Assessing Smoking Material Fires in the City of Tampa

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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, idea, expression, or writings of another.

Signed: _____

Abstract

The identified problem for this research was that Tampa Fire Rescue (TFR) has not conducted a smoking material fire risk assessment study. The purpose of this research was to conduct a smoking material fire risk assessment for the City of Tampa (COT). Descriptive research methodology was utilized to focus on the research questions: What are the neighborhood characteristics and demographics associated with the at risk population living in other fire department jurisdictions where the highest frequencies of smoking material fire deaths and/or injuries are occurring, What neighborhoods had the highest frequency of smoking material fire deaths and/or injuries in the City of Tampa (COT) from 2007-2012 and What are the demographics associated with the at risk population living in COT neighborhoods where smoking material fire deaths and/or injuries occurred compared to the neighborhoods where no deaths or injuries occurred from 2007-2012?

A literature review, internal TFR records review, U.S. census data review and the dissemination of a questionnaire were used to collect information to answer the research questions. The questionnaire was distributed electronically to fire departments through several routes, which resulted in 106 departments participating. The results of the TFR records query identified nine out of 20 neighborhoods suffered a smoking material fire death and/or injury from 2007-2012. The demographics of the at risk populations living in the neighborhoods that experienced a smoking material fire death and/or injury from 2007-2012 in the COT included individuals living below poverty (28%), disabled individuals (25.6%), non-English speaking individuals (23.2%), adults over the age of 65 (14.2%), children less than 5 years of age (6.8%) and families living below poverty (5.1%). Several recommendations were made to include

targeting the nine at risk neighborhoods with risk reduction strategies, promoting the use of fire-safe cigarettes and conduct biennial fire risk assessments in the COT.

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Introduction

Tampa Fire Rescue (TFR) has processes in place to collect and archive informational data associated with the fire response services that are provided to the community. The data collected is stored electronically in a departmental database and also sent to the National Fire Incident Reporting System (NFIRS) collection site. The problem is that TFR has not utilized existing fire response data to conduct a smoking material fire risk assessment study. Unfortunately, this lack of knowledge prevents the organization from identifying at-risk populations and developing preventable programs aimed at reducing the frequency and severity of fires that start from smoking material. The purpose of this research is to conduct a smoking material fire risk assessment for the City of Tampa (COT).

The descriptive research methodology will be utilized for this project as it is suitable for the "collection of data to answer questions concerning the current status of the subject of the study" (National Fire Academy, 2009a, p. 14). The research questions used as the foundation for this project include: What are the neighborhood characteristics and demographics associated with the at risk population living in other fire department jurisdictions where the highest frequencies of smoking material fire deaths and/or injuries are occurring? What neighborhoods had the highest frequency of smoking material fire deaths and/or injuries in the City of Tampa from 2007-2012? What are the demographics associated with the at risk population living in the City of Tampa neighborhoods where smoking material fire deaths and/or injuries occurred compared to the neighborhoods where no deaths or injuries occurred from 2007-2012?

Background and Significance

The COT is a large metropolitan community that is recognized as "the nation's 54th largest city" (City of Tampa, 2013a, p. 1). "The initial incorporation of the city occurred on December

15, 1855" (COT, 2010a, p. 156) with many "subdivisions starting to be built in 1923" (COT, 2010b, n.p.). This long history has culminated into a city with neighborhoods that are populated with varying ages of construction that are distinctly differentiated based on the demographic diversity and/or socioeconomic status of the residents. Fires caused by smoking material will be the focus of this assessment because this fire cause has been identified as one of the leading factors associated with fire related deaths and injuries in the COT from 2007-2012.

The significance of this research is that this researcher is a former Fire/Arson Investigator and was responsible for investigating the origin and cause of many preventable fires that were started by carelessly discarded smoking material from 1993 through 2003, with several resulting in great bodily harm and/or death to COT residents. Sadly, some of these fire fatalities were children, who had no control over the fate they suffered as a result of someone else that carelessly discarded smoking material.

This project has direct linkage to goals identified by the U. S. Fire Administration (USFA) and the National Fire Academy's (NFA) Executive Leadership course. The results obtained by this research may contribute to increasing the quality of life for the citizens of Tampa by identifying trends associated with smoking material fires, "thus providing the opportunity to develop proactive measures aimed at educating and equipping at risk populations" (Gonzalez, 2011, p. 8). This desired outcome targets the USFA's Goal 1: Reduce Risk at the Local Level through Prevention and Mitigation. The first operational initiative of this goal seeks to "expand initiatives in public fire and safety education through various avenues to reach all segments of the population, particularly high risk groups" (USFA, 2010-2014, p. 18). In addition, the project is linked to the Executive Leadership course through the systems thinking approach that can be used to chart "the patterns that recur" in order to assist with "the identification and diagnosis of

adaptive challenges" (NFA, 2012, p. SM 3-5). Through the use of the systems thinking approach, TFR can "zero in on the highest risk population" (NFA, 2009b, p. SM 2-23) associated with smoking material fires to influence and educate others in an attempt to leverage a change in public policy towards risk reduction strategies (NFA, 2012).

Literature Review

A review of existing literature was completed to gather information to determine how smoking material fires are identified, classified, reported and how the collected information is disseminated throughout the fire service community. Statistical information will be synthesized to report the frequency, deaths and injuries associated with smoking material fires. Lastly, causal factors and smoking material fire risk reduction strategies will be discussed.

Identification of Smoking Material Fires

Once a formally reported fire "has been extinguished, state and local governing documents mandate that an investigation to identify the fire's origin and cause is conducted" (Gonzalez, 2011, p. 9). The laws governing fire origin and cause may differ slightly from jurisdiction to jurisdiction. In the State of Florida, Fire Code Chapter 69A-61 Rules of the Bureau of Fire and Arson Investigations, Section (3) Conduct of Initial Investigation states,

> (a) Any time a fire or explosion has occurred which results in property damage in any municipality, county, or special district having an organized fire department, any local fire official whose intent is to request the State Fire Marshal to perform an investigation under Section 633.03, F.S., shall make or shall cause to be made an initial investigation of the circumstances surrounding the cause and origin of such fire. Law enforcement officers are permitted to, if any chooses, conduct such initial investigations.
>
> (b) If the fire occurs in a municipality, county, or special district which has no organized fire

> department or designated arson investigations unit within its law enforcement providers, the municipality, county, or special district is permitted to request the bureau to conduct such initial investigation. (Florida Depatment of State, 2011, para. 4)

The aforementioned state rule is adopted locally by the COT Charter in Chapter 11 Fire Prevention and Protection, Section 11-8 Investigation of Fires, which states,

> The Fire Marshal and his designated representatives shall investigate the origin, cause, and circumstances of every fire or explosion occurring within the jurisdiction of the city, which is of suspicious nature or which involves loss of life or injury to a person or by which property has been destroyed or damaged or an attempt has been made to destroy property, or cause loss of life or injury. Where it has been determined through such investigation that the fire is of a criminal nature, it shall be the responsibility of the Fire Marshal or his designated representative to conduct further investigation to determine who is criminally responsible, to develop a case for presentation to the State Attorney, and arrest those for whom probable cause has been established that a criminal act has been committed. (COT, 2009, p. 3)

The identification of a fire cause is the end result of a forensic analysis of the fire scene. The National Fire Protection Association (NFPA) 921, Guide for Fire and Explosion Investigations was developed "to assist in improving the fire investigation process and the quality of information on fires resulting from the investigative process" (National Association of Fire Investigators, 2011, p. 1). The process that is used for fire cause determination adheres to the same theory of other processes used in the fire and Emergency Medical Services (EMS) profession, which is to conduct a systematic approach during high valued assessment situations to make sure that nothing is missed. For example, a firefighter uses a left or right hand search process to make sure that every area of a structure has been exhaustively searched for possible

victims, while an EMS worker utilizes a head to toe process when performing patient assessments to make sure that all possible injuries are identified.

The systematic approach used to assess a fire scene when seeking to identify a fire cause is to work from the least damaged areas of a structure to the heaviest damaged areas (Gonzalez, 2011; NFPA, 2008). "This systematic approach has sometimes been referred to as conducting a backwards investigation" (Gonzalez, 2011, p. 11). The theory of a backwards investigation is that the heaviest damaged room is where the fire burned the longest, and the area of the room with the heaviest damage is where the point of origin of the fire will usually be located. "The point of origin is defined as the exact physical location where the heat source and a fuel come in contact with each other and a fire begins" (NFPA, 2008, p. 310). After locating where the fire originated, the next step in the process is to identify the fire cause.

Determining the actual fire cause is best achieved by reconstructing the room of the fire's origin back to its original state prior to the fire and fire suppression efforts. This process requires the ability to forensically piece together the contents of the room based on the burnt remains and existing fire patterns. "Fire patterns are the visible or measurable physical change" (NFPA, 2008, p. 20) "of material, such as furniture, clothing, appliances, wall coverings and structural components" (Gonzalez, 2011, p. 12). The fire patterns and burnt remains are then used as directional indicators to identify the fires path of travel. This process can sometimes be difficult to accomplish, especially if the firefighters removed the material from the room and/or structure as part of the overhaul operation.

"The fire cause is the circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion" (NFPA, 2008, p. 20). The first step in determining the fire cause is to identify and

assess “all heat-producing devices, appliances, or equipment that could have caused the ignition” (NFPA, 2008, p. 336). The fire investigator will look for all possible accidental fire causes first. Once all accidental fire causes are eliminated the query will switch to willful and unlawful sources of ignition.

Many smoking material fires can be identified as a result of the extended amount of time it takes for the discarded smoking material to smolder and generate enough continuous heat upon the material they come in contact with in order to produce flaming combustion. This process usually results in patterns that investigators use to assist with identifying discarded smoking material as the fire’s cause. One pattern is a situation where there is relatively a small amount of fire damage compared to the extensive soot damage caused by “the production of thick, tarry smoke” that is left behind throughout the entire structure (Forensic Science Central, 2013, n.p.). Another pattern is left when the discarded smoking material is left on a spring style mattress. In this scenario, the slow extended buildup of heat causes the springs to collapse in the area of the discarded material while the remaining springs remain in their usual position.

Classification and Reporting of Smoking Material Fires

“In 1963 the National Fire Protection Association (NFPA) formed a technical committee to devise a uniform system of fire reporting to encourage fire departments to use a common set of definitions” (National Fire Incident Reporting System, 2008, p. 1-5) to classify fires. “As a result, NFPA 901 Standard Classifications for Incident Reporting and Fire Protection Data was created and offered as a guide for use by the fire service industry” (Gonzalez, 2011, p. 13). This guide created a structured framework known as the National Fire Incident Reporting System (NFIRS) to compile and categorize fire cause data so that reliable analysis can be performed to validate local, state and national trends. The classifications associated with smoking material

fires are outlined in the NFIRS Chapter 4 Fire Module. In Chapter 4 under Section E Heat Source, the fire officer completing the fire report will identify the fires heat source. The classifications include 61 cigarette, 62 pipe or cigar and 63 heat from undetermined smoking material (NFIRS, 2012).

"The United States Fire Administration (USFA), through the National Fire Data Center (NFDC) plays a significant role in collecting and distributing data concerning the causes of fires and consequences to fire departments and their communities" (NFIRS, n.d., para. 1.) through the data that is submitted from NFIRS (Gonzalez, 2011). B. Pabody, (personal communication, December 14, 2010) the Chief of the NFDC, reported that "approximately 22,000 out of 30,000 fire departments use NFIRS so the data collected is not exhaustive." However, J. Kromrey, (personal communication, January 25, 2011) Professor with the Department of Educational Measurement and Research at the University of South Florida explained, "Although 100% participation is not achieved, having a sample that represents 73.3% of the population provides extremely precise estimates of the entire population's characteristics."

> As pointed out, even though the large sample size increases the validity of the data collected by NFIRS and supports the generalizability of the results to the nation as a whole, potential reliability issues regarding inconsistency of the data being entered may exist. (Gonzalez, 2011, p. 14)

B. Pabody, (personal communication, December 14, 2010) explained that "28% of all fires and 43% of fatal fires reported in NFIRS are classified as unknown." Unfortunately, this large percentage of incidents with unknown fire causes may actually be minimizing a much greater fire problem associated with smoking material fires than what is being reported.

Collection and Dissemination of Smoking Material Fire Statistics

"The Federal Fire Prevention and Control Act of 1974 (P.L. 93-498) authorizes the National Fire Data Center to gather and analyze information on the magnitude of the Nation's fire problem" (USFA, 2011, p. 1). "To fulfill this obligation, the NFDC established NFIRS to serve as the data collection point for the nation's fire service" (Gonzalez, 2011, p. 15). NFIRS a component of the USFA "is the most representative national fire database, providing detailed information on individual fires and casualties" (USFA, 2006, p. 1). The data entered into NFIRS is categorized in order to assist researchers to narrow down their queries. The available NFIRS report types used for this research include Civilian Casualties, Residential Structure Fire Causes and Tally. The Residential Structure Fire Causes contains 13 categories. The category used by this researcher includes smoking. The Tally reports provide the frequency and percentages of a particular incident to include civilian and fire service injuries and deaths (NFIRS, 2013).

The information contained in the NFIRS database can be requested by participating fire department representatives and presented by jurisdictional boundaries at the local or state level via the website http://www.nfirs.fema.gov. This type of analysis allows fire departments the ability to specifically identify their community's fire problem, while also being able to bench mark their community with neighboring jurisdictions, similar sized communities and/or nationally. The USFA uses the national analysis that is generated by NFIRS to inform and educate end users through various technical reports that are made available electronically via the website https://apps.usfa.fema.gov/publications/ or in a hard copy format via a request to the NFA. "The data produced by the USFA is considered the most reliable because the information collected is provided directly by fire departments that use NFIRS" (Gonzalez, 2011, p. 15).

Another nationally based fire reporting data source that is available for fire cause analysis is the U. S. Consumer Product Safety Commission (USCPSC). In contrast to the USFA, the data that is available from the USCPSC is collected from telephone surveys of individuals that experienced non-fire department attended fires (Gonzalez, 2011; Greene & Andres, 2009). In comparison with the USFA, injury statistics and technical reports are made available electronically via the website http://www.cpsc.gov/ under the tab Research & Statistics.

Smoking Material Fire Statistics

This section will present information based on the reported number of smoking material fires and the reported number of deaths and injuries resulting from smoking material fires in the U. S., State of Florida and the COT.

Smoking Material Fires

"Nearly all smoking-material fires and losses involve cigarettes" (USFA, 2006, p. 4). Both interior and exterior environments sustain smoking material fires. In 2005, the nation's firefighters responded to 82,400 smoking material fires (Huang, 2009). Ten years later "in 2010, U.S. fire departments responded to an estimated 90,800 smoking-material fires", which was "largely unchanged from 89,500 in 2009" (Hall, 2012, n.p.). These statistics represent all locations where smoking material fires occur, both inside and outside structures; however, the majority of smoking material fires occur in exterior environments. A possible contributing variable associated with this trend may be the fact that "as of December 2012, 28 states have enacted statewide bans on smoking in all enclosed public places, including bars and restaurants" (Wikipedia, 2013, n.p.). In addition to the aforementioned regulatory smoking bans in public buildings, the abundance of coverage by way of print, radio and television regarding the negative health issues associated with second hand smoke, has probably resulted in personal bans for

residential households that have mixed occupants of smokers and non-smokers. In short, the more smoking that occurs outside is directly proportionate to the reduced amount of smoking inside structures, which is a good thing given the fact that "cigarettes are, by far the leading type of smoking material involved in residential smoking fires and account for 87 percent of these fires" (USFA, 2010a, p. 3).

The USFA (2013a) publishes national estimates for residential smoking material fires from the data that is collected via NFIRS. The frequencies for the reported number of residential smoking material fires nationally from 2007-2011 are presented in Table 1.

Table 1

Frequency of Residential Smoking Material Fires Nationally from 2007-2011

Year	Residential Fire Frequency
2007	8,900
2008	8,300
2009	7,000
2010	7,600
2011	7,800

Even though the data in Table 1 does not identify a consistent decrease in the frequency of residential smoking material fires nationally from 2007-2011, "the long term trend in smoking-material fires have been down, by 73% from 1980 to 2010" (Hall, 2012, n.p.). Literature suggest that this trend may be associated with a reduction in smokers, regulations making mattresses and upholstered furniture more resistant to cigarette ignition and the development of fire safe cigarettes (Hall, 2012; USFA, 2012).

In the State of Florida, smoking material fires accounted for approximately 2.08% of all structure fires from 2007-2012 (NFIRS, 2013). The COT reported that smoking material fires accounted for approximately 8.64% of all structure fires from 2007-2012 (COT, 2013b). Frequencies and percentages for the reported number of smoking material fires in the State of Florida and COT from 2007-2012 are presented in Table 2.

Table 2

Frequencies and Percentages for Smoking Material Fires in the State of Florida and City of Tampa from 2007-2012

	Florida		Tampa	
Year	Frequency	Percentage	Frequency	Percentage
2007	259	1.99	25	9.12
2008	287	2.09	23	7.08
2009	303	2.07	20	10
2010	283	1.98	17	7.32
2011	288	2.16	19	11.24
2012	284	2.16	13	7.07

Unfortunately, the data presented in Table's 1 and 2 are not truly representative of the totality of the smoking material fire related problem. "The U.S. Consumer Product Safety Commission (CPSC) is charged with protecting the public from unreasonable risks of injury or death from thousands of types of consumer products under the agency's jurisdiction" (U. S. Consumer Product Safety Commission, 2011, p. 1). The USCPSC acquires data regarding the relationship between consumer products and fire safety by conducting "national telephone probability sample

survey of unreported (and non-fire department attended) residential fires" (Greene & Andres, 2009, n.p.). The USCPSC reported that 96.4% of the total number of residential fires went unreported to fire departments in 1984 and 96.6% went unreported in 2004-2005 (Gonzalez, 2011; Greene & Andres, 2009).

Deaths and Injuries Associated with Smoking Material Fires

Smoking material fires are the leading cause of fire related deaths (Miller, 2013; NFPA 2013a; USCPSC, 2013; USFA, 2010b). "Every year, almost 1,000 smokers and non-smokers are killed in home fires caused by cigarettes and other smoking materials" (USFA, 2013b, p.1). Unfortunately, one-in-four people killed in a smoking material fire is not the individual whose cigarette started the fire (USFA, 2006; USFA, 2013b).

The USFA (2006) reported that "fires started by lighted tobacco products, principally cigarettes, constitute the leading cause of residential fire deaths" with an annual average of 937 deaths and 2,217 injuries from 1994-1998 (p. 1). In 2002, smoking fires resulted in 520 deaths and 1,330 injuries and accounted for "19% of residential fire fatalities and 9% of injuries" (USFA, 2005, p. 1). By 2005, smoking material fires ranked first among the 16 leading fire causes of fire in home deaths with 19.2% of all civilian fire related deaths and sixth with 7.2% of all civilian fire related injuries (Huang, 2009). However, from 2003-2007 the fire related "death rate declined by 20 percent, and the injury rate declined by 9 percent" (USFA, 2010b, p. 1). While this finding in general is encouraging, fatalities and injuries caused by preventable fires remain a problem in the U.S.

The reduction of death and injury caused by smoking material continued to decline between 2006-2008 with an annual average of 450 and 1,025 respectively (USFA, 2010a). Miller (2013) with the USCPSC reported that "smoking materials were the largest contributor to deaths

associated with an annual average of 500 deaths from 2008 to 2010 and accounted for 21.5 percent of the estimated annual average of total residential fire deaths" (n.p.). Unfortunately, by 2010 smoking material fires started to rise again with an estimated 610 civilian deaths and 1,570 civilian injuries (Hall, 2012) and in 2011, smoking material fires resulted in 490 deaths and 1,370 injuries (NFPA, 2013b).

As previously stated, the USCPSC cited 96.4% of the total number of residential fires went unreported in 1984 and 96.6% went unreported in 2004-2005 (Greene & Andres, 2009). As such, the aforementioned reported number of deaths and injuries to our nation's citizens as a result of smoking material fires, especially those representing injuries may not truly be representative of the totality of the problem for three potential reasons. The first is associated with the aforementioned USCPSC report that identified the extremely large percentage of fires that go unreported (Gonzalez, 2011; Greene & Andres, 2009). "The second reason is associated with the lack of tracking patient progress once the victim has been transferred from the responding agency to the hospital" (Gonzalez, 2011, p. 20). For example, K. McCarthy (personal communication, January 26, 2011) with the State of Florida NFIRS explained,

> If a person is injured in a fire and later succumbs to the injury and dies in the hospital, a change in NFIRS database does not occur unless the responding agency makes the change. As such, the reported number of deaths may be higher than what has been reported.

The third reason is that approximately 43% of fire incidents entered into NFIRS do not have sufficient information to classify the cause of the fire, thus attributing to another possible percentage of smoking material fire deaths and injuries that are not accounted for (Gonzalez, 2011; USFA, 2010c). Finally, compounding this issue even further is the potential for reporting errors caused by the fire departments entering the data into the NFIRS (Gonzalez, 2011).

The State of Florida reported 19 deaths from 2007-2012 and approximately 198 injuries per year during the same time period (NFIRS, 2013). Frequencies and percentages for the reported number of smoking material fire deaths and injuries in the State of Florida from 2007-2012 are presented in Table 3.

Table 3

Frequencies and Percentages for Smoking Material Fire Deaths and Injuries in the State of Florida from 2007-2012

	Deaths		Injuries	
Year	Frequency	Percentage	Frequency	Percentage
2007	2	3.03	25	4.80
2008	6	7.79	39	6.75
2009	6	8	28	3.81
2010	0	0	40	5.43
2011	3	4.17	43	5.91
2012	2	2.63	23	3.28

TFR reported four deaths and 12 injuries resulting from smoking material fires from 2007-2012 in the COT (COTb, 2013). Frequencies and percentages for the reported number of smoking material fire deaths and injuries in the City of Tampa from 2007-2012 are presented in Table 4.

Table 4

Frequencies and Percentages for Smoking Material Fire Deaths and Injuries in the City of Tampa from 2007-2012

	Deaths		Injuries	
Year	Frequency	Percentage	Frequency	Percentage
2007	2	66.67	0	0
2008	0	0	5	33.33
2009	0	0	1	12.50
2010	0	0	5	62.50
2011	1	33.33	1	33.33
2012	1	25	0	0

Causal Factors Associated with Smoking Material Fires

An analysis of causal factors is an important component of assessment based research in order to identify the existence of potential relationships (Gonzalez, 2011). "Causal factors must be addressed in order for risk to be reduced" (NFA, 2009b, p. SM 2-7). This section will discuss the smoking material fire causal factor's human behavior, gender and age.

Human Behavior

The leading causes of residential fires are both directly and indirectly attributable to human behavior and not equipment malfunction (Ahrens, Hall, Comoletti, Gamache & LeBeau, 2007; Gonzalez, 2011; Huang, 2009; USFA, 1998). Greene and Andres (2009) identified that "the majority of residential fires (69 percent) were associated with human carelessness" (n.p.). This contributing factor is largely attributed to the inability of some individuals to clearly delineate

the difference between perceived risk and actual risk resulting in the decision to engage in unsafe behaviors (Gonzalez, 2002).

"Among the human factors that contribute most to the occurrence of smoking fires is falling asleep" (USFA, 2005, p. 4). The USFA (2010a) identified that "smoking (or smoking-related fires) are considered a behavioral cause" (p. 1) and that abandoned or carelessly discarded smoking material was the leading factor at 67% associated with the ignition of a fire compared to misuse of material (15%), heat source too close to combustibles (11%) and unspecified (7%).

Gender

In 2006, males accounted for 2,377 and females accounted for 1,563 of our nation's fire deaths (USFA, 2010b). A potential cause for males becoming a fire related casualty more frequently than females may be due to the fact that males "are much more likely to experience an increased activation of the physiological response" (James, 2011, p. 2) that triggers the fight over flight reaction. Unfortunately the fight "response can be extremely powerful, but it doesn't always work to our advantage" (Ellis-Christensen, 2011, p. 1), in that 59% of civilian injuries from 2004-2008 were a result of attempting to extinguish a fire (Ahrens, 2010; Gonzalez, 2011). Regardless of gender, another contributing factor resulting in the decision to fight the fire may be "out of a sense of responsibility for the mistake of letting the fire start in the first place" (Chubb, 2003, p. 2).

Age

In general, individuals between ages 20 and 54 represent the greatest risk of experiencing a fire related injury (USFA, 2010b). The age of the victims' increases when smoking material is the cause of the fire. The USFA (2005) reported that "middle-aged and older adults are most

often killed or injured in residential smoking fires" (p. 5) with "nearly half (45%) fatal home smoking-material fire victims were age 65 or older" (NFPA, 2013c, n.p.).

Unfortunately, children are also highly represented in this demographic with more than one third of the people that died as a result of smoking fires were the children of the smokers that caused the fire (USFA, 2006; USFA, 2013b). Craig Fugate the Director of the Federal Emergency Management Agency supported this unfortunate statistic by explaining that "little kids just can't get out by themselves" (Sternberg, 2011, p. 2). "Young children are vulnerable due to their psychomotor inability to self evacuate or their lack of cognitive development resulting in a decision to seek a hiding place rather than evacuation" (Gonzalez, 2011, p. 25).

Smoking Material Risk Reduction Strategies

When developing risk reduction strategies, "it is important to zero in on the highest risk population" (NFA, 2009b, p. SM 2-23). Hall (2005) identified the highest two at risk populations associated with fire incidents were education level and income. Unfortunately, even though the highest risk populations are easy to target, they tend to be the hardest in making an impact with prevention measures (Gonzalez, 2011; Hall & Cote, 2008). "Accordingly, the challenge life safety educators' face has less to do with matching the population's education level with the "right" information than with persuading the learner that the information being received is relevant to their everyday existence" (Gonzalez, 2011, p. 29).

Fire service professionals are in the best position to drive fire risk prevention strategies; however, to accomplish this task they must commit to sharing the overwhelming emphasis on response missions with fire prevention initiatives (Gonzalez, 2011; Lacy & Valentine, 2005). As a framework to focus prevention efforts, the NFA's Executive Analysis of Community Risk Reduction course outlined the five E's (education, enforcement, engineering, economic incentive

and emergency response) as a realistic and effective approach to reducing community fire risk (Gonzalez, 2011; NFA, 2009b).

Education

Gielen, McDonald and Piver (2007) found that 86% of fire departments engage in fire safety education. Unfortunately, as many communities continue to recover from the past decade's economic downfall, many departments have been faced with reducing services as a result of budget cuts. "As such, when faced with the reality of cutting emergency response services or fire safety education, the latter will understandably loose out" (Gonzalez, 2011, p. 28). One reason for this albeit easy decision is that since it is impossible to quantify the effectiveness of fire safety education programs by validating that a fire did not start as a direct result of fire safety education, emergency response will always be required to mitigate the damage caused by fires (Hall & Cote, 2008). "In fact, TFR had to make this difficult decision recently, which resulted in the reduction of one of the two fire life safety educators" (Gonzalez, 2011, p. 28).

To assist local communities with smoking material fire risk reduction messaging, the USFA (2006) provided the following information for public dissemination.

- If you smoke, smoke outside.
- Wherever you smoke, use deep, sturdy ashtrays. Ashtrays should be set on something sturdy and hard to ignite, like an end table.
- Before you throw out butts and ashes, make sure they are out, and dowsing in water or sand is the best way to do that.
- Check under furniture cushions and in other places people smoke for cigarette butts that may have fallen out of sight.
- Smoking should not be allowed in a home where oxygen is used.

- If you smoke, choose fire-safe cigarettes. They are less likely to cause fires.
- To prevent a deadly cigarette fire, you have to be alert. You won't be if you are sleepy, have been drinking, or have taken medicine or other drugs. (p. 56)

Enforcement

"Some of the greatest advances in fire prevention include the promulgation of laws, rules, codes, standards and regulations to promote the primary prevention of fires" (Department of Health, 2010, p. 1). The NFPA is "the world's leading advocate of fire prevention… and disseminates more than 300 consensus codes and standards intended to minimize the possibility and effects of fire" (NFPA, 2011a, p. 1). NFPA 101 Life Safety Code "addresses those construction, protection, and occupancy features necessary to minimize danger to life from the effects of fire, including smoke, heat, and toxic gases created during a fire" (NFPA, 2011b, p. 1). The advantage of the requirements outlined in NFPA 101 is that they "do not require the active participation of individuals to prevent fires" (DOH, 2010, p. 1).

The nation's fire services have used building fire codes as a way to reduce fires and the associated deaths and injuries resulting from fires for decades. These fire code provisions are written into law at the state level and enforced at the local level by fire officials through the adoption of ordinances. A disadvantage related to enforcement authority associated with building fire codes as a strategy to reduce residential fire risk is that "the provisions of the Life Safety Code shall not apply to one-family and two-family dwellings" (Florida Statutes, 2011, n.p.). This exclusion removes a large portion of the occupancies where smoking material fires frequently occur.

In addition to building fire codes, national regulations making mattresses and upholstered furniture more resistant to cigarette ignition and the development of fire safe cigarettes have also had a positive impact at reducing the risk associated with fires (Hall, 2012; USFA, 2012).

> In the 1980s, grassroots organizations and Congress worked to pass bills that would require cigarettes to pass ignition tests. These efforts culminated in the 1984 Cigarette Safety Act and the Fire Safe Cigarette Act of 1990, both of which stimulated research to make cigarettes more "fire safe" and less likely to prevent future fire tragedies. (USFA, 2010a, p. 1)

New York was the first state to enact legislation to mandate the sales of fire-safe cigarettes. "Since the New York State legislation was enacted in 2003, all 50 States have adopted fire-safe cigarette regulations with the last State passing legislation in March 2010" (USFA, 2010a, p. 2).

Engineering

"One of the more common and prevalent types of engineering technology used to save lives and reduce property damage caused by fire is the automatic smoke alarm" (Gonzalez, 2011, p. 31). Unlike the intent of fire-safe cigarettes, which are designed to "sharply reduce ignition strength (ability to start fires)" of discarded lit cigarettes (Hall, 2012, n.p.), automatic smoke alarms are primarily used to mitigate the effects after a fire has ignited by quickly notifying the building occupants and/or the local fire department via a monitored alarm service provider (Gonzalez, 2011). "Because smoking fires result in more fire deaths than any other residential fire cause, these statistics suggest the need to pay special attention to smoke alarm maintenance in smoker households" (USFA, 2010d, p. 8).

Economic Incentive

Many fire departments have used grant funds to purchase and provide automatic smoke alarms at no cost as an economic incentive to their citizens to reduce the number of fire deaths

and injuries (Gonzalez, 2011, p. 31). P. Dempsey, (personal communication, May 17, 2013) Public Education Officer with TFR reported that "approximately 1,250 automatic smoke alarms is distributed annually in the COT." In the COT,

> residents can go to their neighborhood fire station to receive a free automatic smoke alarm or replacement battery. If the resident is unable to get to their neighborhood fire station or are unable to install the automatic smoke alarm or replacement battery, the neighborhood fire station personnel will go to the residence and perform the task for them. (Gonzalez, 2011, pp. 31-32)

Emergency Response

Obviously the time to put aside risk reduction initiatives is during situations in which personnel are providing emergency response service delivery. However, there are some situations where fire prevention efforts can be discussed after the emergency has been mitigated. For example, while in a residential structure for an emergency situation, such as a medical call, personnel can ask the home owner if they have a working smoke detector after the patient's illness or injury has been resolved.

Procedures

The procedures used in this study and described in this section were very similar to those previously presented by this researcher in the Applied Research Paper titled *Assessing Residential Cooking Fires in the City of Tampa*. Four approaches were used to collect information for this project. The approaches included literature reviews, fire reporting data reviews, census data reviews and the dissemination of a questionnaire. The literature review began at the National Fire Academy's Learning Resource Center in March 2013 and continued using the Internet. The fire reporting data was gathered through literature reviews, the COT Fire

Marshal's Office and NFIRS. Census data was collected from the internet via the American FactFinder link on the www.census.gov website.

The collection of original research was facilitated by developing and disseminating a 12-item self-reported questionnaire (see Appendix A for a copy of the Assessing Smoking Material Fires Questionnaire). This researcher developed the questionnaire after a review of the Internet did not reveal any applicable data collection instruments. Consideration was given for the potential respondent's time, therefore the questionnaire was limited to 12 items and utilized a structured format in which the questions included suggested answers that could be quickly marked. The questionnaire was used to answer research question one: What are the neighborhood characteristics and demographics associated with the at risk population living in other fire department jurisdictions where the highest frequencies of smoking material fire deaths and/or injuries are occurring?

Question one of the 12-item self-reported questionnaire was included to categorize the fire department based on personnel employment structure (career, volunteer or combination). The information allowed this researcher to determine if a correlation exists between personnel employment structure (question 1) and fire prevention staffing (questions 2 and 3) and/or public education staffing (questions 4 and 5). A possible correlation was also sought between personnel employment structure (question 1) and whether or not the respondent's department had conducted a smoking material fire assessment (question 6) or had engaged in the use of smoking material fire risk reduction strategies (question 9).

Question 10 was asked to identify if smoking material risk reduction strategies were being used, and if so, what types (enforcement, engineering, education or economic incentives) were the most prevalent. Questions 11 and 12 were included to solicit information regarding whether

or not the respondents that reported using smoking material fire risk reduction strategies (question 6) had evaluated the effectiveness of their programs, and if so, how effective had the programs been. This information was sought to determine if a correlation existed between the type of risk reduction strategy being used (question 10) and its reported effectiveness (question 12). The purpose of questions seven and eight was intended to gather information to specifically answer research question one: What are the neighborhood characteristics and demographics associated with the at risk population living in other fire department jurisdictions where the highest frequencies of smoking material fire deaths and/or injuries are occurring? The at risk categories used for this study includes children less than 5 years of age, adults over 65 years of age, individuals living with a disability, non-English speaking individuals, families living below the poverty level and individuals living below the poverty level.

The questionnaire was distributed using a convenience sampling approach to other fire departments electronically through two routes. The first was through a request made to the Florida Fire Chief's Associations (FFCA). "The Florida Fire Chiefs' Association (FFCA) is Florida's leading management education organization for fire & emergency services professionals" (FFCA, 2012, n.p.). The FFCA has a web based information exchange service that is available to its members for information gathering purposes. The information request is disseminated electronically to all active members of the FFCA, which includes representatives from other states.

The second route was accomplished by sending the questionnaire electronically to former Executive Fire Officer Program participants that attended the January 2010 Executive Development, December 2010 Executive Analysis of Community Risk Reduction, October 2011

Executive Analysis of Fire Service Operations in Emergency Management and March 2013 Executive Leadership courses.

The third route was accomplished by posting the questionnaire on the International Association of Fire Chiefs (IAFC) KnowledgeNet. KnowledgeNet is a new service provided by the IAFC "that allows members to directly connect with the rest of the membership." (A. Davison, personal communication, February 3, 2012).

All returned questionnaires were categorized alphabetically by the fire department name associated with the individual submitting the questionnaire to verify that no duplicate responses by any one fire department were part of the data analysis. A checklist was created by this researcher and used to categorize and chart the data collected from each fire department respondent's questionnaire (see Appendix B for a copy of the Data Collection Checklist for Fire Departments).

The COT Fire Marshal's Office and the NFIRS data center were used to collect fire reporting information to answer research question two: What neighborhoods had the highest frequency of smoking material fire deaths and/or injuries in the COT from 2007-2012. Variations between the two data sources were noted when trying to identify the frequency of smoking material fire deaths and injuries in the COT. The COT Fire Marshal's Office data was selected and presented in Table 4 to answer this component of the research question because this data source was determined to be more reliable and valid. The COT Fire Marshal's Office was also used to identify the other component of this research question, which was to identify the neighborhoods were the smoking material deaths and/or injuries occurred from 2007-2012.

The American FactFinder link on the www.census.gov website was used to collect census data to answer research question three: What are the demographics associated with the at risk

population living in COT neighborhoods where smoking material fire deaths and/or injuries occurred compared to the neighborhoods where no deaths or injuries occurred from 2007-2012? The most recent demographic population data available from the Census Bureau was from 2010. This year would have been selected even if more current data was available since it best represents a snap shot of the COT population from 2007-2012.

Limitations of the Project

Four potential limitations for this project are noted. The first is the absence of an existing questionnaire to collect information from the participants; however, since this process did not measure attitudinal scales, reliability and validity checks were not needed (Gall, Borg, & Gall, 1996; Gonzalez, 2011). The second is a product of the convenience sampling procedure. The population used for the original research data collection of this project was limited to those fire departments that were readily available to this researcher based on time constraints (Gonzalez, 2011). The third is associated with the use of a self-reported questionnaire. Self-reported data may be affected by bias (Gonzalez, 2011). The fourth is that questionnaires should avoid items "that might elicit reactions of embarrassment" (Ary, Jacobs & Razavieh, 1979, p. 177). As such, it is possible that some individuals opted not to respond as a result of feeling embarrassed about not conducting a risk reduction assessment or not utilizing risk reduction strategies in their communities (Gonzalez, 2011).

Results

Information collected from the Assessing Smoking Material Questionnaire (Appendix A) provided answers to research question one: What are the neighborhood characteristics and demographics associated with the at risk population living in other fire department jurisdictions where the highest frequencies of smoking material fire deaths and/or injuries are occurring? A

total of 106 participants responded to the questionnaire. Questions seven and eight of the self-reported questionnaire were used to collect data to create a profile of the neighborhood characteristics and at risk population demographics of other communities where the highest frequency of smoking material fire deaths and injuries are occurring. The results of the questionnaire identified lower socioeconomic neighborhoods with older residents and older construction had a significantly higher frequency of smoking material fire deaths and injuries than higher socioeconomic neighborhoods with younger residents and newer construction. The at risk population demographics of the residents that suffered the highest frequency of smoking material fire deaths and injuries were adults 65 years of age or older, disabled and living alone or with family members below the poverty level. The neighborhood characteristics (Table 5) and at risk population demographics (Table 6) of other fire department's communities where the highest percentage of smoking material fire deaths and injuries occurred are presented in Table 5 and Table 6.

Table 5

Other Fire Department's Neighborhood Characteristics Profile With the Highest Percentage of Smoking Material Fires, Deaths and Injuries

Characteristics	Percentage
Lower Socioeconomic	58.5
Upper Socioeconomic	3.8
Older Residents	22.6
Younger Residents	3.8
Newer Construction	0.0
Older Construction	45.3

Table 6

Other Fire Department's at Risk Population Demographic Profile With the Highest Percentage of Smoking Material Fires, Deaths and Injuries

Demographic	Percentage
Less than 5 Years Old	5.7
Over 65 Years Old	34
Disabled	20.8
Non-English	5.7
Family < Poverty	28.3
Individual < Poverty	28.3

Questions one, two through six and 10 of the questionnaire (Appendix A) were used to collect data to determine if a correlation exists between pay structure (question 1) and fire prevention activities and staffing (questions 2 and 3), public education activities and staffing (questions 4 and 5) and whether or not the department had conducted a smoking material fire assessment for their community (question 6) or had engaged in the use of smoking material fire risk reduction strategies (question 9). The participants that responded to the questionnaire represented 73.6% career departments, 26.4% combination departments and 0% volunteer departments. The results of the data analysis did not identify any correlation between pay structure and the other aforementioned variables.

The data collected from questions two through six identified; 84.9% of the participants responded yes to having a designated fire prevention division with 83% of those reported staffing the division with full-time personnel; 73.6% reported yes to having a public education division with 51% of those reported staffing the division with full-time personnel; 88.7% of the participants responded that no residential cooking fire assessment had been conducted for their community. Of the 106 total participants that responded to the questionnaire, 32.1% of the participants responded yes to using one or more smoking material fire risk reduction strategy. Question 10 was used to identify the type of risk reduction strategies that were being used most frequently by other fire departments; 5.7% reported using enforcement, 24.5% reported using engineering, 35.8% reported using education and 28.3% reported using an economic incentive. Question 11 was used to identify whether or not an assessment of the risk reduction strategies that were being used by other fire departments had been conducted; 9.4% of the respondents reported yes to conducting risk reduction strategy evaluation. Of those, 56.7% reported their program to be effective and 43.3% reported their program to be somewhat effective.

Information collected from the COT Fire Marshal's Office and the NFIRS was used to answer research question two: What neighborhoods had the highest frequency of smoking material fire deaths and/or injuries in the COT from 2007-2012? TFR has 22 fire stations with 21 of them geographically spread throughout the COT to protect their residents. Fire station number 2 is located at Tampa International Airport. The personnel and equipment assigned to station number 2 do not leave the airport property. Fire station number 22 was built and put into service in 2012. Fire station number 22 did not have any smoking material fire deaths or injuries in 2012. From 2007-2012 TFR responded to 117 smoking material fires resulting in four civilian deaths and 12 civilian injuries requiring transport to a medical facility. With the exception of fire station 2 and 22, of the remaining 20 neighborhood fire stations, the deaths and injuries occurred in the neighborhoods that are protected by nine of them. The nine fire stations were numbers 1, 4, 5, 6, 7, 10, 11, 15 and 18. Frequencies for the reported number of smoking material fire deaths and injuries from 2007-2012 by TFR fire station numbers are presented in Table 7.

Table 7

Frequencies for Smoking Material Fire Deaths and Injuries by TFR Fire Station Number

Station	Deaths	Injuries
1	0	2
4	0	1
5	0	1
6	0	1
7	1	1
10	1	1
11	0	3
15	1	1
18	1	1
Total	4	12

Internet research from the census bureau was used to answer research question three: What are the demographics associated with the at risk population living in COT neighborhoods where smoking material fire deaths and/or injuries occurred compared to the neighborhoods where no deaths or injuries occurred from 2007-2012? The most recent demographic data available from the Census Bureau was from 2010. The COT is a large urban community that is filled with a diverse population. The categories used to identify the demographic profile for this research includes children less than 5 years of age, adults 65 years or older, persons living with disability, non-English speaking households, families living below poverty level and individuals living

below poverty level. The COT 2010 demographic profile percentage of the at risk population in the neighborhoods by fire station number that responded to a smoking material fire death and/or injury from 2007-2012 are presented in Table 8.

Table 8

COT 2010 Demographic Profile Percentage by Fire Station Number that Responded to a Smoking Material Fire Death and/or Injury from 2007-2012

Category	#1	#4	#5	#6	#7	#10	#11	#15	#18
Child < 5	1.3	10	11.2	7.1	5.4	6	7.1	6.1	7.3
Adult > 65	24	21.1	5.1	13.9	13.5	16	8.5	12	14.1
Disabled	22.7	35.8	27.1	20	26.1	30.6	29	11.3	28
Non-English	25.8	31.5	19.1	55.3	16.1	4	31	15.1	11.1
Family < Poverty	.7	7.8	11.3	6	3.6	6.6	4.4	1.1	4.4
Ind. < Poverty	16.1	51.4	52.5	29.3	14.8	35.4	22	9.5	20.8

A demographic profile of the at risk population in the neighborhoods in which the fire stations did not respond to a smoking material fire death or injury from 2007-2012 was also conducted to identify similarities and differences between the two demographic profiles. The COT 2010 demographic profile percentage by fire station number that did not responded to a smoking material fire death or injury from 2007-2012 are presented in Table 9.

Table 9

COT 2010 Demographic Profile Percentage by Fire Station Number that did not Respond to a Smoking Material Fire Death or Injury from 2007-2012

Category	#3	#8	#9	#12	#13	#14
Child < 5	5.2	5.6	5.5	7.3	8.3	5.2
Adult > 65	15.5	16.5	23.3	9.2	7.3	16.4
Disabled	20	26.1	32	20.4	31.2	14.5
Non-English	9.6	21.1	63	43	21.8	14.6
Family < Poverty	3	2.4	3.8	3.7	4.9	.3
Ind. < Poverty	17.8	14	22.2	18	22.8	4.3

Category	#16	#17	#19	#20	#21
Child < 5	3.9	5	7.1	8.2	7.9
Adult > 65	5.5	14	8	4.2	4.6
Disabled	19	12.7	24.3	9	7.8
Non-English	14.8	13.6	13.3	12.8	12.5
Family < Poverty	2.6	0	3.6	1.3	1.1
Ind. < Poverty	15	3.5	15.1	5.8	3.8

A comparison between the averages of the at risk populations in the two demographic profiles identified in Table 8 and Table 9 did not reveal much variation (less than 3%) between the categories children less than 5 years of age, adults over 65 years of age, non-English speaking and families living below poverty level. Disabled individuals had approximately 6% and individuals living below poverty level had 15% variations, which revealed that the

neighborhoods with a higher percentage of disabled and individuals living below poverty level suffered more fire deaths and injuries associated with smoking material fires from 2007-2012. A comparison of the 2010 demographic profile percentages for the fire stations that did and did not respond to a smoking material fire death and/or injury from 2007-2012 are presented in Table 10.

Table 10

COT 2010 Demographic Comparison Percentages for Fire Stations that did and did not Respond to a Residential Cooking Fire Death and/or Injury from 2005-2010

	Residential Cooking Fire Death or Injury	
Category	Yes	No
Child < 5	6.8	6.3
Adult > 65	14.2	11.3
Disabled	25.6	19.7
Non-English	23.2	21.8
Family < Poverty	5.1	2.4
Ind. < Poverty	28	12.9

Discussion

The result of this research provides information that can assist TFR with developing risk reduction strategies to reduce the frequency of smoking material fires. Focusing on smoking material fires for the basis of this research project is reinforced by the fact that "in 2010, U.S. fire departments responded to an estimated 90,800 smoking-material fires", which was "largely unchanged from 89,500 in 2009" (Hall, 2012, n.p.). Smoking material fires are also reported as the leading cause of fire related deaths (Miller, 2013; NFPA 2013a; USCPSC, 2013; USFA,

2010b), with “almost 1,000 smokers and non-smokers killed in home fires caused by cigarettes and other smoking materials” annually (USFA, 2013b, n.p.). Even more egregious is the fact that, one-in-four people killed in home fires is not the smoker whose cigarette started the fire (USFA, 2006; USFA, 2013b).

In addition, the project is especially applicable and meaningful to the COT given the fact that smoking material fires accounted for approximately 2.08% of all structure fires from 2007-2012 in the state of Florida (NFIRS, 2013), while the COT reported that smoking material fires accounted for approximately 8.64% of all structure fires for the same period of time (COT, 2013b). This trend clearly reinforces the need for TFR to focus more resources towards smoking material fire risk reduction strategies in the COT (Gonzalez, 2011). Even though the aforementioned data clearly illustrates an unacceptable pattern associated with smoking material fires, the research identified that the true extent of the problem may not be known since approximately 96% of the total number of residential structure fires are unreported annually (Gonzalez, 2011; Greene & Andres, 2009). The organizational implication regarding the uncertainty of the true amount of unreported fires and the associated data regarding how the fires are being started prevents TFR from accurately identifying the effectiveness of current risk reduction strategies that may be working towards reducing smoking material fire deaths and/or injuries.

The study clearly identified the COT neighborhoods where smoking material fire deaths and/or injuries had occurred from 2007-2012 (Gonzalez, 2011). Of the 21 neighborhood fire stations, only nine neighborhoods experienced a smoking material fire death and/or injury from 2007-2012 (COT, 2013b). Of those, fire station’s 7, 10, 15 and 18 responded to one death and one injury, station 11 responded to three injuries, station 1 responded to two injuries and

station's 4, 5 and 6 responded to one injury (COT, 2013b). The implication of having access to this information allows TFR to accurately identify at risk neighborhoods (Gonzalez, 2011). As a result, risk reduction strategies associated with enforcement, engineering, education, economic incentives and emergency response can be focused more intensely in these nine neighborhoods (Gonzalez, 2011).

The research also identified that of the at risk populations living in the neighborhoods that experienced a smoking material fire death and/or injury, individuals living below poverty (28%), disabled individuals (25.6%) and non-English speaking individuals (23.2%) made up the largest percentage of the residents. In addition, the research pointed out that children are also highly represented in this at risk demographic with more than one third of the people that died as a result of smoking fires were the children of the smokers that caused the fire (USFA, 2006; USFA, 2013b). The organizational implications of this finding will allow TFR to tailor the smoking material fire risk reduction strategies to best address the particular needs of these groups.

As a result of the participation of the self-reported Assessing Smoking Material Fires Questionnaire (Appendix A), this researcher identified that other fire department's neighborhood characteristics that experienced the highest prevalence of smoking material fire deaths and/or injuries include lower socioeconomic areas with older residents living in older construction houses. The questionnaire also revealed that the demographic at risk populations that other fire departments attribute the majority of their smoking material fire deaths and injuries to were families living below poverty (28.3%), individuals living below poverty (28.3%0 and disabled individuals (20.8%).

Fire service professionals are in the best position to promote and champion fire risk prevention strategies (Gonzalez, 2011; Lacy & Valentine, 2005). The EACRR course outlined the five E's (education, enforcement, engineering, economic incentive and emergency response) as a realistic and effective approach to reducing community fire risk (NFA, 2009b). Gielen, McDonald and Piver (2007) found that 86% of fire departments engage in fire safety education; however when the participants of the Assessing Smoking Material Fires Questionnaire (Appendix A) were asked if they used risk reduction strategies to reduce the number of smoking material fire deaths and/or injuries, only 32.1% responded yes. Of those, 35.8% reported using education, 28.3% reported using economic incentive, 24.5% reported using engineering and 5.7% reported using enforcement. The implication of this finding is that educational strategies appear to continue to be the most popular route that fire departments are still using to reduce smoking material fires.

The Assessing Smoking Material Fires Questionnaire (Appendix A) identified that economic incentive and engineering respectively were the next highest used strategies behind education. Engineering and economic incentive can be commingled into one strategy since most departments provide automatic smoke alarms to their citizens for free (Gonzalez, 2011). This finding implies that TFR should continue the practice of providing free automatic smoke alarms to their residents as an effective strategy to reduce the risk of death or injury resulting from un-witnessed fires in the COT.

Recommendations

Based on the literature review and results gathered from the original research, the following recommendations are being presented for consideration.

1. TFR should increase public education outreach, to include enforcement, engineering, education and economic incentive strategies in the nine neighborhoods that suffered a smoking material fire death and/or injury from 2007-2012, while continuing at the current level in the remaining 12 neighborhoods.
2. TFR should tailor some of their risk reduction strategies to target individuals living below poverty, disabled individuals, non-English speaking individuals and adults over the age of 65 years old.
3. TFR should promote the use of fire-safe cigarettes.
4. TFR should conduct a fire risk assessment every two years to identify emerging trends, identify at risk groups and track the effectiveness of existing fire risk reduction strategies.

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Appendix A

Greetings,

By way of introduction, my name is Michael Gonzalez and I am the Tampa International Airport Fire Chief. I would like to request your assistance with gathering information pertaining to a community risk reduction assessment project I am working on titled *Assessing Smoking Material Fires in the City of Tampa* that I am working on as part of the requirement for the Executive Fire Officer Program.

Please complete the questionnaire and return it via email to michael.gonzalez@tampagov.net or by fax to 813-348-6525.

I want to thank you in advance for your assistance in this matter.

Assessing Smoking Material Fires Questionnaire

1. How are the personnel structured in your department/organization?

- ❑ Career/All Paid
- ❑ Volunteer
- ❑ Combination Career/Volunteer

2. Does your department/organization have a designated fire prevention division?

- ❑ Yes
- ❑ No
- ❑ Not Sure

3. If you answered yes to item 2, how is your fire prevention division staffed?

- ❑ Full-Time
- ❑ Part-Time
- ❑ Not Sure

4. Does your department/organization have a designated public education program?

- ❑ Yes
- ❑ No
- ❑ Not Sure

5. If you answered yes to item 4, how is your public education program staffed?

- ❑ Full-Time
- ❑ Part-Time
- ❑ Not Sure

6. Has your department/organization conducted a smoking material fire assessment of your community?

- ❑ Yes
- ❑ No
- ❑ Not Sure

7. Based on your experience, what are the neighborhood characteristics in your jurisdiction that has the highest prevalence of smoking material fires, deaths and/or injuries?
(Please check all that apply)

- ❑ Lower socioeconomic neighborhoods
- ❑ Higher socioeconomic neighborhoods
- ❑ Neighborhoods with predominantly older residents
- ❑ Neighborhoods with predominantly younger residents
- ❑ Neighborhoods with predominantly newer construction
- ❑ Neighborhoods with predominantly older construction

8. Based on your experience, what are some of the demographic profiles associated with the populations in your jurisdiction that experiences the highest prevalence of smoking material fires, deaths and/or injuries?
(Please check all that apply)

- ❑ 5 or less years old
- ❑ 65-years or older
- ❑ Disabled individual (physical/mental) living in the household
- ❑ Non-English speaking individuals living in the household
- ❑ Individuals earning below the poverty level living in the household
- ❑ Families earning below the poverty level living in the household

9. Does your department/organization use any risk reduction strategies to reduce the number of smoking material fires, deaths and/or injuries in your jurisdiction?

- ❑ Yes
- ❑ No
- ❑ Not Sure

10. If you answered yes to item 9, what is the focus area of the risk reduction strategy?
(Please check all that apply)

- ❑ Enforcement: Home safety surveys/inspections, stores only sell fire safe cigarettes
- ❑ Engineering: Promote smoke alarms, residential sprinkler systems
- ❑ Education: Public speaking outreach, pass out literature at public events
- ❑ Economic Incentives: Provide free smoke alarms and/or replacement batteries

11. If you answered yes to item 9, has your department/organization evaluated the effectiveness of the risk reduction strategy?

- ❑ Yes
- ❑ No
- ❑ Not Sure

12. If you answered yes to item 11, how would you rate the effectiveness of the risk reduction strategy?

- ❑ Very Effective
- ❑ Somewhat Effective
- ❑ Not Effective

Appendix B

Data Collection Checklist for Fire Departments

Fire Department Structure	Career	Volunteer	Combination
Fire Prevention Division	Yes		No
Fire Prevention Staffing	Full-Time	Part-Time	Not Sure
Public Education Division	Yes	No	Not Sure
Public Education Staffing	Full-Time	Part-Time	Not Sure
Conducted Smoking Material Fire Assessment	Yes	No	Not Sure

Neighborhood Characteristics	Lower Socio	Higher Socio	Older Residents	Younger Residents	New Homes	Old Homes
Population Demographics	Under 6 Years Old		Over 65 Years Old		Disabled	
Population Demographics	Non-English Speaking		Individual Below Poverty		Family Below Poverty	
Use Risk Reduction Strategies	Yes		No		Not Sure	
Type of Risk Reduction Strategy	Enforcement	Engineering	Education	Economic Incentive		
Risk Reduction Strategy Evaluation	Yes		No		Not Sure	
Risk Reduction Strategy Effectiveness	Very Effective		Somewhat Effective		Not Effective	