

**DEVELOPMENT OF AN ELDERLY HIGH-RISE FIRE SAFETY PLAN FOR
THE CITY OF ROCHESTER FIRE DEPARTMENT**

LEADING COMMUNITY RISK REDUCTION

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An applied research project submitted to the National Fire Academy
as part of the Executive Fire Officer Program

October 2004

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 was the Rochester Fire Department (RFD) did not have any fire safety programs that dealt with elderly residents who live in high-rise buildings. The purpose of this study was to develop a plan that would enhance fire safety education for this segment of the population. This was an action research project. The research questions were:

1. What experiences do other organizations have in dealing with fire safety and elderly residents who live in high-rise buildings?
2. What fire safety competencies do elderly high-rise residents currently possess in the City of Rochester?
3. What is the RFD currently doing to address fire safety concerns with elderly residents who live in high-rise buildings?
4. How would the RFD best communicate fire safety concerns with elderly residents who live in high-rise buildings?

The procedures involved, utilized a questionnaire, researching trade publications and an interview with a High-rise Fire Safety Inspector.

The results indicated that the elderly population in the City of Rochester, need fire safety education, and that the best way to distribute this information is in person. Currently, the RFD is not satisfactorily addressing elderly high-rise fire safety concerns.

The recommendation, based on this study, is for the RFD to start utilizing a plan for educating elderly high-rise residents in fire safety. This program will need to begin with very basic information and be expended upon as time goes on.

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Introduction

The elderly population in the United States is increasing at a rapid rate. Over the last century, the number of persons age 65 and older has tripled. Currently, those aged 65 and older represent 12.5% of the total population and number 35 million. By the year 2050, the elderly population is expected to double, reaching 80 million or 20% of the American population (APCO, 2001). This “graying of America” will have a profound affect on everyone, including the fire service. Elderly people are more susceptible to fire burns and fatalities. The fire death rate is 20 percent higher for those over 60 than the national average for those in all age groups. For those aged 70, the fire death rate is double the national average, and for those aged 85 the death rate from fire is four times the national average (TriData, 1999).

Elderly residents are one of the highest at risk groups for fire related death and injury. The problem is that the Rochester Fire Department (RFD) does not have any fire safety programs equipped for the elderly, and more specifically, elderly residents who live in high-rise buildings. The purpose of this study is to develop a plan that will help the RFD better prepare and protect elderly residents who live in high-rise buildings from the effects of fire. This is an action research project. The research questions are:

1. What experiences do other organizations have in dealing with fire safety and elderly residents who live in high-rise buildings?
2. What fire safety competencies do elderly high-rise residents currently possess in the City of Rochester?
3. What is the RFD currently doing to address fire safety concerns with elderly residents who live in high-rise buildings?

4. How would the RFD best communicate fire safety concerns with elderly residents who live in high-rise buildings?

Background and Significance

For years fire departments have been focusing their fire prevention efforts almost exclusively on juveniles and elementary school age children. Fire prevention for the elderly has been “spotty” at best. This lack of fire prevention education among the elderly is starting to show up in statistical data now being generated. “In one month in 1989, for example, major fires killed 23 residents in three different elderly housing complexes in Roanake, Virginia; Watertown, New York; and Johnson City, Tennessee” (Weiger, 2002, p. 65). The RFD, like many fire departments around the country, has been focusing its prevention efforts almost entirely on juveniles. This focal point has resulted in a dramatic decrease in juvenile fire deaths in the City of Rochester. For the first time in the history of the department, the RFD did not experience a juvenile fire death for one full 12 month period in 2001-2002. But, over the last four years, 50 percent of the fire fatalities in the City of Rochester have been to those aged 60 and older.

The City of Rochester, located in upstate New York, is 36.44 square miles. It is a densely populated city of 219,773 of which 25,626 (11.66 percent) are over the age of 62. Over the past 3 years 25 percent of all fire related injuries in the City of Rochester have been to those aged 62 and older (Robert Branca, personal communication, June 13, 2004). The majority of the elderly residents who live in Rochester are housed in high-rise buildings located throughout the city. These high-rise buildings are not nursing homes or assisted living complexes. They are simply rent controlled apartments for the elderly.

Presently, the RFD does not have a program in place that deals specifically with the elderly and fire education or prevention. Over the next 25 years the elderly population is expected to increase rapidly. This increase is due in part to the “baby boom” generation reaching retirement age. It is estimated that between 2010 and 2030 those entering their 60s will increase by 2.8 percent annually. This is in comparison to an annual increase of 1.3 percent from 1990 to 2010 and a 0.7 percent increase from 2030 to 2050 (TriData, 1999). If the RFD is to continue focusing efforts on proactive fire fatality prevention, then this segment of the population will need to be addressed.

The elderly tend to have many deficiencies that contribute to their increased risk of fire death. Some of these deficiencies include diminished sense of smell, hearing, depth perception, mobility and balance (Burris, 2001). Because the elderly are at higher risk for fire deaths and injuries, future efforts will need to concentrate on this age group. It is anticipated that with a better understanding of the elderly population and their fire educational needs, the RFD will be able to limit the number of fire deaths and injuries to the elderly in the future.

This Applied Research Project (ARP) studies a community risk reduction taught in the *Leading Community Risk Reduction* course. Unit 4 of the course states:

The purpose of fire prevention education is to raise awareness, provide information and knowledge, and ultimately produce desired low-risk behavior.

Often referred to as “pub ed,” fire departments have been involved in the field of fire prevention education for many years. Public education has been growing in popularity recently because of demands from the public for this message. (NFA, 2003, p. 4-42)

This research project ties into the United States Fire Administration operational Objective to “reduce the loss of life from fire in the age group 65 years old and above” (NFA, 2002, II-2) by providing a guide that can be used to educate the elderly population on fire prevention and protection.

Literature Review

The purpose of this literature review is to set forth the practical foundation of this study. During the literature review process, various fire service trade magazines, books, technical reports and internet sites were reviewed. Information was also gathered by personal communication. The information collected allowed for a comprehensive review of those fire risks associated with the elderly population, concentrating on those elderly residents who live in high-rise buildings.

Before undertaking any study, it seems prudent to look at previously related incidents and studies to try and gain insight from others. When looking at fire safety and the elderly who live in high-rise buildings, many unique circumstances are apparent. The first area of concern is the mobility of those who live on upper floors. Many of the elderly are wheelchair bound or have an extremely hard time descending flights of stairs. During the World Trade Center attacks, these types of limitations and their effects became apparent. John Abruzzo, who is a C 5-6 quadriplegic and wheelchair bound, had to descend 69 floors during both attacks. During the first attack in 1993 it took Mr. Abruzzo more than six hours to evacuate from the 69th floor. During the second attack (with the use of an emergency evacuation chair) it took over 1 hr 30 min to descend 69 floors (Pauls, 2002). Fire departments must realize that significant time and resources will be expended if the elderly need help evacuating upper floors of a high-rise.

Another area of major concern is knowledge regarding what to do after a fire has started. Many times, firefighters and civilians are killed due to the circumstances created by the actions of citizens after a fire has started. For example, on Oct 12th, 1998 a high-rise building which housed the elderly almost cost a Fire Captain his life. This high-rise was located in a metropolitan city in Missouri. The fire started on the 21st floor around 0900hrs and the first call to the fire department was received at 0934hrs. The occupant of the apartment stated she tried to extinguish the fire with glasses of water for a period of time. The resident then called the front desk to report the fire, and left the apartment with the door in the open position (NIOSH, 1999). Because the door was left open and there was a delayed alarm the fire was allowed to gain significant headway before the fire department arrived. These types of actions by the resident (delayed alarm, leaving the front door open) were incorrect and almost cost a firefighter his life.

In another instance, the United States Fire Administration (USFA) states that a delayed alarm and open apartment door led to the death of two occupants and five firefighter injuries, one with serious burns, during a fire in 2002. This incident occurred on June 28th, in a high-rise condominium in Clearwater, Florida. It is estimated that the apartment occupant and another resident fought a stove fire for 16 minutes before the fire department was called. Because the residents left the door open and fought the fire themselves, the fire gained significant headway and extended out into the hallway by the time the fire department arrived. This stove fire caused approximately \$1 million in damages to the high-rise (Cook & Miller, 2002).

Before a fire safety plan can be developed for the elderly, their current fire safety awareness must be ascertained. Most studies done on fire prevention for the elderly indicate that fire departments should stress the same issues they do with children. Some key topics would include stop drop and roll, plan and practice your escape route, know local emergency numbers, and smoke alarms save lives. Some other considerations for the elderly may include large deep ashtrays, kitchen safety, proper use of space heaters, and knowing your limitations when planning your escape route (Padula, 1999). Since most public education on fire safety only started over the past 20 years, it is very likely that the elderly have never been given “basic” fire safety programs. If the elderly are unaware of rudimentary fire safety messages then the educational programs must start at step one.

Other fire safety competencies that the elderly should possess are; unplugging and turning off small appliances before leaving home, proper storage of flammable materials, not leaving candles unattended, having a working smoke detector, and not smoking in bed or on a sofa (C2 Technologies, 2002).

The elderly also tend not to know what they should do if they are injured by fire. One study uncovered that elderly patients tend not to report their injuries in a timely manner, and also have little knowledge on how to treat a burn wound. 36 percent of burn patients in one study treated their burns with herbal ointment, toothpaste, soya sauce, and some even applied cigarette ash to their wounds (Ho, Ying, & Chan, 2001). This improper treatment leads to infections which contribute to prolonged hospital stays and increased mortality. Most fire departments tend to incorporate those who die from fire related injuries as fire deaths. If the RFD is going to reduce fire deaths to the elderly then

it must also address fire related injuries. The elderly will need to be educated on injury treatment and how to care for their injuries. They also would need to be educated on injury prevention.

Other issues the fire service will have to take into consideration when looking at fire safety competencies the elderly possess are their physical and mental capabilities. As Burris (2001) found, many of their potential deficiencies include diminished sense of smell, hearing, depth perception, mobility, and balance. These deficiencies need to be taken into consideration when developing fire safety programs for the elderly. As C2 Technologies (2002) uncovered, the elderly have a hard time replacing batteries in their smoke detectors. They often must use ladders to reach the battery and most do not feel comfortable using a ladder. Chances are also significant that they may fall while on the ladder. It is obviously not prudent for the elderly to be injured while performing fire safety recommendations from the fire department. If the fire service is going to make fire safety recommendations, then the physical and mental ability of the audience must be considered.

Next, it is crucial to find out if the RFD is currently doing anything to address fire safety concerns of the elderly residents who live in high-rise buildings. Two areas of primary importance that the RFD should be concentrating on include; sprinkler systems and emergency voice / alarm communications (EVAC).

Sprinkler systems have always been a political nightmare for fire departments. The cost of retrofitting buildings with sprinklers has always come under fire from building owners. In October 2003, six people died in a high-rise building in Chicago that did not have a sprinkler system. Sprinklers which are nearly 100 percent effective could

have saved the lives of these six people. For the cost of installing new carpet throughout the building, this high-rise could have had sprinkler protection (Manning, 2003).

Another area that needs to be addressed is the installation of voice communications in high-rise buildings. As Bunker (2002) stated, the ability to communicate verbal instructions to building occupants on upper floors during an emergency will save many lives. This ability to use an EVAC system for buildings over seven stories in height is imperative. The use of this system is greatest whenever it is impractical or impossible to provide total evacuation. These types of systems should be used during fire drills that the fire department is evaluating. As Winter (2003) describes, fire drills should be conducted giving residents from each floor different instructions to ascertain whether or not they follow instructions given by the fire department during fire drills. Because of today's building construction features, most residential high-rises are compartmentalized. This allows residents to stay in their apartments on upper floors (away from the fire) without becoming subjected to the products of combustion. The only way to communicate with people on upper floors is through an EVAC system. The second link to this communication chain is the understanding from residents that they will be told what to do and that they must follow these instructions. If residents don't know what to do during a fire then chaos is sure to follow.

The RFD could also explore the use of a special needs registration program. Linn County, Iowa has such a program for the elderly. This program provides the emergency management coordinators with information on people who would require special assistance in the event of an emergency. The information is collected by pre-paid post cards that are found inside phone books each year. This information is then downloaded

into a data base to be used during an emergency (Gibney & Wright, 2000). Although the program in Linn County is used primarily for elderly homeowners, it does not preclude it from being used for elderly residents who live in high-rise buildings.

Finally, for any type of fire safety program to work, the target audience must be reached. In order to communicate fire safety messages to the maximum number of elderly, coalitions must be formed with other organizations. Some of these organizations may include Meals-on-Wheels, Red Cross, churches, YMCA, and home care services (Weiger, 2002).

After the McCauley Culkin family fire at 66th street in Manhattan claimed the lives of four civilians, New York City formed a task force to make recommendations for high-rise multiple dwellings. This task force was entrusted with making high-rises safer from fire and its consequences. Some of the recommendations included distribution of pamphlets, (on what to do during a high-rise fire) residential high-rise education, building managers' inspection check lists, and a notice of a required fire safety plan (Derosa, 1999).

The elderly also tend to watch a lot of television. This becomes an easy medium to reach them, particularly during the news hour. Programs which air during the news will have an impact on the elderly. Because of the respect the elderly have for the fire department they, also respond well to fire safety presentations given by the fire department in person (C2 Technologies, 2002).

Another way of communicating a fire safety message or concern to the elderly is through actual scenarios. Senior citizens tend to be proud of and concerned for their rights and freedom. It is important, therefore, for the fire department to help them

understand their potential limitations in dealing with fire emergencies. An APCO (2001) study emphasized that fire departments must help the elderly understand their mobility impairment. This is best done during fire drills where their limitations will be recognized without drawing undue attention to them. These types of drills will help the fire department in getting its message across regarding lower floor placement of elderly residents with mobility restrictions.

In summary, it appears that many areas need to be addressed when developing a fire safety guide for the elderly. Some key areas include; the physical and mental state of the elderly, their present knowledge of fire safety recommendations (before and after the fire), and how to treat fire injuries. The RFD should also be concentrating on sprinkler and EVOC ordinances. Lastly, in order to best communicate fire safety messages to the elderly it is apparent that coalitions must be formed. Television and pamphlets can also be used to spread fire safety messages. The best possible way to get a fire safety messages across maybe during actual scenarios presented by the firefighters themselves.

Procedures

For this action research project two processes were undertaken. The first was the distribution of a questionnaire to elderly high-rise residents, and the second was an interview of a high-rise fire safety inspector for the City of Rochester.

Questionnaire

A questionnaire (Appendix A) was developed and distributed to residents of two elderly high-rise buildings located on the west side of the City of Rochester. The questionnaire was utilized to answer research questions one, two, and four. The subject matter for the questions was derived from the literature review. The first objective was to

look at past elderly high-rise fires (nationally) and errors that occurred, to see if these same circumstances existed in the City of Rochester. The second objective was to determine if the elderly residents who live in high-rise buildings in the City of Rochester had certain competencies with regard to fire safety. The third was to determine how to best communicate fire safety messages to elderly high-rise residents in the City of Rochester.

The questionnaire was developed by this author and reviewed by Sandy Blasi, the building manager of the two high-rise buildings where the questionnaire was distributed (S. Blasi, personal communication, July 20, 2004). The reason for the review by Ms. Blasi was because she communicates with the residents on a regular basis through internal memos, and she understands the residents reading comprehension levels and abilities. The questionnaire was pilot tested by 15 elderly high-rise residents, chosen randomly, from a high-rise building on the eastside of the City of Rochester for clarity of content.

Population

The questionnaire was then distributed to all residents of two elderly high-rise buildings located on the west side of the City of Rochester. Each building is ten stories in height and each has 90 residential apartments for a total of 180 separate dwelling units. The questionnaire was placed under the door of each unit with a two week time frame to complete the questionnaire and drop it off at the manager's office in the lobby. The two elderly residential high-rises chosen are comparable to the majority of elderly residential high-rises found throughout the City of Rochester.

The second method used for this action research project was an interview with a high-rise fire safety inspector for the City of Rochester. The fire safety inspector, Mark Scialdone, is a uniformed employee of the RFD and has the responsibility for high-rise fire safety of all high-rises located on the eastside of the City of Rochester. Although the high-rise fire safety inspector is responsible for all high-rises (office and residential), the content of this interview was only concerned with elderly residential high-rises. The interview took place on July 27, 2004 in a fire house located at 57 Gardiner Ave. in the City of Rochester. Inspector Scialdone was asked the following questions: (A) Is there any effort underway to mandate the retrofitting of sprinklers in residential high-rises? (B) Is there any mandate for building owners to have an Emergency Voice Alarm Communication system? (C) Does the RFD have a fire safety program that deals specifically with elderly residents who live in high-rise buildings? (C) Does the RFD provide information to elderly high-rise residents on burn treatments? (D) Does the RFD collect data on the elderly and what their special needs may be during an emergency?

Limitations and Assumptions

This research was limited by the fact that a number of residents in these high-rises, like most high-rises in the City of Rochester, have a limited reading ability. Although each question was developed for simplicity and ease of understanding, it is unknown if the respondents fully understood the questions.

Another limitation is the willingness or physical ability of each resident to drop the questionnaire off at the manager's office. Some residents may feel that it is asking a lot to fill out a questionnaire and then delivery it 11 floors to the lobby.

Finally it is assumed that the respondents answered honestly.

Definition of terms

High-rise – Is a structure “generally defined as a building over 75 feet in height” (Dunn, 1999, p. 14).

Dwelling Unit – “Any room or group of rooms located within a dwelling forming a single habitable unit with facilities which are used or intended to be used for living, sleeping, cooking, eating and sanitation by one family” (City of Rochester Property Code, 1987, p.3).

High-rise fire safety inspector – A uniformed fire department official responsible for conducting high-rise property inspections, and ensuring compliance of all state and local fire codes.

Statistical Analysis

Descriptive statistics were used to calculate and interpret the data generated from the questionnaire. The raw numbers and percentages are reported. The results at the structured interview are presented also.

Results

The following answers were gathered as a result of the interview with High-rise Fire Safety Inspector Mark Scialdone.

(A) Is there any effort underway to mandate the retrofitting of sprinklers in residential high-rises? Answer - No

(B) Is there any mandate for building owners to have an Emergency Voice Alarm Communication System? Answer - No

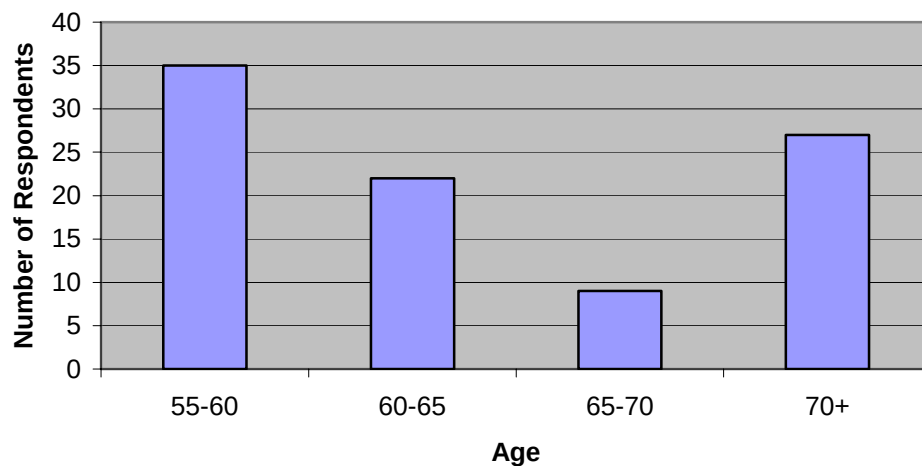
C) Does the RFD have any fire safety program that deals specifically with elderly residents who live in high-rise buildings? Answer - No

(D) Does the RFD provide information to elderly high-rise residents on burn treatment? Answer - No

(E) Does the RFD collect data on the elderly and what their special needs may be during an emergency? Answer – No

A total of 93 (51%) questionnaire forms were returned. Although 93 questionnaires were returned, a few questions were left blank by some respondents. The breakdown in age of those who returned their questionnaire was as follows: 35 (38%) were between the ages of 55-60, 22 (24%) were between the ages of 60-65, 9 (9%) were between the ages of 65-70, and 27 (29%) were 70 years old or older (Figure 1).

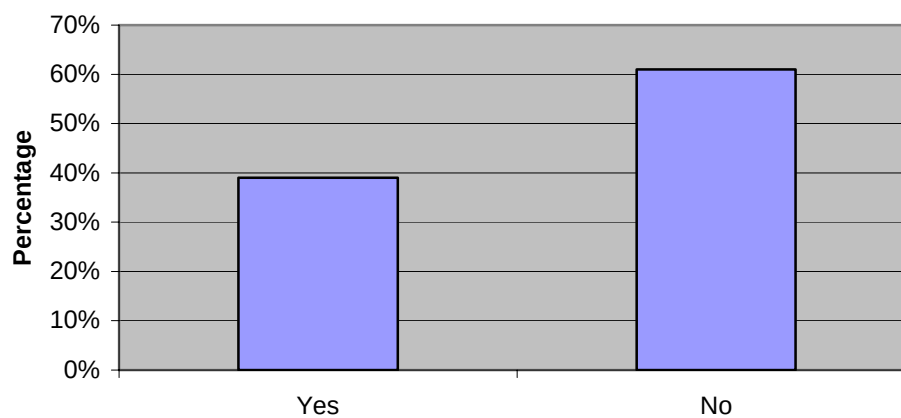
Figure 1: Age Range of Respondents



Age was not a factor when determining which floor the elderly lived on. Each respondent's floor number was placed into the age groupings above (55-60, 60-65, 65-70, 70-up) and averaged out. After averaging out each age grouping it was determined that the eighth floor was the average floor that a respondent lived on. Therefore, age has no relevance on deciding which floor an elderly resident will be assigned.

Fifty-seven respondents (61%) stated that they could walk down the stairs to the lobby from their apartment without assistance. Twenty-seven respondents (29%) stated they could not walk to the lobby without assistance. When asked if the fire department had ever talked to you about fire safety, 36 (39%) stated yes while 57 (61%) stated no. These findings are displayed in Figure 2.

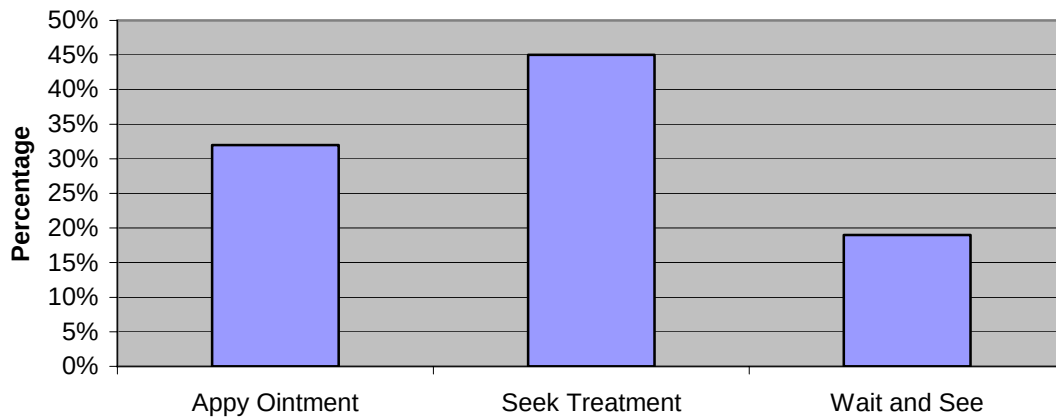
Figure 2:Ever been give Fire Safety Presentation?



When asked about a fire on their stove, and what they would do, the response was 57 (61%) would try and put it out before calling the fire department, 3 (3%) would leave their apartment than call the fire department, and 27 (29%) would leave their apartment closing their door and then call the fire department.

The following responses (figure 3) were given for the treatment of a burn which caused blisters. These were: 30 (32%) would apply an herbal ointment, 42 (45%) would seek treatment from an ambulance, and 18 (19%) would wait and see what happens over the next few days.

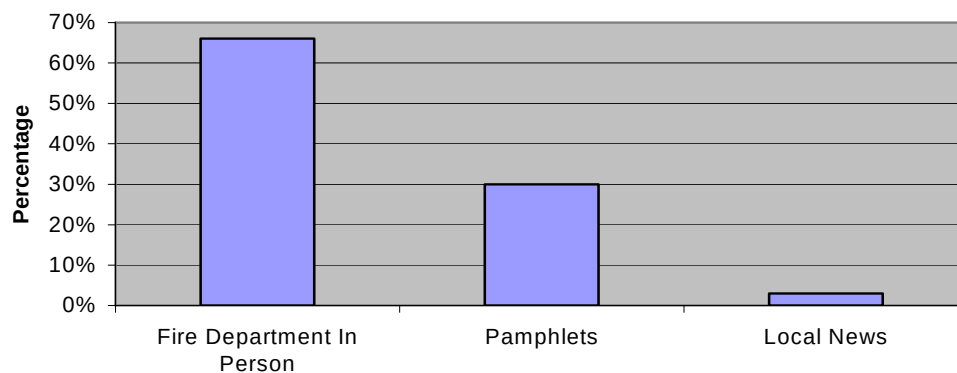
Figure 3: Response for Treatment of 2nd Degree Burns



Over half of the respondents 54 (58%) would find the nearest exit and leave if the fire alarm was going off in the building. Only 3 (3%) of the respondents would do nothing if there was no smoke in the hallway, and 27 (29%) of the respondents stated they would wait for instructions from the fire department.

When asked what is the best way to distribute fire safety information, 61 (66%) felt having the fire department telling them in person was the best. Twenty-eight respondents (30%) felt handing out pamphlets was the best way to distribute fire safety information, while only 3 (3%) felt the local news was better (figure 4).

Figure 4: Best Way to Distribute Fire Safety Information



The respondents were asked if anyone besides family visits them; 15 (16%) stated yes, while 68% stated that no outside agencies visit them on a regular basis. The last question asked the respondents if they knew what an A and B stairwell was; 60 (65%) circled yes while 27 (45%) had no idea what an A and B stairwell was.

In looking at fire safety concerns for elderly residents who live in high-rise buildings in Rochester, New York it is rather evident that every area of fire safety needs to be addressed. The plan for educating elderly high-rise residents is a Standard Operating Guideline (SOG) which lists items to cover whenever a fire safety presentation is given to elderly high-rise residents (Appendix B).

Discussion

The results indicate that the RFD should address fire safety concerns with elderly residents who live in high-rise buildings. Because the elderly population is expected to double over the next 46 years (APCO, 2001), and the fire death rate for those over 70 is double the national average (U.S. Fire Administration), the RFD must make a concerted effort to protect those who are most at risk from the effects of fire.

Mobility of elderly residents is of major concern when looking at high-rise residency and fire safety. Twenty-seven respondents (29%) stated that they could not walk down the stairs to the lobby from their apartment on their own. When people need help exiting their building during an emergency, significant time and resources are needed. John Abruzo, a quadriplegic needed six hours to descend 69 floors during the first World Trade Center attack in 1993 (Pauls, 2002). Although Mr. Abruzo was not elderly, his diminished capabilities are similar to those of some elderly. The RFD does not have any mechanism in place currently to determine how many elderly residents

would need assistance during an emergency and there is also no effort underway to regulate which floor people live on according to their capabilities. Because the elderly may be concerned with their individual rights, and freedom to choose where they live inside a high-rise building, fire departments may have to use actual drills to get their point across. Fire departments must help the elderly understand their physical limitations without drawing undue attention to them. These drills would include actual fire drills where every resident would need to exit the building using the stairs (APCO, 2001). It is anticipated that during these “live” drills the realization of each persons’ restriction would become apparent to them. This realization may help the fire department in convincing those individuals with mobility issues to relocate to lower floors where they can be more easily evacuated. These drills would need to be closely monitored at each floor so that no one is hurt during this exercise.

When the respondents were asked about fire safety presentations, 57 (61%) stated that no one from the fire service has ever talked to them about fire safety and what to do during an actual fire. Each respondent was asked what they would do if they had a fire on their stove. Only 29% of the respondents circled the right answer (leave their apartment closing their door and then call the fire department). The majority would have incorrectly tried to put the fire out before notifying the fire department. It is these types of actions by well intentioned, but uninformed individuals that often result in fire deaths and large loss of property. On Oct 12th, 1998 a fire in a high-rise building which houses the elderly almost cost a Fire Captain his life. The occupant of the apartment where the fire originated tried to extinguish the fire for a period of time before leaving their apartment. When the occupant finally left their apartment they left the front door open

(NIOSH, 1999). When a fire is delayed in being reported and the front door to the fire apartment is left open, the fire department is at a major disadvantage. By delaying the alarm the fire has a chance to grow out of control before the fire department is able to get water on it. By not closing the door to the fire apartment the hallway is allowed to fill with dense smoke and heat, which not only endangers other residents on the fire floor, but also makes it extremely difficult for the fire fighters to get down the hallway to put the fire out. In another example that killed two occupants and injured five firefighters, a resident fought a stove fire for 16 minutes before the fire department was called. The occupant of the apartment also left their door open when they finally decided to stop fighting the fire themselves and call the fire department. This high-rise fire caused over \$1 million in damages plus the loss of two lives due to incorrect actions by the occupant (TriData, 2002).

Since 61% of elderly high-rise residents have never been given a fire safety presentation by the fire department, the RFD must include very basic fire safety education in any program they put forth. As Padula (1999) indicated, some key topics would include stop drop and roll, plan and practice your escape route, know local emergency numbers, and smoke alarms save lives. Some other considerations for the elderly may include large deep ashtrays, kitchen safety, and proper use of space heaters. It may seem foolish and awkward to be showing a 70 year old how to stop drop and roll, but if they have never been taught this simple technique, they could significantly suffer if their clothes ever caught on fire. Some other simple messages that the fire department can convey to the elderly include; turning off and unplugging small appliances before leaving home, proper storage of flammable liquids, and not leaving candles unattended

(C2 Technologies, 2002). Because fire safety education is only 15-20 years old in most cities, and these efforts have mostly concentrated on school age children, it is very likely that most elderly would benefit from fire safety messages that appear elementary.

Fire safety awareness for elderly high-rise residents would also include what to do during a fire alarm, and what an A and B stairwell is. It is very important for high-rise buildings to have EVAC systems and for the residents of these buildings to listen for directions during an emergency. Although the City of Rochester has no current codes to mandate the installation of EVAC systems some building owners have installed them. Danforth Towers, the high-rise used in this study, has an EVAC system in place. According to Bunker (2002), the ability to communicate verbal instructions during an emergency to building occupants on upper floors is essential to saving many lives. This system is best utilized when it is impossible or impractical to totally evacuate a high-rise. Because of the physical limitations of the elderly it is nearly impossible to totally evacuate an elderly high-rise building during a fire. Because the majority of residents (58%) stated they would find the nearest exit and leave during a fire alarm this incorrect behavior needs to be rectified during fire safety presentations. Most residential high-rises are compartmentalized and residents tend to be safer in their rooms during a fire emergency then if they go out into the hallway or try and exit using the stairs. A majority of high-rise fire deaths occur in the stairwells because residents did not listen for instruction from the fire department. If a fire department chooses to partially evacuate a high-rise during a fire then, a designated evacuation stairwell will be chosen. This evacuation stairwell will be either A or B. When a fire department attacks a fire in a high-rise building they choose a stairwell with a standpipe to hook their hoses up to. Once the

stairwell door is open the stairwell becomes contaminated with smoke and hot gases. If a resident chooses to exit by the stairwell the fire department is using their chances of survival is limited at best. Once a stairwell is chosen (A or B) for the fire attack the other stairwell will be designated for evacuation. Unless residents listen for instructions they will never know which stairwell is safe to use for evacuation. For these reasons it is important to listen for instructions from the fire department and to also know what an A and B stairwell is. During this study, the elderly residents were asked if they knew what an A and B stairwell was. A better question and one that must be addressed during fire safety presentations is what an A and B stairwell is used for. Most residents have seen the letter designations at the bottom of the stairwell doors, but do they know why these letters are there?

Another area that needs to be incorporated into fire safety education is burn prevention and treatment. Only 45% of those questioned would seek medical treatment if they suffered a second degree burn. In one burn study (Ho, Yang, & Chan, 2001) it was discovered that 36% of burn patients incorrectly treated their burns with herbal ointment, toothpaste, and some with cigarette ash to their wound. Thirty-two percent of those questioned during this study would also have applied an herbal ointment to their wound. Because improper treatment of burn injuries results in infections, longer hospital stays, and possible death, it is necessary to include proper burn treatment in fire safety education programs for the elderly. This is especially true if death from burn injuries is included as fire deaths in annual reports of fire departments, and one goal is to reduce fire deaths in their communities.

There are many ways to present fire safety education. Some examples include public service announcements on television, distribution of pamphlets, forming coalitions with other agencies, and fire departments giving presentations in person. The results indicate that 66% prefer the fire department giving fire safety presentations in person, while 30% felt distribution of pamphlets was best. As C2 technologies (2002) indicated the elderly respect the fire department and because of this they respond well to fire safety presentations given by the department in person. Because only 16% of the respondents had someone from an outside agency visit them on a regular basis, coalition forming may not be the best way to get elderly high-rise residents fire safety material. It would seem prudent for the RFD to have pamphlets made up regarding high-rise fire safety, and distribute them during presentations which are given by fire department personnel. If some people cannot make the presentations, they can at least have a pamphlet to look over.

The results of this study further indicate that the RFD has no programs or mandates which deals specifically with high-rise buildings or the elderly who live in them. Retrofitting of sprinkler systems for elderly high-rise buildings would be a major first step in eliminating the potential for fire fatalities in these buildings. Sprinklers which are nearly 100 percent effective would have made a difference in the October 2003 Chicago high-rise fire in which six people lost their lives (Manning, 2003). Although the RFD is not currently mandating the retrofitting of sprinklers for elderly high-rise buildings this one simple change could have a profound positive affect on future loss of life from fire for the elderly. The RFD should also make an effort to have EVAC systems

mandated in high-rise buildings. There are many fire safety needs that elderly high-rise residents have, and the RFD is not currently addressing any of them.

Recommendations

Based on the results of this study, the RFD should adopt a plan (SOG) for educating elderly high-rise residents about fire safety. Study data shows the majority of elderly high-rise residents have never been given a fire safety presentation by members of the fire department. Without proper fire safety education, it is likely that these elderly residents would not know what to do during a fire emergency. A fire safety plan for the elderly will assist members of the RFD in delivering fire safety educational material to this target group. Because the Fire Safety Division of the RFD does not have any program in place to educate the elderly who live in high-rise buildings, this SOG will be an impetus for further discussion and development on this important topic. The elderly population is continuing to increase at a rapid rate therefore, it only seems logical that the RFD begin to address the fire safety needs of this target group.

An elderly high-rise safety plan is only the beginning step in protecting the elderly. The RFD should also concern itself with the adoption of codes for sprinkler protection, the mandatory installation of EVAC systems, and the creation of a data base for the elderly and their special needs during an emergency.

Fire departments throughout the country should begin to see an increase in their elderly population. This increase in the elderly population will bring new and different perspectives that the fire service must address. Although this project relates to elderly high-rise fire safety, fire departments must also address the concerns of those elderly who live in buildings other than high-rises. Each organization will have different

circumstances that will dictate what their plan should contain. Some mid-western states may wish to address tornadoes and the elderly, while the west-coast may address earthquakes and the elderly population. The fire service must adapt to ever changing conditions, and the elderly population growth and their needs, is no different.

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Appendix (A)

This questionnaire is part of my Executive Fire Officer Applied Research Project. Responding to all questions is voluntary and confidential. This project concerns fire safety and residents who live in high-rise buildings. Thank you for your assistance with this project. Darryl Winter.

- 1) How old are you? _____
- 2) What floor is your apartment on? _____
- 3) Could you walk down the stairs to the lobby from your apartment without assistance? YES NO
- 4) Has anyone from the fire department ever talked to you about kitchen safety, space heaters, or stop drop and roll? YES NO
- 5) If a pan on your stove was on fire, which of the following would you do?
 - A) First try and put it out then call the fire department.
 - B) Leave your apartment and call the fire department.
 - C) Leave your apartment closing your door and call the fire department.

6) If your arm got a burn which caused blisters, what would you do?

A) Apply herbal ointment.

B) Call an ambulance to seek treatment.

C) Wait and see what happens over the next few days.

7) When the fire alarm goes off in the building what do you do?

A) Nothing if there is no smoke in the hallway

B) I listen for instructions from the fire department

C) I find the nearest exit and leave

8) What is the best way for the fire department to give you information about fire safety?

A) Through the local news.

B) By handing out pamphlets.

C) By having the fire department tell you in person.

D) _____

9) Does anyone besides your family visit you? Ex: Home health aide, Meals on Wheels. _____

10) Do you know what an A and B stairwell is? Yes No

Appendix B

Standard Operating Guidelines for the Rochester Fire Department

Title: Elderly High-Rise Fire Safety Presentations

Date: 09/15/04

Purpose: To insure that all elderly high-rise residents are uniformly and properly instructed in high-rise fire safety and burn treatment. This guideline is not all inclusive, but merely an introduction to elderly high-rise fire safety issues. It is recommended that this information be distributed in person by RFD personnel whenever possible.

Scope: Elderly high-rise fire safety is an important component in reducing loss of life from fire in the City of Rochester. It is anticipated that with enhanced proactive fire education all citizens in the City of Rochester will be better served. This guideline offers suggestions on important topics that need to be covered during elderly high-rise fire safety presentations.

Fire Drills

It is important that elderly residents realize their limitations on their own. Fire drills should involve everyone exiting their building utilizing the stairs. During this exercise some elderly residents may realize that a lower floor placement is advised. Care must be taken so that no one is injured during this exercise.

Fire Safety Points to Cover

- Nearest escape routes
- Stop drop and roll
- Emergency numbers
- Kitchen safety (egg timers used during cooking)
- Space heaters (placement near combustibles)
- Smoking in bed
- Smoking on a couch
- Never leave candles unattended
- Electric blankets (get rid of if old, wires may become brittle)
- Unplug appliances if they are not in use
- Check smoke detectors and change batteries
- Utilize deep ashtrays if elderly smoke
- Use of extension cords and the dangers associated with them
- Keep a portable extinguisher on hand
- Do not overload electrical circuits

Fire in Occupants Apartment

Explain the importance of not trying to fight the fire, exiting the apartment, and closing the door (but not locking it) when they leave. The fire department should be called by either utilizing a pull box or phone on the floor below. The occupant should try and alert others on the fire floor as they exit to a lower floor. It is important that the occupant alert the fire department that either no one is inside the fire apartment, or more importantly that someone may be still inside.

If the Fire is Not in Their Apartment

Stay inside rather than entering smoke filled hallways. Keep door to apartment closed. Listen to instructions from fire department on what to do. Call 911 and let them know what apartment you are in if there is smoke entering your apartment. Seal your apartment door with wet towels, and if your door becomes hot, cool it down with water from the sink.

Burn Injuries

The elderly must realize that all burn injuries need to be looked at by professional medical personnel. It is important that the elderly seek medical treatment to avoid infections.

A & B Stairwells

Explain the difference between an A and B Stairwell. Explain why the stairwells are marked and the importance of listening to the fire department as to which stairs should be utilized during an evacuation. Explain that the fire department must utilize these stairwells during a fire attack and that whichever stairwell is used will become contaminated with smoke.