication or effective teamwork" (Montgomery, 2001, p. 69). In the case of fire prevention education programs, the desired result is demonstrated behavior in responding to different possible fire-related emergencies.

After a program is delivered, the student should be evaluated for understanding. The method used for evaluation varies depending on the complexity of the lessons being taught. Engaging and complex learning experiences require more than just a written test. Evaluating the acquisition of knowledge and the ability to solve problems requires the proper matching of evaluations and demonstrations. (Montgomery, 2001)

A good evaluation process is designed to show proof of the prevention program's effectiveness, accomplished by citing objective data that measures performance. (USFA, June 2008) Proper evaluations also must be valid and relevant. Another source addresses this with the idea that invalid tests that are administered in a wrong manner are "unfair, demoralizing, and discriminatory." (Salowe & Lessinger, 2002, p. 38)

Tests have to be well developed and administered in a proper manner. They must be objective measures of desired behavior that is reflective of standards. Once this is done, additional instruction and training can be directed to where it is needed the most by each student. (Salowe & Lessinger, 2002)

The reliability and standardization of all scores must be determined. This is generally easier with written tests than with clinical observations. (Hoge, Guerra, & Boxer, 2008) However, some clinical observation must be involved with administering the instruments.

A margin of error is present with any instrument and should be accounted for during the administration. One way reliability can be determined with respect to margin of error is through the test-retest method. It is designed to evaluate which of the scores are affected by the error variance. (Hoge et al., 2008)

Also when considering reliability in test scores, consistency is a major focus. The same test given to the same student twice should produce the same result if the test is reliable. However, numerous variables can alter the scores and produce false and unreliable results. All effort must be taken to account for these variables in order to preserve the reliability of the test results. (Lindsey, 2006)

School-based fire prevention programs are designed to decrease children’s involvement with setting fires. With these programs most children understand and “learn age-appropriate, fire-safe behaviors.” (United States Fire Administration, January 2002, p. 1) However even with understanding of these behaviors there are other variables that can lead to a child’s

involvement with fire settings. These include psychological and social factors. (United States Fire Administration, 2002)

An option for these children is participation in a juvenile fire setter prevention and intervention program. The object of treatment is to help the offender change his or her behavior and learn to adapt to the various contexts in his or her life. These are the outside factors that influence a juvenile’s behavior, such as peers, schools, neighborhoods, and even society as a whole.

The primary goal of treatment programs is to help offenders learn how to manage their own behavior within specific contexts. (Hoge et al., 2008) Changing the contexts themselves is generally not an option and can be costly.

Comprehensive treatment programs need to change not only the juvenile’s behavior but must build on their knowledge across the contexts to better enable them to adapt and become functioning members of society.

To summarize the literature review, fire prevention programs are a necessary element for all fire departments. Several pieces of literature support this (U.S. Fire Administration, October 2006, The National Commission on Fire Prevention and Control, 1973, USFA, 2000). The fire prevention programs should be directed at population segments that have

been identified as suffering the most in fire loss (USFA, 2004, USFA, 2000).

Other literature reveals that many fire departments do not have prevention programs or know how to present them properly (Gielen et al., United States Fire Administration 2007). Programs are available to help teachers and fire departments present programs to school age children (National Fire Protection Association, 1991). Whichever fire prevention program is presented, it must be evaluated to ensure it is relevant, reliable and relays knowledge (USFA, 2000, Gielen et al., Montgomery, 2001, Lindsey, 2006, Salowe & Lessinger, 2002, Hoge et al., 2008, Gielen et al.). Besides fire prevention programs, alternative programs exist that can be effective in educating juveniles who have already engaged in fire setting activities (Hoge et al., Broward Sheriff's Office, n.d.).

Procedures

The descriptive research method was used to gather information describing existing juvenile fire safety education programs presented by MFR and other departments within Broward County, Florida. The descriptive methodology focused on the need for, components of and the evaluation of these programs.

Procedures for the Literature Review

The first part of the research involved review of available literature on the need for fire prevention programs. This was

initially conducted in Emmitsburg, Maryland, at the National Fire Academy, Learning Resource Center. Topics searched included “fire prevention,” “prevention programs,” “fire,” and “juvenile programs.”

Further research was conducted in Boca Raton, Florida, at the Florida Atlantic University library. Again literature was consulted in an attempt to identify reasons why programs should be conducted and how they should be evaluated. Various combinations of “fire prevention program” were entered into the card catalog search engine to discover references including journal articles and books on the subject. Additional research was conducted by searching for reference material on “evaluation,” “test,” “correlation” and “reliability.”

Online sources were then consulted, including the US Census Bureau website, to determine the population profile of Margate, FL, and several other cities located in Broward County, FL. Another site consulted was the Broward Sheriff Office website for material on a local juvenile fire setter program.

Procedures for K-1st Grade Pre- and Posttest Evaluation

The second part of the research involved examining data on pre- and posttests that were administered by MFR to kindergarten and first grade classes. The MFR Fire Prevention Records were searched to obtain copies of these tests. These tests had been developed in September of 2006 by Mailodie Ferland, a first

grade teacher at Atlantic West Elementary School in Margate, FL. Ms. Ferland was contacted in May of 2009, and related that she had been provided a copy of a test from MFR Division Chief Dan Booker and was asked to review and provide a first grade test to be used in the program. She changed some questions and added her own and then used her class as a test group. (Appendix C) After that she gave the test to MFR for use as a pre- and posttest for the first grade classes in the program. (M. Ferland, personal communication, May, 2009)

MFR Division Chief Booker was contacted for information on where he obtained the original test bank. He related that the test was part of the packet included with the delivery papers of the Mobile Concepts by SCOTTY Fire Safety Trailer. In an attempt to make the test relevant to Margate, he had decided to seek the input of a local teacher to validate the test. (D.Booker personal communication, May, 2009)

According to Ferland, the kindergarten questions were developed from the first grade test with whatever concepts she thought they could handle. (Appendix A) She had recommended a verbal test over a written test because they would only have been in class for a month or so at the time of the Safety Town visit. Students would be more proficient at raising hands in response to verbal questions and would provide more valid test data than if the students were given a written test.

Once the tests were complete, each elementary school was visited by a member of the MFR Fire Prevention Division. The programs, tests, and the teacher and student’s roles in the program, were explained. This meeting was held with either the principal or kindergarten/first grade group leader of each school.

In October 2006, each kindergarten class in Margate visited the Margate Safety Town to receive safety education presentations from the police department, fire department and lifeguards from the Margate community pool. The students were placed into small groups and rotated among the stations. Prior to receiving fire prevention education, a MFR representative administered the verbal quiz to the students. After the presentation, the students again responded to the verbal quiz as a posttest.

During December 2006 and January 2007, the public school first grade classes were given a copy of the pretest by the MPD School Resource Officer. The pretest was then administered in class by their teachers on the day before their scheduled visit by the mobile fire safety classroom. Upon the return of the students to their classrooms, the teachers were provided new copies of the test to administer again as a posttest.

In the private schools, a member of the MFR Fire Prevention Division provided the teachers a copy of the test the day before

their scheduled visit by MFR. After their visit to the mobile classroom, the teachers were again provided new copies of the test to administer upon the children's return to the classroom. All posttests were collected within a week of their completion of the mobile fire safety classroom visits.

As the tests were collected, inconsistencies were noted in several groups. Some of the pretests had perfect or near perfect scores. While this would have been an ideal outcome, especially for the first graders, a cursory comparison against other groups showed this simply did not agree. The teachers of the aberrant groups were questioned and revealed that they had assisted the students with the pretest. These groups were identified and then filed separately.

Beginning in May 2009, the files were entered into the Statistical Package for the Social Sciences (SPSS) predictive analytics software program to compile and analyze the data results for inclusion in this research. According to the SPSS website, utilizing their product to analyze data "identifies precisely whom to target, how to reach them, when to make contact, and what messages should be communicated." (Statistical Package for the Social Sciences, 2009) The various histograms and tables that were produced were included in the next section.

Limitations include the previously mentioned discovery that some teachers assisted students with the completion of the pre-

or posttest. Groups of tests, where the students were confirmed to have had assistance by a teacher were not entered into the data file. If other groups received assistance and were not identified, they were included and may have caused variance in the test results and limit the reliability of the collected data. Additionally, the only demographic data that could be collected from the tests was the student's gender. This limited the number of variables that could be included in the correlations.

Procedures for Juvenile Fire Setter Program Referral Data

The third part of the research involved collecting data on the referrals to the Broward County JFPIP by MFR and other fire departments throughout Broward County, Florida. In May 2009, MFR records were consulted to find out how many juveniles were referred to the program by MFR. It was discovered that not all the juvenile referrals were on file at the MFR Fire Prevention Division. Because the needed data could not be collected this way, contact was made with Courtney Palmer who is the Special Projects Coordinator for the BSO JFPIP. She advised that she had the referrals from MFR and other departments filed alphabetically by name only, and not by city. Absent a list of names, the referring department could not be determined without going through hundreds of files manually. She suggested contacting the program physiologist, Dr Donna Faranda, PsyD, to

acquire the needed data. (C. Palmer, personal communication, May 14, 2009)

Between May 18 and 29, 2009, several contacts were made with Dr. Faranda by phone and email. She has been involved with the current program since 2003 and advised that she had a list of referrals by zip code, without names, that could be provided for this research. (BSO, raw data, n.d.) The data included the individual's gender, age, date and type of incident. The data set was large so it had to be reduced to a usable amount.

Once again Courtney Palmer was contacted to identify which cities conducted some type of elementary school fire prevention education program. She advised that BSOFR provides fire and EMS services to the cities of Weston, Southwest Ranches, Pembroke Park, Lauderdale-By-The-Sea, Cooper City, Lauderdale Lakes and Sea Ranch Lakes. Palmer also advised that in addition to fire and EMS services, her division provides fire prevention education programs to the public schools located in those cities.

In addition to BSOFR, other departments such as Coral Springs Fire Rescue (CSFR), Pompano Beach Fire Rescue (PBFR), and Fort Lauderdale Fire Rescue (FLFR) routinely conduct fire prevention education programs similar to those of MFR. Accordingly, they were included in the comparison portion of this research.

The obtained data was entered into the SPSS software to analyze and produce data sets to answer the questions. Data was presented in several forms, including mean and mode.

The arithmetic mean is also known as the average, which is acquired by adding up all the values and dividing that by the number of values. (Norusis, 2006) The result for this research was the overall average score or central tendency of the tests. This is useful in that it shows an expressed value which is very familiar and easy to interpret. (Welch & Comer, 2006)

Mode is the most frequently occurring value in a data set. (Norusis, 2006) In the analyzed data sets included in this research, the mode was used to identify which age was referred the most in the data set. For example, if the following ages were recorded in the set, 14, 15, 14, 5, and 6 then 14 would be the mode.

Limitations to this part of the research included limited amounts of data. Individual names could not be accessed for research but the raw data also did not include the ethnicity of the individuals. Again this will limit the number of variables available for inclusion in correlations.

Results

Research question 1. What were the results of the kindergarten fire education program pre- and posttests used by the MFR Fire Prevention Division?

There were a total of 348 students included in the kindergarten pre- and posttest dataset. They were divided into eight different groups with an average of 43.5 students per group. (Appendix B)

The first test question involved identifying the behavior of Stop, Drop and Roll. (Appendix A) During the pretest sampling, a total of 273 students identified the correct behavior before the participation and instruction portion. After the instruction a total of 346 students indicated the proper response. The increase was 73 students from the pretest. (Appendix B)

The second test question involved identifying 911 as the right phone number to call in case of an emergency. (Appendix A) Of the 348 students involved in the data set, 316 indicated the proper response in the pretest questioning. Following the instruction portion, all 348 indicated the proper number. This was an increase of 32 students from the pretest. (Appendix B)

The third question involved getting out of the house when there is smoke. (Appendix A) Pretest results showed 160 students identified the proper behavior of exiting by crawling. After the

instruction portion, 310 students indicated the proper response. This was an increase of 150 students over the pretest. (Appendix B)

The fourth question involved identifying a meeting spot for all members of the family after exiting the structure. Only 183 of the 348 students identified the proper behavior during the pretest portion. After the instruction portion, 309 indentified the proper behavior. This was an increase of 126 students.

The fifth and final question involved identifying the proper behavior of children leaving matches alone. (Appendix A) A total of 206 students identified the proper behavior with the pretest. Following the instruction portion, 325 students identified the proper behavior on the posttest. This was an increase of 119 students between the pre- and posttest. (Appendix B)

Overall, the average number of correct responses to the pretest questioning was 227.6 students per question. After the instruction, an average of 327.6 students per question indicated the proper response to the questions. This was an increase of an average of 100 students per question. (Appendix B)

Research question 2. What were the results of the first grade fire education program pre- and posttests used by the MFR Fire Prevention Division in terms of learning retention?

In order to evaluate if the post-test results were higher than those of the pretest the mean scores for each school were compared. Again the groups of tests that were identified as receiving assistance from the teacher were not included in the data set.

School attended, gender of student, pre- and posttest means and mean change are presented in Table 1. The greatest change occurred at Margate Elementary School with a pretest mean of 56.2 and posttest mean of 87.2. Next was Atlantic West with a mean change of 29.5. Liberty Elementary was the final public school and had a mean change of 14.6. The private school with the greatest change was Abundant Life Christian School with a mean change from 72.1 to 80.3 for a total of 8.2. Faith Christian had a mean change of 0.7 from 92.9 to 93.6. Overall the combined total means were 65.2 for the pretest, 85.7 for the posttest for a total mean change of 20.5. (Table 1)

The gender of the students was fairly evenly distributed over the five schools. Males made up anywhere from 40% to a high of 55% for Margate Elementary. The total ratio was 46% male and 54% female students taking the test. (Table 1)

Table 1:
First Grade Test Means

	M	F	Mean		
			Pre-test	**Post-test**	**Change**
Abundant Life	14 42%	19 58%	72.1	80.3	+ 8.2
Atlantic West Elementary	17 40%	25 60%	58.6	88.1	+ 29.5
Faith Christian	6 43%	8 57%	92.9	93.6	+ 0.7
Liberty Elementary	31 44%	39 56%	69.1	83.7	+ 14.6
Margate Elementary	36 55%	30 45%	56.2	87.2	+ 31
Combined	104 46%	121 54%	65.2	85.7	+ 20.5

Next, the test reliability and validity were evaluated using the Pearson’s Correlation Coefficient. In analyzing the reliability of tests, coefficients need to be computed for the questions as a whole. The Pearson Correlation Coefficients range from -1 through 1 with zero being the midline. A coefficient of zero means there was no relationship between the two sets of test scores. Conversely, a coefficient of 1, either negative or

positive, would occur if the test takers received the same score on both tests.(Lindsey, 2004)

In Table 2, the coefficient results correspond with the reliability ratings. For example, a coefficient rating of 0.95 would lead to a high reliability in the test results.

Table 2
Pearson's Coefficient Reliability Ratings

Reliability	**Coefficient**
High Reliability	0.90 or higher
Good Reliability	0.80 to 0.89
Low to moderate reliability	0.60 to 0.79
Doubtful reliability	0.40 to 0.59

Courtesy Fire Service Instructor (p 207)

The actual Pearson Correlation Coefficients are included in Table 3. Low reliability was indicated at Margate Elementary and Liberty with a coefficient of 0.63 and 0.60. Doubtful reliability was indicated at Atlantic West and Abundant Life with a coefficient of 0.59 and 0.47. Faith Christian had a coefficient of 0.37, which is not within the reliability rating parameters.

Table 3
Pearson's Coefficient Results

	Pearson Correlation Coefficient
Margate Elementary	0.63
Liberty Elementary	0.60
Atlantic West	0.59
Abundant Life	0.47
Faith Christian	0.37

After the data analysis, it was found that question number seven on the test (Appendix C) was missed by an overwhelming 89% of the students on the pretest. On the post-test, 71% of the students missed the same question. Exit Drills in The House (EDITH) was not included in the presentations at Safety Town or at the schools. Because of this, numerous students missed this question on both the pre- and posttest. The high miss rate could have skewed the resulting data and caused the reliability rating to be lower than it really should have been.

Research question 3. What were the numbers of juveniles referred to the Juvenile Fire Setter Program since 2003 from the City of Margate?

The results of the analysis of the juvenile referrals are shown in Table 4. There was a high total of 11 referrals by MFR to the JFPIP during 2003. In each of 2004 and 2007 there was a low of only two referrals made to the program. The second highest referral rate was recorded in 2005 with eight. Finally in the first half of 2009 there were three referrals made. While the referrals have decreased from the high in 2003, there still seems to be a plateau at around five or six referrals.

Table 4
MFR JFPIP Referrals by Year

Year	Frequency	Percent
2003	11	31
2004	2	6
2005	8	22
2006	5	14
2007	2	6
2008	5	14
2009	3	8
Total	**36**	**100**

As can be seen in Table 5, the majority of the JFPIP referrals by MFR were for playing with matches or lighters. This included 13 referrals for 36% of the total.

The next type of referral was for starting structure fires. Referrals for this occurred at a rate of nine times for 25% of the total. (Table 5)

The next highest type of referral was the Curiosity with Fire category with six referrals for 17% of the total. (Table 5)

Both outside structure fires and false alarms accounted for four referrals each of the total. (Table 5)

Table 5
MFR JFPIP Referral Types

Type	Frequency	Percent
Playing with matches/lighter	13	36
Structure Fire	9	25
Curiosity	6	17
Outside Structure Fire	4	11
False Alarm	4	11
Total	**36**	**100**

The referrals were combined into two groups representing before and after prevention program delivery. Pre-program delivery consisted of 2003 through 2006 and post-program delivery consisted of 2007 through 2009. The pre-program group contained 26 referrals over the four-year period for a mean of 6.5 referrals per year. The post-program group contained 10 referrals over the two-and-a-half year period giving a mean of four referrals per year. This represented a mean decrease of 2.5 juvenile referrals per year.

Between 2003 and 2006 there were six referrals for starting structure fires. Between 2007 and 2009 there were a total of three referrals for the same. (Table 6)

Referrals for Curiosity with Fire occurred six times between 2003 and 2006. There were no referrals for the same between 2007 and 2009. (Table 6)

Setting outside structure fires accounted for two referrals for the group occurring between 2003 and 2006. Again in the group between 2007 and 2009 there were two referrals. (Table 6)

The referral rate for playing with matches/lighters was nine between 2003 and 2006 and four between 2007 and 2009. (Table 6)

The referrals for reporting false alarms occurred three times between 2003 and 2006. During the second group between 2007 and 2009 there was one referral. (Table 6)

Table 6
MFR JFPIP Referral Types by Group

Type	Year	Frequency
Structure Fire	2003-2006	6
	2007-2009	3
Curiosity	2003-2006	6
	2007-2009	0
Outside Structure Fire	2003-2006	2
	2007-2009	2
Playing with Matches/lighter	2003-2006	9
	2007-2009	4
False Alarm	2003-2006	3
	2007-2009	1

Research question 4. What was the number of juveniles referred to the Juvenile Fire Setter Program since 2003 within the other Broward County cities?

BSOFR had a total of 225 juvenile referrals from January 1, 2003 to June 1, 2009. This was a mean of 34.3 per year over the six-and-a-half year period. (Appendix D)

The leading cause for the referrals was playing with matches, which accounted for 23% of the referrals. Next were the 50 juveniles who were referred for setting outside structure fires which accounted for 22% of the total. There were 47 juveniles referred for starting structure fires which accounted

for 21% of the total. The 27 juveniles referred for reporting false alarms accounted for 12% of the total. Of the 225 juvenile referrals 11% were for setting trash can fires, 7% for curiosity and the remaining 4% were for acid bombs. (Appendix D)

The BSOFR referrals were also placed into two groups with the first group representing referrals made between 2003 and 2006. There were a total of 128 referrals to the program during that period. This represented a mean of 32 referrals per year by BSOFR. In this group the leading cause for the referrals was outside structure fires, 30%, followed by structure fires, 29%, with playing with matches coming in third at 27%. False alarm, 15%, trash can fires,13%, curiosity, 9%, and acid bombs (5%) account for the remaining referrals. (Appendix D)

The second group was the BSOFR referrals between 2007 and June 1, 2009. During this period there were a total of 97 juveniles referred to the program. This was a mean of 37.3 referrals per year by BSOFR. This time, playing with matches was the leading cause for referrals at 24%. Outside structure fires, 20%, and structure fires, 18%, made up the top three referrals. Trash can fires, 12%, false alarms, 12%, curiosity, 6%, and acid bombs, 5%, were the reasons for the remaining juvenile referrals. (Appendix D)

Next, the City of Coral Springs referrals were analyzed between 2003 and June 1, 2009. There were a total of 97

juveniles referred to the program during that period. The mean was 14.7 referrals per year by CSFR. The majority of the referrals, 27%, were for setting fires outside a structure. Again setting structure fires, 25%, and playing with matches, 17% made up the top three referral causes. False alarm, 10%, trash can fires, 10%, and curiosity, 8%, made up some of the other referral causes. Vehicles fires accounted for 2% of the referral causes. (Appendix E)

Two groups were then analyzed with 2003 to 2006 being the first group. There were 62 juvenile referrals during the period. The mean was 15.5 referrals per year to the program. Setting outside structure fires accounted for 29% of the juvenile referrals. Setting structure fires, 23%, and playing with matches, 16% accounted for the top three referral causes. False alarms, 11%, and trash can fires, 11%, curiosity, 8%, and acid bombs, 2% accounted for the remaining referral causes. (Appendix E)

The second group was from 2007 to June 1, 2009. During this time there were 35 juvenile referrals to the program. A mean of 13.7 referrals per year was recorded. Setting structure fires accounted for 29% of the juvenile referrals during the period. Setting outside structure fires, 23%, and playing with matches, 17%, rounded out the top three referral causes. Setting trash can fires, curiosity, and false alarms accounted for 9% of the

referrals each. The two juveniles who set vehicle fires were included in this group. (Appendix E)

The City of Pompano Beach Fire Rescue (PBFR) was the next city analyzed. During the period between January 1, 2003 and June 1, 2009 they referred 78 juveniles to the JFPIP program. The mean was 13.3 referrals per year to the program. The majority of the referrals were for setting outside structure fires, 26%. Playing with matches, 22%, and setting structure fires, 21%, made up the top three referral causes. Trash can fires, 14%, curiosity, 9%, false alarms, 8%, and acid bombs, 1%, were the remaining causes for program referrals. (Appendix F)

Referrals were then divided into groups consisting of 2003 to 2006 and 2007 to 2009. The first group had 38 referrals to the program for a mean of 9.5 referrals per year. The leading referral cause was for setting outside structure fires, which accounted for 29% of the referrals. Setting structure fires, 24%, and playing with matches, 21%, rounded out the top three referral causes. False alarms accounted for 11% and setting trash can fires accounted for 8% of the referrals to the program. Curiosity, 5%, and acid bombs, 3%, completed the referral causes. (Appendix F)

The second group contained 40 referrals with a mean of 18.3 program referrals per year. Setting outside structure fires and playing with matches each accounted for 23% of the juvenile

referrals during the period. Setting trash can fires, 20%, setting structure fires, 18%, curiosity, 13%, and false alarm, 5%, completed the referral causes. (Appendix F)

Fort Lauderdale Fire Rescue (FLFR) was the last department to be analyzed. FLFR referred a total of 96 juveniles to the JFPIP program between 2003 and 2009. The mean was 14.4 referrals per year to the program. Setting structure fires was the leading cause for referral at 33%. Setting outside structure fires, 21%, and playing with matches, 15%, rounded out the top three referral causes. False alarms, 12%, setting trash can, 11%, curiosity, 5%, and acid bombs, 4% completed the referral causes during the period. (Appendix G)

Next the referrals were divided into two groups, one being 2003 to 2006 and the other being 2007 to 2009. The first group contained 53 referrals for a mean of 13.3 referrals per year. The leading referral cause was for setting structure fires at 28%. Setting outside structure fires, 23%, and false alarms, 15% rounded out the top three referral types. Playing with matches was next at 13% followed by setting trash can fires, 11%, acid bombs, 6%, and curiosity, 4%, completing the referral causes. (Appendix G)

The second group contained 43 juvenile referrals between 2007 and June 1, 2009. This was a mean of 16 referrals per year to the JFPIP program. Again, setting structure fire was the main

referral cause at 40%. Next was setting outside structure fires at 19% and playing with matches at 16%. Setting trashcan fires, 9%, curiosity and false alarms both at 7% and acid bombs at 2% completed the referral causes. (Appendix G)

Table 7
All Department JFPIP Referral Mean

Department	2003-2006 Referral Mean	2007-June 1, 2009 Referral Mean	Change
MFR	6.5	4	-2.5
BSOFR	32	37.3	+5.3
CSFR	15.5	13.7	-1.8
PBFR	9.5	18.3	+8.8
FLFR	13.3	16	+2.7

Research question five. What were the demographics of the juveniles referred by the City of Margate and the other cities within Broward County Florida?

The first department analyzed was MFR. Between January 1, 2003 and June 1, 2009 there was a total of 36 juveniles referred to the JFPIP. Of those, 33 were males and 3 were females. During the same period the mean, or average age, was 10.78 years old. The mode or central tendency was 12 years of age. Again the data was divided into two groups with the first being 2003 to 2006 and the second being 2007 to 2009.

The first group had 26 juveniles referred to the program. Of these, 24 were males and 2 were females. The average age of the juveniles was 11.58 and the mode was 16 years of age. However the second group had nine males and one female. This

produced a mean age of 8.7 years of age and a mode that was the same for several ages. The 4, 6 and 12 years of age had the same number of referrals. (Table 8)

Next, several other fire departments in Broward County were analyzed. First was BSOFR, which had a total of 225 juvenile referrals from January 1, 2003 through June 1, 2009. Of these referrals 201 were males and 24 were females. This produced a mean age of 11.45 and a mode of 14 years of age.

Of those referrals, 119 of the males and 9 of the females were referred between 2003 and 2006. This produced a mean age of 11.72 years of age and a mode of 14 years of age.

The remaining 82 males and 15 females were referred from 2007 to 2009. The mean age was 11.1 years of age. Again the mode was the same at 14 years of age.

The second department analyzed was CSFR. Between 2003 and 2009, they sent a total of 97 juvenile referrals to the JFPIP. Of these, 87 were male and 10 were female. This group had a mean age of 11.29 years of age and a mode of 16 years of age.

Once again referrals were divided into two groups. There were 62 referrals from 2003 to 2006, where 57 were male and 5 were female. The mean age during the period was 11 and the mode was 13.

Between 2007 and 2009 there were 35 referrals to the JFPIP program. During this time there were 30 males and 5 females.

This group recorded a mean age of 11.8 years old and a mode age of 16 years old.

The next department analyzed was PBFR. Between 2003 and 2009 they referred a total of 78 juveniles to the JFPIP program. The mean age was 11.79 and the mode was 14 years of age. There were 71 males and 7 females referred to the program during the period.

Again the data set was divided into two groups, with the first being referrals between 2003 and 2006. During that period there were a total of 38 referrals. A mean age of 10.89 years of age and a mode of 14 was obtained. The group included 35 males and 3 females.

The next set contained referrals from between 2007 and 2009. This data set included 40 referrals, 36 males and four females, to the JFPIP program. The mean age was 12.65 and the mode was 14 years of age.

The final department analyzed was FLFR, which referred 96 juveniles to the program between 2003 and 2009. Of this group 88 were males and 8 were females. The mean age was 11.55 and the mode was 14 years of age.

The data set was divided with the first group having 53 referrals to the program between 2003 and 2006. A total of 45 males and 8 females were referred during the period. The mean age was 11.96 and the mode was 14 years of age.

The final data set contained the number of referrals from 2007 through 2009. There were a total of 43 referrals which were all male juveniles. The mean age was 11.05 and the mode was 12 years of age. (Table 8)

Table 8
Juvenile Referral Demographics

Department		Referral Gender		Referral Age	
		Male	Female	Mean	Mode
MFR	**Total**	33	3	10.78	12
	2003-2006	24	2	11.58	16
	2007-2009	9	1	8.70	4a
BSOFR	**Total**	201	24	11.45	14
	2003-2006	119	9	11.72	14
	2007-2009	82	15	11.10	14
CSFR	**Total**	87	10	11.29	16
	2003-2006	57	5	11.00	13
	2007-2009	30	5	11.80	16
PBFR	**Total**	71	7	11.79	14
	2003-2006	35	3	10.89	14
	2007-2009	36	4	12.65	14
FLFR	**Total**	88	8	11.55	14
	2003-2006	45	8	11.96	14
	2007-2009	43	0	11.05	12

a. Multiple modes exist (4, 6, and 12 y/o), so youngest was shown.

Discussion

Beginning in 1973, federal commission findings recommended that fire departments participate in fire prevention education activities. The main reason was to reduce fire-related injuries and deaths (The National Commission on Fire Prevention and Control, 1973). Follow-up report findings in 2000 indicated that some fire departments still were not engaging in fire prevention education activities (USFA, 2000).

In the United States, one age group having a higher than average rate of fire injuries and deaths was children (USFA, 2004). As a result of this, particular attention should be directed to children when conducting fire prevention education programs. One setting in which children can receive fire prevention education is in elementary school (Mullen, 2007).

From the results of this research, the researcher determined that several steps have been taken by MFR to attempt to lessen the number of fire related incidences involving children.

A fire education program has been implemented in the elementary schools in conjunction with the MPD School Resource Officers. This was a result of research which identified that the school setting is the most effective place to reach and educate children in fire prevention education programs (Gielen et al., 2007, Mullen, 2007, The National Commission on Fire Prevention and Control, 1973, USFA, 2000).

The program is based on standards and programs that have proven effective (Gielen et al., 2007, National Fire Protection Association, 1991). Both before and after the delivery of the interactive portion of the kindergarten program, the students were evaluated. Pre- and posttest comparisons do demonstrate an increase in knowledge after the interactive portion of the program. According to Montgomery, all students should be

evaluated for their comprehension of a presented subject matter. Only by this evaluation can the student demonstrate increased knowledge and understanding of the material (Montgomery, 2001).

However, in order to be fair and objective, the test has to be properly administered (Salowe & Lessinger, 2002). The current test involved counting the number of students who raised their hands in response to a question. This was not a completely objective system of evaluation. Students could have been raising their hands in reaction to peer pressure and not because they knew the answer.

First grade test results were similarly positive in that they showed an increase in demonstrated knowledge. Review of test results indicated the tests were administered in a proper manner but may not have been well developed (Salowe & Lessinger, 2002). One question in particular was missed on the pre- and posttests at a high rate because the idea was not presented during the program. Possibly because of this, the correlation coefficients of the pre- and posttests showed low reliability ratings (Lindsey, 2006).

In addition to the prevention education program, MFR also participates in the Broward County JFPIP. This program is directed toward juveniles who demonstrate some type of fire setting behavior (Hoge et al., 2008, United States Fire Administration, January 2002). Overall, Margate Fire Rescue

referral numbers have decreased since the introduction of their elementary school fire prevention education program. In an attempt to see if the decrease in referrals was similar to other Broward County departments, referral numbers of other departments were compared with those of Margate Fire Rescue. Results of this research indicated that Margate Fire Rescue and Coral Springs Fire Rescue both experienced decreases in the number of referrals from before the implementation of the MFR fire education program. Margate Fire Rescue had the highest decrease in the number of juvenile referrals between the two groups of years. However BSOFR, PBFR, and FLFR all showed increases in the number of JFPIP referrals during the same years. This would indicate that the pre-K through 1st grade fire prevention programs being conducted by MFR are causing a change in the number of juveniles involved in fire setting activities.

Research also focused on the demographics of the juveniles referred into the JFPIP by MFR and other Broward County Departments. MFR had a mode age of 12 compared to most of the other departments, which had a mode of 14 or 16. However the mean age for MFR was 10.78. This was younger than all other departments in the research and would indicate that the average JFPIP referral is young enough to be influenced already by the elementary school fire prevention program presented by MFR.

Recommendations

Margate Fire Rescue has established a fire prevention education program in addition to participating in the Broward county JFPIP. Failure to analyze the results of a pre- and post-test delivered to kindergarten and first grade children during the presentations has prevented MFR from determining definitively if the program is effective. The following changes should be made to the program delivery and evaluation:

- Develop a better pre- and posttest for delivery to the kindergarten classes. Use existing programs and evaluations such as the “Learn Not to Burn” curriculum to accomplish this.
- Enlist help from the kindergarten teachers with the presentation and evaluation of the fire prevention program. They may want to delay the presentation to better coordinate with existing curriculum and student knowledge.
- Eliminate question number seven from the first grade pre- and posttest. (Appendix C)
- Add an additional relevant question to the first grade pre- and posttest.
- Conduct another correlation study of the first grade pre- and posttest after changes and redelivery.
- Develop a filing system to better track JFPIP referrals.

- Analyze the results of both the K-1st grade pre- and post-tests and the JFPIP referrals for trends that can be addressed by MFR.

MFR personnel and future readers should attempt to evaluate the effectiveness of these programs on a regular basis. Additional research needs to be conducted on why the referral rates are higher for males than for females. Additional emphasis can then be placed on providing more fire prevention programs directed at males to lower their high referral rate.

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Appendix A

Kindergarten Pre/Post Test

1. When your clothes are on fire you should Stop, **Drop**, and **Roll**?

2. What number do you call if your house is on fire? **911**

3. If there is smoke in your house what do you do? **Get out**

4. Once outside where do you go? **Meeting Place**

5. Should you pick up matches? **No, point them out to an adult**.

Appendix B

Kindergarten Pre/Post Test Results

Group Number		**Question Numbers**				
		1	**2**	**3**	**4**	**5**
1	**Pre**	21	30	8	5	28
	Post	41	43	42	43	43
	Change	**+20**	**+13**	**+34**	**+38**	**+15**
2	**Pre**	35	34	11	3	16
	Post	37	37	29	33	37
	Change	**+2**	**+3**	**+8**	**+30**	**+21**
3	**Pre**	30	36	12	15	20
	Post	36	36	31	28	36
	Change	**+6**	**0**	**+19**	**+13**	**+16**
4	**Pre**	40	47	23	19	35
	Post	47	47	44	46	45
	Change	**+7**	**0**	**+21**	**+27**	**+10**
5	**Pre**	38	41	13	37	39
	Post	43	43	37	37	43
	Change	**+5**	**+2**	**+24**	**0**	**+4**
6	**Pre**	43	40	39	38	24
	Post	46	46	43	40	39
	Change	**+3**	**+6**	**+4**	**+2**	**+15**
7	**Pre**	24	38	24	27	24
	Post	46	46	44	35	41
	Change	**+22**	**+8**	**+20**	**+8**	**+17**
8	**Pre**	46	50	30	39	20
	Post	42	50	40	47	41
	Change	**+4**	**0**	**+10**	**+8**	**+21**
Pre average		227.6				
Post average		327.6				
Change		**+100**				

Appendix C

First Grade Pre / Post Fire Safety Test

Name: _____

Write the word in the space to finish each sentence.

A. Crawl B. Warn C. Heat D. Hide E. Matches

1. Smoke detectors are installed to _____ people of fire.
2. Adults are the only ones who should use _____ .
3. Let _____ escape safely when opening food containers cooked in a microwave oven.
4. When a room is full of smoke ____to the nearest escape route.
5. Never run or _____ under a bed or in a closet during a fire.

Circle the word that belongs in each sentence.

6. Always STOP, _____, ROLL, if your clothes catch on fire.

   A. Hide B. Run C. DROP D. ROLL

7. Always remember to practice _____ .

   A. Eating B. E.D.I.T.H. C. Slowly D. Running

8. Pots and pans on the stove should have the handles turned __.

   A. Out B. Over C. In D. Out

9. Fire needs _____, something to burn, and heat.

   A. water B. smoke C. dark D. oxygen

10. Matches and lighters are _____.

   A. toys B. tools C. safe D. fun

Appendix D

BSOFR FRIP Referrals

Year	Frequency	Percent
2003	22	9.8
2004	49	21.8
2005	22	9.8
2006	35	15.6
2007	45	20.0
2008	37	16.4
2009	15	6.7
Total	**225**	**100.0**

Type	Frequency	Percent
trash can	25	11.1
structure fire	47	20.9
curiosity	15	6.7
acid bomb	10	4.4
outside structure fire	50	22.2
playing with matches/fire	51	22.7
false alarm	27	12.0
Total	**225**	**100.0**

Type	Year	Frequency
Playing with Matches/lighter	2003-2006	27
	2007-2009	24
Structure Fire	2003-2006	29
	2007-2009	18
Curiosity	2003-2006	9
	2007-2009	6
Outside Structure Fire	2003-2006	30
	2007-2009	20
Trash Can	2003-2006	13
	2007-2009	12
Acid Bomb	2003-2006	5
	2007-2009	5
False Alarm	2003-2006	15
	2007-2009	12

Appendix E

CSFR JFRIP Referrals

Year	Frequency	Percent
2003	17	17.5
2004	14	14.4
2005	18	18.6
2006	13	13.4
2007	17	17.5
2008	12	12.4
2009	6	6.2
Total	97	100.0

Type	Frequency	Percent
trash can	10	10.3
structure fire	24	24.7
curiosity	8	8.2
acid bomb	1	1.0
vehicle fire	2	2.1
outside structure fire	26	26.8
playing with matches/fire	16	16.5
false alarm	10	10.3
Total	97	100.0

Type	Year	Frequency
Trash Can	2003-2006	7
	2007-2009	3
Structure Fire	2003-2006	14
	2007-2009	10
Curiosity	2003-2006	5
	2007-2009	3
Acid Bomb	2003-2006	1
	2007-2009	0
Vehicle Fire	2003-2006	0
	2007-2009	2
Outside Structure Fire	2003-2006	18
	2007-2009	8
Playing with Matches/lighter	2003-2006	10
	2007-2009	6
False Alarm	2003-2006	7
	2007-2009	3

Appendix F

PBFR JFRIP Referrals

Year	Frequency	Percent
2003	7	9.0
2004	13	16.7
2005	10	12.8
2006	8	10.3
2007	10	12.8
2008	15	19.2
2009	15	19.2
Total	**78**	**100.0**

Type	Frequency	Percent
trash can	11	14.1
structure fire	16	20.5
curiosity	7	9.0
acid bomb	1	1.3
outside structure fire	20	25.6
playing with matches/fire	17	21.8
false alarm	6	7.7
Total	**78**	**100.0**

Type	Year	Frequency
Trash Can	2003-2006	3
	2007-2009	8
Structure Fire	2003-2006	9
	2007-2009	7
Curiosity	2003-2006	2
	2007-2009	5
Acid Bomb	2003-2006	1
	2007-2009	0
Outside Structure Fire	2003-2006	11
	2007-2009	9
Playing with Matches/lighter	2003-2006	8
	2007-2009	9
False Alarm	2003-2006	4
	2007-2009	2

Appendix G

FLFR JFRIP Referrals

Year	Frequency	Percent
2003	17	17.7
2004	20	20.8
2005	12	12.5
2006	4	4.2
2007	16	16.7
2008	22	22.9
2009	5	5.2
Total	**96**	**100.0**

Type	Frequency	Percent
trash can	10	10.4
structure fire	32	33.3
curiosity	5	5.2
acid bomb	4	4.2
outside structure fire	20	20.8
playing with matches/fire	14	14.6
false alarm	11	11.5
Total	**96**	**100.0**

Type	Year	Frequency
Trash Can	2003-2006	6
	2007-2009	4
Structure Fire	2003-2006	15
	2007-2009	17
Curiosity	2003-2006	2
	2007-2009	3
Acid Bomb	2003-2006	3
	2007-2009	1
Outside Structure Fire	2003-2006	12
	2007-2009	8
Playing with Matches/lighter	2003-2006	7
	2007-2009	7
False Alarm	2003-2006	8
	2007-2009	3