

# **PEOPLES AWARENESS OF FIRE**

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# **ABSTRACT**

A sample group of the Christchurch population was interviewed to discover if there were any trends in fire awareness and fire knowledge that were related to background characteristics.

A variety of methods were used to reach the 141 respondents who completed the survey. These respondents came from a variety of income, age and ethnic groupings. However most respondents were mid-income Europeans.

Results were gathered and presented to show what this sample group believes about fire and its behaviour. It also shows peoples actions in fire situations and what fire safety equipment is installed in their homes. A Chi-square analysis was then performed on four background characteristics. This was done to find if there was any evidence that these background characteristics have an affect on peoples' awareness of fire.

From the analysis the author recommends that information on the care of smoke detectors and fire extinguishers becomes more widely available and easily accessible. Also of great importance is the need for every household to have and to practice an escape plan. These general recommendations need to be available for the general population along with specific information to target the lack of knowledge in the different background categories.



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## 1.0 INTRODUCTION

The majority of fire fatalities in New Zealand occur in domestic structures. Of the 292 fire deaths over the period 1986-1994, 174 deaths occurred in these structures. This means that nearly 60% of fire fatalities occur in domestic dwellings. Domestic structures also have the highest incidence of fires, with 21 percent of all fires occurring in the home [1].

Private dwellings are structures with the least amount of regulation for fire safety. There are no laws requiring smoke detectors, extinguishers or sprinklers in private dwellings. Even if some, or all of these devices could be made compulsory, it still would be difficult to ensure that all home owners correctly installed and maintained their fire safety equipment.

Law changes would improve the safety of domestic structures. However, at this time it is unlikely that fire safety devices would become compulsory. This leaves education as an option by which to decrease the number of deaths in home fires. By teaching people safe behaviours in the home and in daily activities the number of fires occurring may be decreased and lives may be saved.

This project is aimed at discovering if there is a lack of public knowledge and awareness in relation to fire. An evaluation of the general fire knowledge may point out specific areas of weakness or strength in the populations' knowledge. From this evaluation a picture of fire safety knowledge can be formed and then used as an indication of where further education needs to be targeted. This evaluation was achieved by interviewing a random number of Christchurch, New Zealand, residents.

The questionnaire was formed by combining questions from a variety of past surveys, as well as original questions which could be valuable in finding information in regards to peoples fire awareness. These past surveys come from the United Kingdom, the United States, Norway and from other New Zealand cities and are covered in Chapter 2.

One hundred and forty one respondents, representing a sample of the Christchurch, New Zealand, population were interviewed to complete a questionnaire. The respondents came from a variety of backgrounds, though this report was interested in contacting 'at risk' groups, in particular the elderly, Maori and Pacific Islanders. These groups and the general population were contacted through Age Concern, Retirement Villages, newspaper advertisements and word of mouth. Chapter 3 shows how the respondents were contacted and how many from each group were interviewed.

The questionnaire is broken into six sections:

- Statements related to fire, to agree or disagree with
- Situations that could occur
- Self rating on preparation and knowledge
- Fire alarm systems
- General fire knowledge
- Background information on the respondent.

Each respondent was asked a number of questions, the number being dependent on the respondent's situation. This was either done in person or over the telephone. Chapter 4 discusses the aim of the questionnaire and the expected results.

Upon completion of the interview process the results were presented in Chapter 5 to show clearly how the sample group responded to the questions. The results of this study in relation to peoples' fire awareness are expected to be similar to the surveys that were reviewed.

The next stage involved performing a Chi-square analysis in Chapter 6 on background characteristics. This analysis was performed to find if any particular groups, categorised by the following four background characteristics were more at risk from fire:



- With or without children
- Own or rent home
- Age grouping
- Gender.

Recommendations are made in Chapter 7 to the four different groups distinguished by the previously mentioned background characteristics and to the sample population as a whole. The results from the questionnaire and the analysis are then concluded in Chapter 8. Future recommendations for improvements to the questionnaire and the interviewing process are made in Chapter 9. This chapter also covers alternative methods that could be used to discover peoples fire awareness.



## **2.0 LITERATURE REVIEW**

Information on the subject of peoples' awareness of fire was gathered from within New Zealand and from overseas. As well as information from past surveys, data on relationships between various demographic characteristics and fire were also recorded.

The first part of the literature review (section 2.1-2.9) summarises previous reports that used questionnaires and surveys to discover peoples' knowledge and awareness of fire. This literature formed the basis of the questionnaire in this research report as well as providing an idea of what results the questionnaire would give.

The remaining reports (section 2.10-2.14) are those that deal with the relationships between city and personal characteristics, and residential fire rates. These studies highlight which groups of the population are more at risk from fire. The groups which have been shown to be more at risk will be used as an indication of what types of results could be gathered from interviewing Christchurch residents.

## **2.1 1996 NFPA NATIONAL FIRE SAFETY SURVEY. [2]**

In 1996 the National Fire Protection Association (NFPA) commissioned a survey to find out about North Americans' beliefs about fire dangers, their knowledge of the safest behaviours to protect themselves from fire and their fire safety practices. The NFPA interviewed 800 households by telephone.

### **2.1.1 RESULTS**

#### **Do people feel safe?**

The survey showed that the majority (57%) of respondents felt "very confident" about their own personal safety from fire and 92% felt at least "somewhat confident," even though 24% have experienced an unintentional fire.

From the age of 50 up, confidence rises dramatically, but so does the risk for those aged 65 years and older. NFPA's survey indicated that older adults do not seem to realise their fire risk. Nearly half of the younger adults are very confident about their personal safety from fire, even though the United States has the highest fire death rate amongst developed nations.

#### **Where do people feel safest?**

The majority (53%) of those surveyed felt safest from fire in their homes, although homes account for 78%-80% of fires and pose a much greater risk of death from fires than do other locations. Safety concerns are expressed most often about hotels, which are amongst the safest places. Although people do not feel very safe in hotels and motels, nearly half of the patrons do not check the fire escape plan provided by hotels. People are most at risk from fire in their homes and cars. This misconception is encouraged by the fact that most people who die in house fires die in ones and twos and are unlikely to get a lot of media coverage.

## **What fire safety equipment and behaviours do people have?**

Automatic fire sprinklers are reported as being installed in the homes of 4% of respondents. As of 1994, 93% of households had at least one smoke detector. Monthly smoke detector testing is reported by 55% of respondents with detectors. Seventy-two percent of respondents said they had fire extinguishers in their homes.

Although about half of the respondents (53%) said they had an escape plan to follow in the event of a fire, only 31% of those with a plan had practiced it. When asked why they did not have an escape plan, 55% said that they had never thought about it. Only 16% of those who might need an escape ladder said that they had one.

It was found that people who went to college, who had a household income over US\$45,000, and people who had children, were more likely to have an escape plan. Men were slightly more likely to have an escape plan and were also more likely to have practiced it than females.

Only 13% of respondents failed to identify smoke detectors in answer to the question, “What would wake you up in a home fire?” Pets, sirens, divine intervention, and the various effects of the fire itself are mentioned, though this report believes that none of these would be likely to wake a sleeping person in time to escape safely.

79% of respondents know to “stop, drop and roll” if their clothes catch fire. However, it is not clear if people have practiced this behaviour. Dropping can be dangerous for older people and so smothering is recommended by this report as the best option for the elderly. Only 34% know the safest way to deal with a pan fire on the stove is to smother it with a lid and then turn off the burner. All other responses have the potential to permit or increase fire spread.

More than half the respondents wrongly assumed that they would have plenty of time to escape a typical living room fire. Most had no idea how quickly smoke, toxic gases and heat can fill a room. Fifty-eight percent thought that they had more than two minutes to escape, while 24% of those respondents believed they had 10 minutes or more to escape.

### **2.1.2 CONCLUSION**

The NFPA surveyed peoples' beliefs about fire dangers, their knowledge of the safest behaviours to protect themselves from fire, and their fire safety practices. From this survey it was found that nearly all of the respondents felt at least somewhat confident about their personal safety from fire. Most of the people surveyed felt safest in their homes, even though homes pose a much greater risk of death from fires than do other locations.

Most respondents had at least one smoke detector in their homes and just over half of these respondents tested their smoke detector monthly. About half of the respondents said that they had an escape plan, but only 31% of these respondents had practiced the plan. Half of the respondents without a plan had never thought about one.

Most people know to stop drop and roll if their clothing catches fire. This method is not recommended for the elderly, rather they should smother the fire. Only one third of the respondents knew the correct method for dealing with a pan fire.

More than half of the respondents assumed that they would have plenty of time to escape from a typical living room fire. Most respondents had no idea how quickly smoke, toxic gases and heat can fill a room.

## **2.2 CHILDREN'S KNOWLEDGE OF FIRE SAFETY, 1992. [3]**

This is a report produced for the New Zealand Fire Service analysing what standard two children (eight year olds) know about fire safety and where they got that information from.

In 1991 the NZ Fire Service planned a primary school fire safety education programme and kits were delivered in 1992 to new entrants (five year olds). The Fire Service wished to measure the effectiveness of its fire safety programme. It was decided that one way to do this would be to try and establish what knowledge of fire safety children in standard two had, prior to the new fire safety modules being introduced. This was done in the form of a questionnaire administered to a random sample of 1014 standard two children.

Another part of the research was a practical demonstration of the various fire safety procedures. A few children who did not complete the survey were asked to respond to three questions:

- "What would you do if your skirt or trousers caught on fire?"
- "What would you do if you were in a room of smoke?"
- "How would you telephone for help if there was a fire at your house?"

The purpose of this part of the research was to observe how effective children were in demonstrating and carrying out fire safety procedures and to validate the knowledge children said they had. Some children were hesitant about performing in front of strangers and this may have had some effect on the outcomes of the research.

### **2.2.1 RESULTS**

#### **What is the first thing you should do if your clothes catch on fire?**

90% of children chose the correct answer "stop, drop and roll". The other option chosen by a sizeable number of children (4%) was to "run to the door". 2.5% of children did not know what they should do.

**If the room is full of smoke what should you do first?**

More than two-thirds of the children (69%) chose the correct response “crawl low in smoke”. Twelve percent said to “stop, drop and roll” while 10.5% said “run outside”. One percent of the children did not know what to do.

**If you saw a fire which of these things would you do first?**

Seventy and a half percent chose the correct response of “make a phone call” while 3% did not know what they should do.

**If you have to phone for help about a fire, who would you call first? Which number would you use to call the Fire Service?**

Eighty and a half percent knew to call the Fire Service first, followed by 8.5% calling mum or dad. Ninety-two and a half percent knew the correct number to call, while 5% chose either “911” or “999” and 2% did not know which number to call.

**How do you know what to do first?**

For every question the children were asked how they knew what to do in each case. Children were almost equally likely to say that they had learned about fire safety procedures at home (22%) or from the Fire Service (20%). Fewer children indicated that they had learned about fire safety procedures from television (18%), from their teacher (15%), “just knew” (13%) or learned from someone else (10%).

### **2.2.2 DEMONSTRATION**

The other part of the research involved a practical demonstration. One or two children from the schools visited were randomly selected to demonstrate their knowledge of fire safety procedures. They had previously not completed a questionnaire.



Forty-seven percent of children mastered stop, drop and roll, yet only eight children were considered to have performed well enough to prevent further burning as well as to save life. Fifty and a half percent of children mastered crawling through smoke. Nearly three-quarters of the children who mastered, or partially mastered the technique looked for an exit before crawling. Eighty-four percent of children mastered phoning the Fire Service and giving their address.

### **2.2.3 CONCLUSION**

On the basis of the questionnaire responses, it was found that standard two children possess quite a high level of knowledge of the three fire safety procedures of concern to the Fire Service. These are; what to do if your clothes caught on fire, what number to dial for the Fire Service and what to do in a smoky room.

This questionnaire gave only set options to the questions. In some cases, the correct answer was more credible than some of the alternatives. This could have led to a higher correct response than if it was worded differently.

Although the questionnaire appeared to indicate that most standard two children have a high knowledge of fire safety, the demonstrations showed that a lower percentage of children faced with a simulated emergency situation were able to respond automatically in the most appropriate way. In a real emergency, with the likelihood of associated fear and panic, the percentage of children who respond correctly could well be lower.

## **2.3 CHILDREN'S KNOWLEDGE OF FIRE SAFETY. STAGE 2, 1995. [4]**

In 1991 the New Zealand Fire Service planned a primary school fire safety education programme for children from new entrants to form two (five year olds to twelve year olds). The programme introduced a new module to the children each year of their primary education.

The first module, *Calling the Fire Service, Stop, Drop, and Roll, and Crawling Low in Smoke*, is for new entrants (five year olds) and was produced in 1992. The second module, *Staying Safe from Fire*, is for J2 children (six year olds) and was introduced in 1993. The third module, the *Big Story Book*, was introduced in 1994.

The New Zealand Fire Service wanted to measure the effectiveness of its new fire safety programmes for junior school pupils. It was decided to do this by first establishing standard two children's knowledge of fire safety prior to the new programmes being introduced (Section 2.2, Children's Knowledge of Fire Safety, 1992), and then at a later date comparing data with knowledge held by children who had experienced the new programmes. By 1995 it was expected that the standard two children surveyed would have up to four annual visits from a Fire Service representative who taught the modules.

All schools that participated in the baseline study in 1992 took part in the re-evaluation of children's knowledge of fire-safety in 1995. The questionnaire was administrated to 1089 children, with 100 children who had not completed the questionnaire demonstrating how accurately they could perform the required fire safety techniques.

The questionnaire was the same as used in the 1992 study. The three areas of fire-safety knowledge targeted by the study were:

- Stop, drop and, roll
- Crawl low in smoke
- Phoning 111

The questionnaire comprised 10 structured questions with a list of options. For each question there was an accompanying question asking where they learnt the information.

The children's demonstration section was designed to observe how effective children were in demonstrating and carrying out fire safety procedures. The children were asked to show the researcher what they would do if:

- Their clothes were on fire
- The room was full of smoke
- They had to phone for help

Both studies (1992 and 1995) were compared to ascertain any changes in the children's knowledge.

### **2.3.1 RESULTS**

Of the 47 schools surveyed, 89% said that their school had participated in at least one of the three programmes, but not all had done so each year. Four schools had not participated in any of the new programmes and one principal was unsure if his/her school had participated.

#### **What is the first thing you should do if your clothes catch on fire?**

Ninety-two percent of the children correctly responded with "stop, drop on the floor and roll". This compares with 90% in 1992. The difference is not statistically significant.

#### **If the room is full of smoke what should you do first?**

Although 63.5% answered correctly with "crawl on the floor toward a window or door", there is a significant decrease from 69% in 1992. Significantly more children responded with "stop, drop, and roll" than in 1992. This incorrect response increased

from 12% to 19.5%. The other incorrect responses (excluding no response and other) had little variation from the previous survey.

**If you were by yourself and you saw a fire, which of these things would you do first?**

The correct response of "make a phone call" remained high at 73%, with no significant differences between the years. Once again the response, "stop, drop and roll" had the highest frequency of the incorrect responses (9%).

**If you have to phone for help about a fire, who would you call first?**

The number of children who said they would call the Fire Service increased significantly from 80.5% to 84%. There was also a significant decrease in the number of children who said that they would call a parent first.

**What phone number would you use to call the Fire Service?**

More children who participated in the new programmes correctly recalled the response "111" than those children who had not participated in the programmes. Ninety-two percent of the children recalled the correct number with no significant difference from 92½ % in the previous survey.

**How do you know what to do first?**

Significantly more children in 1995 reported having learnt their fire safety knowledge from a firefighter or teacher. Also, significantly fewer children reported learning from another source, such as a parent or from the television.

### **2.3.2 DEMONSTRATION**

A significantly greater number of children in 1995 reached mastery level of stop, drop, and roll (71%) compared to 47% from 1992. When asked to demonstrate

calling for help from a fire, 95% mastered the technique, a significant increase from 84% previously. No significant difference occurred for crawling through smoke.

### **2.3.3 CONCLUSION**

The 1995 results were compared to those from 1992. It was assumed that any improvements in the children's results could be attributed to the introduction of the programmes, although it was recognised that other factors could have intervened.

The children's ability to respond to the questions varied. It was not possible to determine if the children understood the questions or just randomly ticked boxes. It was also difficult to ensure that children answered the questions by themselves without talking to their neighbour or looking at their responses.

From the children's responses, it appears that standard two children have a high knowledge of fire safety. However the demonstrations showed that a lower percentage of children were able to respond automatically, in the appropriate way.

The only response to the questionnaire that significantly improved between the surveys was the children's answers to who they would call first if they saw a fire. It is reasonable to assume that the increase can be attributed to the fire safety programme. One disappointing finding was that significantly fewer children knew the most appropriate procedure if they were in a room full of smoke. A greater number of incorrect responses to this situation included the "stop, drop, and roll" response. This phrase has been widely promoted to describe what children should do if their clothes catch fire. It may be that children have become confused about the occasions on which this action is appropriate.

The danger of being burnt from a fire is well known by children but it appears that many children are not aware of the immense dangers of smoke. Children need to be aware that smoke can, and does, cause death in a fire.

The findings of this study indicate that although standard two children in 1995 have a heightened awareness of fire safety, there is still room for improvement.

## **2.4 A SURVEY OF FIRE PREPAREDNESS IN A MIDWESTERN CITY, 1977. [5]**

The United States led all major industrial countries per capita deaths and property loss due to fire at this time. One cause of this situation can be attributed to the lack of systematised knowledge in the fire field. In 1977 research regarding fire and its relation to human behaviour was in its infancy. Little work had been done on the role of attitudes in fire preparation. To help fill these gaps in knowledge, a survey was undertaken to explore the nature, extent and dimensions of fire preparedness in a mid-western city.

The questionnaire was completed by a random telephone survey to households in Evanston, Illinois. Of the 651 phone numbers called, 267 were valid household numbers and of this group, 151 provided an interview. The questionnaire contained five topics; Attitudes, Community Perception of Fires, Knowledge of Fire Safety Practices, Self-Ratings of Fire Preparedness and Fire Safety Hardware.

### **2.4.1 RESULTS**

#### **Attitude**

The majority of the sample, 94%, agreed that household fires are caused by careless actions of people. Ninety-two percent felt that they could prevent a fire in their home and most of them perceived control over fire.

#### **How would people behave in fire emergencies?**

Three hypothetical situations were presented for this. The respondents were asked what they would do if they were in such a situation. These were:

- **What would people do if their clothing caught on fire?**

Most people responded in a life supporting fashion saying they would either roll on the floor (60.9%) or wrap themselves in something (13.9%). The remaining respondents would do something else, including taking off their clothes (4.6%).

- **What would people do if they woke up at night, smelled smoke, and found that their bedroom door was shut but hot when touched?**

The most frequent response was to go out the window (41.1%). The second most frequent response, 19.2%, was to open the door. Opening a hot door would expose the occupant to heat beyond the human tolerance level. The remaining respondents would either call the Fire Service for help or lean out the window and call for help (19.9%), or they would do something else.

Other factors besides the respondent's knowledge could have influenced the answers. If there was no phone in the occupants' room they could not call the Fire Service and if the occupant was several stories above ground level they probably could not go out an alternative exit.

- **What would people do if the grease in their frying pan caught on fire?**

The most frequent responses were related to smothering the fire. These included using the lid (19.2%), baking soda (18.5%), salt (11.9%) and 7.3% of respondents who did not indicate how they would smother the fire. Six percent of respondents would get a fire extinguisher and 7.3% would throw water on the fire. The remaining respondents would do something else.

### **How do people view their preparedness for fires?**

Most respondents, 58.9%, said that they know a moderate amount about fire prevention. The majority, 64%, said that they would be fairly sure about what to do in the event of a house fire. Most of the respondents, 45.3%, rated their household to

be not prepared or somewhat prepared for a fire. Married respondents were significantly more likely to judge their household as prepared for a fire, than were single respondents.

### **What fire hardware do these respondents have?**

For single dwelling units 9.6% of respondents said that they had one or more heat sensor, smoke detector, sprinkler system or alarm. Fifty-nine percent stated that they had one or more fire extinguishers in the home. For multiple dwelling unit buildings 5.4% had an alarm in the apartment itself and 21.3% had fire extinguishers.

### **Are respondents' fears of fire reflected in estimates of the community fire problem?**

The respondents' fear of fire was attempted to be measured by the statement "The thought of my being in a fire is very disturbing". The respondents stated their degree of agreement with the statement.

It was hypothesised that the respondents' fear of fire would be reflected in their estimates of the number of building fires in their community and the number of deaths due to fire. However, it was concluded that fear of fire is not related to estimates of the number of fires and fire deaths.

### **Where do people learn about fire safety?**

Television was reported as a source of fire safety by 14.6%, reading by 37.1% and 25.8% said that their work was the source of fire safety knowledge. Almost all (96%) reported that school was a source of fire safety behaviour.

It was found that learning about fire safety from television and reading was related to the respondents' age. Older respondents tended not to have learned about fire safety from these sources.



## **2.4.2 CONCLUSION**

No useful dimensional structure was uncovered in the respondents' attitudes towards fires. It was discovered that most respondents felt that household fires can be attributed to human carelessness. Other findings reveal that most respondents believed that they could act to prevent fires in their homes. As well, most respondents report favourable attitudes towards training. These findings would suggest that there is strong public support for fire safety training.

A significant number of respondents showed a lack of knowledge of appropriate behaviour in fire emergencies as measured by response to scenarios. An analysis of the scenarios documents the need for training. In addition, the respondents' ratings of fire knowledge and preparedness were unrelated to the appropriateness of the response to the scenarios.

It was hypothesised that those respondents who gave an appropriate response to one scenario would also for the others. Results, however, indicated that this was not so, that knowledge of what to do in a fire appears to be situationally bound. Respondents who gave a correct response for one scenario may or may not have given a correct response to another scenario. This may indicate that people only learn and/or retain situationally specific knowledge about what to do in case of fire rather than concepts that they may generalise to many potential fire situations.

## **2.5 THE IMPACT OF FIRE EMERGENCY TRAINING ON THE KNOWLEDGE OF APPROPRIATE BEHAVIOUR IN FIRES. [6]**

This project was undertaken to determine whether training effectively augmented nursing home staff knowledge of a fire emergency plan, and to assess attitudes and general knowledge of appropriate behaviour in fire.

All staff members of a nursing home in Evanston, Illinois, America, completed a questionnaire designed to assess attitudes towards training and general knowledge of appropriate fire behaviour. Items were also included to assess the impact of training on specific knowledge of the fire emergency plan.

The staff were split into two groups: (1) twenty-six staff members who attended a lecture (training session) concerning the first page of the institution's fire emergency plan, and (2) twenty-three staff members who did not attend the lecture.

A 16-page questionnaire was utilised in the assessment of three aspects of the staffs' fire preparedness:

- The staffs' general knowledge of appropriate behaviour in fires.
- The staffs' knowledge of the information contained in the institution's fire emergency plan.
- The impact of the lecture on the staffs' knowledge of the first page of the fire emergency plan.

### **2.5.1 RESULTS**

#### **General attitudes towards fire emergencies.**

More than half of the respondents (62%) felt there was a chance that they would be in a fire in the future. However, 79% felt the building in which they worked was safe from fire. Also, 60% indicated that most people would probably be in a major fire at some time in their lives. A common belief held by the general public and by most of

the nursing home staff sample (88%) is that most people panic when in a fire situation. This belief appears unfounded, as this report found in previous studies.

### **General attitudes towards training.**

A majority of the respondents (81%) believed that educating the public about fire prevention would help reduce the number of fires and 94% indicated that training for fire emergencies could reduce fire related deaths.

### **General knowledge about fire.**

One final question was included to assess the staffs' general knowledge about fires. Respondents were requested to indicate their agreement with a statement which said that most people who die in fires are killed by the smoke, gases, or lack of oxygen and not by the flames. Ninety percent of the sample correctly agreed with the statement.

### **Attitude toward fire prevention and use of equipment.**

Attitudes towards learning how to use fire-fighting equipment, the need for fire department inspections of facilities, and fire prevention were also obtained. Overall, a majority of the respondents indicated they held positive attitudes towards such factors.

Staff members were also asked to rate themselves on how much they felt they knew about fire prevention. The majority (59%) felt that they had a moderate amount of knowledge and 15% indicated they knew a great deal or everything about fire prevention.

## **2.5.2 CONCLUSION**

In general, it was found that nursing home staff members held positive attitudes towards training for fire emergencies, and felt that such training was important. It was also found that a large proportion of the staff members were unfamiliar with certain aspects of the fire emergency plan. This may be due to several factors. Only 17% of the respondents indicated that they had ever read the plan.

Various questions were discussed in the training procedure assessment section, which showed no difference between the training and no-training groups, even though significant results were expected. The training lecture did appear to effectively augment the knowledge of the training group in several areas. These areas involved knowledge about the presence of a fire emergency plan, of fire escape and of fire extinguishers. The training group significantly out-scored the no-training group on questions concerning the fire alarm system of the nursing home.

A general conclusion drawn from this project was that the lecture method of training appears to be adequate in conveying simple, straightforward, factual information contained in a fire emergency plan. Most of the factual information not learned by the training group contained what appeared to be commonly held erroneous beliefs about appropriate behaviour in fire.

## **2.6 FIREFIGHTERS OUT CREATING URBAN SAFETY (FOCUS). [7]**

FOCUS involved the New Zealand Fire Service, in partnership with the New Zealand Employment Service and Community Task Force Scheme, targeting the Kohukohu community. This small community is in the far north of New Zealand, in the Northland Region, and has a high rate of low socioeconomic groups, with 72.9% on some form of government benefit.

FOCUS is a fire safety programme developed by Chicago firefighters and adapted by New Zealand Fire Service personnel in Northland. The project utilised unemployed local fire fighters to conduct a benchmark survey of the current level of awareness of the public to the dangers of fire in residential buildings.

The target sample was a random telephone survey of 48 residences. This was followed by the delivery of Fire Safety promotional packages by Fire Service personnel to the homes. Five questions were asked in the two surveys conducted before and after the project had been implemented.

### **2.6.1 RESULTS**

Results of the survey are summarised in Table 2.1.

Table 2.1 Results of FOCUS study

QUESTION	Survey 1 (before)		Survey 2 (after)	
	Yes	No	Yes	No
Do you have a fire escape plan?	65%	34%	93.7%	6.3%
Do your children know what to do in the event of a fire?	45%	17% <sup>1</sup>	70.6%	29.4%
Have you any smoke alarms fitted in your home?	56%	43.7%	96.3%	3.7%
Do you know how to check and maintain them?	68.7%	31.3%	96.6%	3.4%
Do you have any firefighting equipment in the home?	46.8%	53.2%	87.1%	12.9%

## 2.6.2 CONCLUSION

From this report it can be concluded that the low income neighbourhood that was surveyed had a low ownership of smoke detectors and firefighting equipment. Although two-thirds of respondents had an escape plan, less than half of the respondents felt that their children would know what to do in the event of a fire.

After the distribution of promotional packages by the Fire Service, the ownership of fire safety devices, the number of respondents with escape plans and the number of children knowing what to do in a fire emergency increased.

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<sup>1</sup> Although results do not add to 100%, they are reported as in the original article

## **2.7 RESIDENTIAL FIRE RISK SCAN PROJECT. [8]**

The effectiveness of the New Zealand Fire Service's delivery of Fire Safety Education and Promotion programmes was evaluated by a simple questionnaire. This was developed to pose questions relating to known Fire Safety National Education and Promotion programmes that have been in place for many years. Three districts in Porirua, Otara and Invercargill were asked to survey 100 residences with similar socioeconomic demographics and ethnic characteristics. These were Housing Corporation estates with a high proportion of welfare dependent and unemployed residents from a variety of ethnic and cultural backgrounds.

### **2.7.1 RESULTS**

#### **Contacting the Fire Service.**

This was well understood by most residents. Otara had the lowest knowledge of calling the Fire Service at 95%. Transcripts of the Communication Centre tapes indicates the difficulties the Fire Service has in extracting the information required to ensure the correct address is identified prior to dispatch.

#### **Smoke Alarms**

Otara and Porirua have relatively low proportions (28% and 24%) of residences with smoke detectors. Invercargill is higher on 55%. This confirms the need to address the provision and installation of smoke alarms in low income residential areas. The New Zealand Southland Area average for homes with smoke detectors is 70%. This survey shows that low income areas are trailing behind the Southland average.

#### **Awareness**

These questions were designed to obtain an indication of the effectiveness of various Fire Safety Programmes such as "stop, drop and roll". Most residents knew how to crawl in smoke and a reasonable proportion knew what to do if their clothes caught

fire. On the negative side, a low number of residents understood the need for a home evacuation plan.

Of the households that had experienced a fire, between 30% and 41% did not call the Fire Service.

### **Contact or exposure to the Fire Service and Fire Service fire safety.**

The relatively low response to the question about contact with the Fire Service reflects the Fire Service's difficulty in gaining access to these communities. About 50% of residents surveyed were aware that the Fire Service delivers school education programmes.

### **2.7.2 CONCLUSION**

The questionnaire showed that emphasis needs to shift from teaching people the correct number to dial (111) if they require the Fire Service to a wider education programme to promote the detailed information the Fire Service (and other emergency services) requires prior to response.

The low number of smoke detectors in residences confirms the need to develop and implement strategies to improve the situation in these lower socioeconomic areas.



## **2.8 DO SMOKE DETECTORS AND PORTABLE EXTINGUISHERS IN RESIDENTS AFFECT FIRE SAFETY? [9, 10]**

In 1991, the Norwegian authorities set out to reduce fatalities and damage from fires. One way of reaching these goals was the prescription of smoke detectors and extinguishing equipment for all residents.

A project was initiated to evaluate the effect of the regulations regarding fire safety in dwellings. Part of this study involved a survey of the state of domestic fire safety in a chosen residential area.

The questionnaire was designed to give as much, and as relevant, information about safety in the chosen dwellings as possible. The questions were divided into four different categories:

1. Facts about the household and type of residence.
2. Experiences with real fires, fire safety, and knowledge of the fire regulations.
3. How well the regulations are fulfilled in the household.
4. The household's attitude to fire safety in their own home.

The population was diverse and was divided into three subgroups:

- Families with small children (28% of respondents)
- Elderly people (37%)
- Others (35%)

### **2.8.1 RESULTS**

Two hundred and twenty-four questionnaires were delivered to the chosen households, and 176 of these were completed by the occupants and returned.

### **To what degree are the fire regulations fulfilled?**

No significant differences in the degree of fulfilment of the fire regulations between the different subgroups of the population could be found.

### **Are there any demographic differences in fire prevention behaviour?**

Fire prevention behaviour is defined as behaviour intended to prevent or minimise consequences of a fire in a residence. A statistical analysis showed that households with elderly occupants had a significantly lower level of fire prevention behaviour than other types of households.

Analysis showed that there was a tendency to a lower degree of fire prevention behaviour for occupants in blocks of flats than for occupants in the other types of residences (attached houses/2-3 storey houses, and single family houses). Fire preventive behaviour for families with small children was relatively higher than for the other subgroups, and independent of type of dwelling. There was also an indication that people who once had experienced fire had a slightly higher fire prevention behaviour.

### **Does fire consciousness depend on demographic factors?**

Fire consciousness is a quality that has its origin in gained experience and information about fire. A fire conscious person will consider fire to be a possible event in his or her home, and this consciousness can be demonstrated through the awareness of the necessity of functioning smoke detectors and fire extinguishers.

A slightly higher indication of fire conscious was present for families with small children and for households where a safety-related profession was represented than for other households, but no significant difference was found.

## **2.8.2 CONCLUSION**

Nearly 100% of the residences surveyed had the required smoke detectors and extinguishers installed. Because of non-functioning smoke detectors and extinguishers and bad placement of the equipment, as much as 23% did not fulfil the regulations.

Fourteen percent of the respondents were unaware that smoke detectors and fire extinguishers in residences were regulated by law. The knowledge about recommended installation of such equipment was even less. This is a clear demonstration that frequently repeated information about the regulations, and how to install and maintain the equipment is necessary.

All subgroups had the same level of fire consciousness. Fire preventive behaviour was significantly lower for the elderly group and for people live in blocks of flats. Families with small children and people who had experienced a real fire showed a higher level of fire preventive behaviour than the other groups.

Nearly all respondents had a positive attitude to the fire regulations, but the willingness to pay for increased fire safety at home was limited.

## **2.9 FIRE SAFETY KNOWLEDGE AND PRACTICE, 1997. [11]**

This was the second survey done for the Wellington Area Operations Centre of the New Zealand Fire Service. The objectives of this study were to monitor the penetration of smoke alarms in private homes, to monitor the proportion of households that have an exit drill, and to monitor various other aspects of fire safety knowledge and practice.

The survey was conducted by mail. The sample was drawn from telephone books in the Wellington area. A total of 615 questionnaires were sent out and 453 were returned with valid responses. The results of this survey were also compared to a similar survey in 1996.

### **2.9.1 RESULTS**

#### **Fire Safety Knowledge**

Nearly 99% of respondents correctly identified the correct emergency number as "111". Two respondents replied with "999" and four stated some other number.

The questionnaire portrayed a stove-top kitchen fire scenario and offered six first actions to choose from. Fifty-six percent of the respondents said that they would "smother the fire with a lid or oven tray". The next most popular response was to use a fire extinguisher (16%).

The questionnaire also asked what the respondent would do if faced with a bedroom fire where the carpet, curtains and bedclothes were alight. Of the choices given, "getting everyone outside" was the most popular (72%), followed by "phoning the Fire Service for help" (23%). Three percent said that they would try and put the fire out.

## **Fire Safety Practices**

This section dealt with smoke alarms and household fire drills. Over half of the households surveyed had one or more smoke alarms (51%). Six percent of all the households surveyed had more than two alarms. Sixteen households (7%) reported non-working alarms. Those familiar with Fire Service brochures were more likely to have alarms installed in their households, as did those respondents with children. Sixty percent of those who had children at home had alarms.

Respondents were asked, "Does your household have an exit drill (a plan for getting out of your home safely if there is a fire)?" Respondents who did have a drill were then asked when the drill was last practiced. Of the 165 respondents who reported that they had an exit drill and whether or not they had ever practiced it, over 30% had practiced it in the last six months. Nearly 50% of these respondents had never practiced their drill.

### **2.9.2 CONCLUSION**

Over half of all respondents reported having at least one smoke alarm fitted in their homes, an improvement of 44% from 1996. Respondents were more aware than they were in 1996 of the risk from smoke while asleep, of how quickly fire can take hold of their homes, of the danger in tackling a fire themselves, and of attempting to recover possessions from a house on fire. Respondents were slightly less inclined than they were in 1996 to believe that everyone knew how to get out of their home in the event of a fire, and less inclined to keep furniture and children away from heaters and fires.

Respondents who had read Fire Service fire safety brochures, and respondents who recalled a visit by fire fighters to a child's or grandchild's school were significantly more likely to have a smoke alarm at home, and to have a household drill, than were other respondents.

Households with children under the age of sixteen were more likely to have smoke alarms than those without. It seems reasonable to assume that the number of children in a household increases the likelihood that one of them has been exposed to the fire safety message at school and has passed it onto the parents. It may also be that the real, or perceived, risk of fire increases with the number of children.

Overall, household fire safety improved significantly between 1996 and 1997 in the areas of smoke alarm penetration and the overall level of fire safety knowledge.

## **2.10 THE HUMAN FACTOR IN HIGH FIRE RISK URBAN RESIDENTIAL AREAS: A PILOT STUDY IN NEW ORLEANS, LOUISIANA, USA, 1976. [12]**

Thirty-three firemen serving the New Orleans study area (known in general as the Central City) and 55 residents who had experienced a fire or lived near where a fire occurred in the study area were interviewed. The New Orleans Fire Department provided detailed accounts of their observations and experiences, as well as records of fire occurrence.

### **2.10.1 RESULTS**

The human factor is extremely important in accounting for fires in high risk areas. Interviews indicated that fires are causally associated with attitudes of carelessness as manifested by smoking in bed, leaving food on stoves and placing clothes near heaters; with attitudes of tolerance towards trash and debris; with attitudes of tolerance towards behaviour of children and vagrants; and, with attitudes which militate against the upkeep of houses and buildings.

Certain aspects of the “human factor” will have to be considered in planning programs of fire prevention, namely: the lack of a strong community spirit, the lack of fire safety training, the lack of practice of fire precautions, the lack of fire fighting facilities, and an attitude of fatalism toward fire.

### **2.10.2 CONCLUSION**

From this study it is clear that there is what might be termed a “human factor” fire syndrome. This syndrome includes a basically lower class individual with minimal economic and educational attainment. The person has attitudes of carelessness about fire, with little knowledge of fire precautions and with an attitude of fatalism about fire. There is also relatively little sense of community, and a feeling of alienation towards local government officials.

## **2.11 INVESTIGATING CITY CHARACTERISTICS AND RESIDENTIAL FIRE RATES. [13]**

The objective of the study (1998) was to identify the relationships between city characteristics and residential fire rates within America. Once completed the study would help identify and clarify relationships between the characteristics of people and places, and fire risk. The information can be used for the design, targeting and evaluation of fire prevention programs.

Seventy-three percent of home fires in the United States, in the period of 1993-1995, were contributed to human activities or carelessness. Policy and education interventions stand out as the most effective means to significantly reduce the number of fires in many communities.

### **2.11.1 RESULTS**

Prior research showed that characteristics of city climate and the demographic and socioeconomic characteristics of residents can be useful for predicting the magnitude and nature of fire problems in different neighbourhoods and sometimes different cities.

The research was done by analysing 1993-1995 data from the National Fire Incident Reporting System (NFIRS). The total number of residential structural fires that were reported by 23 major United States cities and three counties were analysed.

The report found that the overall fire rate was higher in cities with a lower income and a higher unemployment rate. Virtually all studies have shown that lower levels of income are either directly or indirectly tied to an increased risk of fire. Bad weather, older housing and a higher number of children under five years also increases the fire risk.

Weather is an indicator of city climate. The worse the weather is, more heating days are required. This means that there is a greater opportunity for a fire to occur as



people use various heating devices to keep warm. Also, people spend more time indoors, and many of their activities, such as cooking, increase the fire risk.

Related to the age of the city is the age of its housing stock. It is likely that newer houses are built to higher building codes, with a better heating system and with electrical systems better equipped to handle modern appliances and electrical loads.

It is unclear what the exact nature of the relationship between young children and an increased fire rate is. However, with more children in a household, there is an increase in the number of children playing fires. The number of children may also increase the risk of other types of fires by children distracting adults.

There was a moderate relationship between careless smoking fire rates and city characteristics. Communities with older, presumably lower quality, housing had a higher careless smoking fire rate. Other studies have indicated that lower income groups have higher proportions of smokers than other income groups.

### **2.11.2 CONCLUSION**

Particular city characteristics were found to be strongly related to fire rates. The specific city characteristics of climate, demographic and socioeconomic characteristics varied by the types of fires investigated. Significant relationships with these factors were identified for overall fire rates, children playing fires and careless smoking fires. Cities with worse climates and older housing had a greater likelihood of fire.

## **2.12 SOCIOECONOMIC FACTORS AND THE INCIDENCE OF FIRE. [14]**

Research indicates that the risk of fire in the home is not the same for all. This United States paper (1997) concentrates on the building stock characteristics and human factors.

### **2.12.1 RESULTS**

An earlier study by Schaenman, Hall, Swartz and Karter (1997) highlighted variables that explained the variation in fire rates. These are parental presence, good education, adequate income and home ownership. All are negatively correlated, that is as the variables increase, the fire risk decreases. Karter and Donner in 1978 found that the average fire rates are higher with low family stability, high levels of poverty, high crowding and low ownership rates.

This paper split the socioeconomic factors into three levels. That of the neighbourhood, the household and the individual.

#### **Neighbourhood**

In poorer neighbourhoods building abandonment is high. Vacant buildings experience more severe fires than other types of buildings, often as the result of arson. Homeless people may also take shelter in these buildings. This situation is especially dangerous in winter when those seeking shelter may light fires indoors in an attempt to keep warm.

The presence of abandoned buildings may discourage apartment building owners from investing in their buildings. The withdrawal of routine maintenance services increases the fire risk from inadequately maintained heating or electrical systems.

As the crime rate tends to be higher in low income neighbourhoods, homes may have barred doors and windows, making it harder for these residents to escape from the burning building.

## **Household**

In many urban areas, people with low incomes live in the oldest and most run-down part of the city. Older housing means older heating, plumbing and electrical systems that need adequate maintenance over their useful lives to ensure their continued safe operation. Many apartment buildings in centre city areas have not been adequately maintained, increasing the risk of mechanical malfunction and the possibility of fire.

The quality of a household's furnishings also affects its fire risk. Lower income households are more likely to have older furnishings, which ignite more readily, and increase the risk of fire and fire related injuries and deaths.

Smoke detectors in the U.S. have reduced fire deaths between 1980 and 1990 by about 25%. In 1994, over 65% of residential fires occurred in households without operational smoke detectors. This raises two possibilities, either households with operational smoke detectors are more safety conscious, or smoke detectors allow residents to detect and extinguish small fires which are not reported to the fire department. It is probable that lower income households are less likely to have operational smoke detectors.

Social factors relating to household structures can also affect fire risk. Single parent households tend to have a lower income than two-parent households and generally have less flexibility to deal with childcare contingencies. Children in urban areas tend to be left alone more often than in other areas.

Elderly people are more at risk of dying in a fire than the overall population. They may be exposed to a greater risk, as everyday activities can become more dangerous as a person's physical and mental abilities decrease. The decline of these capabilities also may reduce their ability to escape from the fire.

## **Individual**

Careless smoking is the leading cause of fire deaths in the U.S. Smoking is inversely related to income and the rate of careless smoking fires is greater in the low income neighbourhoods. Closely related is alcohol and drug abuse. Intoxicated people are more likely to fall asleep while smoking, and improperly discarded or dropped cigarettes are a dangerous ignition source. The proximity of the sleeping person to the origin of the fire illustrates why these fires tend to be so deadly, especially if the victim is too inebriated to recognise the danger and be able to successfully escape.

Lower education levels mean that people are possibly less likely to grasp ideas such as public fire safety education messages. Lower literacy levels may also inhibit the ability to read instruction manuals and warning labels for cooking and heating devices, increasing the chance that they will be used incorrectly.

A lower ownership rate leads to an increased fire risk. Owner-occupiers may have a tendency to better maintain their homes and may be more careful in their everyday routines. They may also have more of a vested interest in purchasing and maintaining fire protection devices.

### **2.12.2 CONCLUSION**

Socioeconomic factors are among the best predictors of fire rates. This report has explored how variations in the socioeconomic circumstances of human occupants of buildings and neighbourhoods can critically impact fire rates. From this report it can be concluded that socioeconomic factors have an affect on fire risk. Lower income households were shown to be at a greater risk. The lower income means that people often live in older housing with older furnishings and may be less likely to own smoke detectors.

Fires resulting from human activities account for a high proportion of residential fires. Public education represents one of the most important avenues for reducing the incidence and severity of fire. Fire prevention efforts need to be sensitive to the needs and concerns of different socioeconomic groups.

## **2.13 SAFE AS HOUSES. [15]**

This report from the Community Fire Safety Task Force (1997) is aimed at providing a strategy to reduce the numbers of fires and fire casualties in dwellings in the United Kingdom.

The UK has more than 550 fatalities and 13,000 injuries in over 64,000 dwelling fires each year. The fact that fires, fatalities and injuries in the home are all increasing suggests that the existing piecemeal approach to fire prevention has not been fully effective in reducing the incidence of domestic fires.

The Task Force believes that the majority of fires in the home are preventable. Domestic fires are mostly a result of negligence or misuse of appliances and because someone failed to take precautions to stop the fires starting.

### **2.13.1 RESULTS**

The most significant causes of fires, injuries and deaths in United Kingdom homes are:

- Smoking: main cause of fire deaths (173) in 1995
- Chip pan fires: largest cause of injury (3,580) in domestic fires
- Misuse of equipment or appliances: the biggest single source of fires (16,300) in the home

Evidence in the UK and overseas has shown that attitudes can be changed if fire-safety publicity and education efforts are properly planned and executed. One example is the Home Office's national television campaign, which raised smoke alarm ownership from 9% to 79% in ten years (1987-1997). The benefits of the increased ownership levels are shown by the Home Office statistics. These statistics show that fires detected by smoke alarms were discovered more rapidly, were associated with lower death rates, and caused less damage because the fire was detected earlier and was extinguished quicker.

Recent results from the British Crime Survey (Fires in the Home in 1995), Table 2.2, identifies the groups of the population most at risk.

Table 2.2 Fire in the Home: Results from the British Crime Survey

FACTOR	GROUP AT RISK
Household Composition	At greatest risk were households with children. Single parents were at a higher risk still. Elderly households had fewer fires but they make up a higher proportion of casualties.
Smoking	The prevalence of fires in smoking households is very much higher than the prevalence of fires directly caused by smoking, suggesting these households have other characteristics that increase fire risk.
Financial Stability	Households saying they were in financial difficulties had the highest risks.
Tenure	Those who rented property (from local authorities or others) were more at risk than owner occupiers.
Drinking	Independent of smoking, the risks were higher in homes where the person interviewed said they drank heavily.
Property Condition	Net of other effects (such as tenure) homes that were in poor condition relative to those nearby were more at risk.
Disability	Households in which the respondent had a limiting disability were more at risk, net of other effects.

The Task Force found that people felt detached from the danger of fire and so did not always behave in a fire safe manner. Only 4% of the public considered that they were likely to have a fire in their home.

### 2.13.2 CONCLUSION

Fire deaths are starting to increase after a long period of decline, and this has coincided with a large reduction in Home Office publicity expenditure. The Task Force concluded that the Ministers who set the overall policy for the Fire Service and

the Fire Authorities who run it need to make the reduction of fires and fire casualties the principal targets which drive Fire Service activity.

The Task Force believed that with the right procedures and measures in place that the fire trends can be turned around. They noted that there is clear evidence that prevention work can make a difference and can drive down the incidence of fire. Local fire safety education work appears to offer the greatest level of reduction in fire deaths by a very cost-effective means.

## **2.14 COMMUNITY CHARACTERISTICS AND THE INCIDENCE OF FIRE: AN EMPIRICAL ANALYSIS. [16]**

An attempt was made in 1977 to determine if systematic relationships exist between the likelihood of fire and a wide variety of structural, climatic, and socioeconomic variables. If so, it should be possible to sketch out types of circumstances that increase the probability of fire.

### **2.14.1 RESULTS**

Seven hypotheses were made relating social, environmental and economic characteristics of residents, housing and weather to fire. Operational tests were developed for each hypothesis and then actual experiences with fire were examined to see whether or not it supports the proposition.

A variety of large cities and smaller communities were analysed. Results were found to be consistent across all samples.

### **2.14.2 CONCLUSION**

The study found that cities with certain characteristics were more at risk than others. These were cities with:

- Relatively cold climates
- Comparatively old and dilapidated housing stock, composed largely of rental units
- A population that has low incomes, a high rate of unemployment and a large minority population
- Land area and dwelling units that are quite crowded

Fire is not a purely random phenomenon. The physical structure of a city and the characteristics of its population will have much to do with its fire experience.



### **3.0 THE RESPONDENTS**

This project aimed to interview 150 respondents. As well as interviewing the general population, the research project aimed to target three specific groups:

- Elderly
- Maori
- Pacific Islander

To avoid the possibility of people not being able to understand the questionnaire and not having any life experience to be able to answer, only people over 18 years were interviewed. This was also done to avoid getting parental permission.

The elderly were targeted as previous projects have shown them to be a sub-group with an increased risk of dying in home fires. Studies from the UK have shown that elderly households have fewer fires but make up a higher proportion of casualties. They may be exposed to a greater risk, as everyday activities can become more dangerous as a person's physical and mental abilities decrease [13]. The decline of these capabilities may also reduce their ability to escape from the fire [14]. The elderly have also been shown to have a lower level of fire prevention behaviour than other types of households [9].

It is believed that within New Zealand, Maori and Pacific Islander [1] groups are over represented in fire deaths. As most information on fire deaths does not identify ethnic groups an addition of this to fire statistics could show if this belief is true. If these groups are in fact over represented, targeting them with fire awareness surveys could show if this is because of any beliefs, behaviours or knowledge in relation to fire safety.

#### **3.1 TEST GROUP**

Four volunteers (three university students and one full time worker) were interviewed once the questionnaire (see Appendix 1) was designed. A copy was also given to the New Zealand Fire Service, Canterbury Region. This copy was sent to ensure that the

Fire Service did not have any particular concerns in relation to the public's fire awareness and knowledge that was not included in the questionnaire.

By performing the survey at an early stage, any difficulties that the initial respondents had in understanding the questions could be highlighted. This process also ensured that the layout of the questionnaire allowed adequate space for the responses.

## **3.2 SELECTION OF VOLUNTEERS**

The following sections show how the 141 respondents were contacted.

### **3.2.1 GENERAL POPULATION**

The method of contact for this proportion of the population was achieved by a variety of methods. Volunteers were gathered by:

- Placing advertisements in local papers; Reporters Diary in "The Press", "The Mail", and "Buy, Sell and Exchange".
- Advertising on an Internet Web Site (social club through University of Canterbury).
- Word of mouth from other students and survey respondents.

Those volunteers that fitted into the specifically targeted respondent groups were put into the appropriate categories.

### **3.2.2 ELDERLY**

The first of the elderly groups was contacted through two Retirement Villages. In one case volunteers were spoken to over the telephone and an interview time was set up. In the other case, respondents were approached by random door knocking.

The second group was contacted through Age Concern, Canterbury. From this organisation a list of 53 clubs for the over 60's in Christchurch was received. As it was expected that there would be more than one volunteer from each club, only some

of the clubs were contacted. The process of choosing the clubs was by “*n*th name sampling”. Five clubs were contacted, with the aim of interviewing five people from each club.

A random starting point chose the first club, and from then on, each tenth club was contacted. If more respondents were required, the process would continue back to the beginning of the list.

Some of the respondents questioned also suggested other people they knew that might be interested in completing the survey. Other respondents volunteered through advertisements in the papers.

Due to a difficulty in contacting the clubs, as Christmas preparations were taking up a large amount of time, only three clubs had people that were able to complete the questionnaire. However, with the other means of contact, as previously mentioned, a total of 43 elderly (60 years and over) respondents completed the questionnaire.

### **3.2.3 MAORI and PACIFIC ISLANDER**

This group was contacted through advertising and word of mouth. It was intended to interview at least 25 respondents from both ethnic groupings. However, with the Maori and Pacific Island groups and organisations shutting down over the Christmas period, only a small number of respondents from these ethnic groups were contacted.

Nine Maori and one Pacific Islander were interviewed. As this was such a small number the two categories were combined.



## **4.0 QUESTIONNAIRE**

### **4.1 AIM**

The main aim of this project is to discover what a sample of the population in Christchurch knows about fire safety. An evaluation of the general fire knowledge will point out specific areas of weakness or strength in the populations' knowledge. From this evaluation a picture of fire safety knowledge can be formed and then used as an indication of where further education needs to be targeted.

By asking the respondent for background information, for example race, age and gender, any trends in behaviour and knowledge can be compared to various demographic groupings. If significant trends do appear in the data, education in the correct fire safe behaviours can be designed to meet the requirements of that demographic group.

### **4.2 THE QUESTIONS**

The questionnaire is broken into six sections. These sections are:

- Statements related to fire, to agree or disagree with
- Situations that could occur
- Self rating on preparation and knowledge
- Fire alarm systems
- General fire knowledge
- Background information on the respondent

Many of the questions were based on previous surveys. The type of questions that have previously been used successfully were then adapted (if necessary) to the New Zealand situation. Some of the questions in the background section are from the 1996 New Zealand Census [17] and the remainder of the questionnaire is original. The Survey Research Handbook [18] outlined steps to follow in the layout of the questionnaire. See Appendix 1 for the full questionnaire.

### **4.3 EXPECTED RESULTS**

The results of this study in relation to peoples' fire awareness are expected to be similar to overseas studies and those done in other cities in New Zealand. In general, it is expected that most people will have a reasonable knowledge of what to do in fire situations.

The only potential difference from previous studies involves the installation of smoke detectors. A programme is presently being run in Christchurch, where two smoke detectors can be purchased for \$15 (or one for \$8) from three local retailers or from SAFE-T<sup>2</sup>, and then will be installed by SAFE-T for free. This availability of cheap smoke detectors may allow people who would not normally be able to afford them, to be able to install smoke detectors in their homes.

<sup>2</sup> Smoke Alarms For Everyone - Team

## **5.0 JUSTIFICATION OF QUESTIONNAIRE AND RESULTS**

The following sections of this report explain why the questions in the survey were asked. Unless otherwise stated, questions were chosen because they had been used successfully in one or more previous studies and would be valuable to finding information in regards to fire awareness.

The appropriate response to situations and behaviours is mentioned where relevant. The information for the appropriate responses comes from a variety of sources, including the Fire Service and the NFPA.

This chapter also takes the responses from the 141 people interviewed and presents them. When some of the questions are only relevant to some of the respondents, the number of people replying is stated.

### **5.1 STATEMENTS**

These nine statements and one question are aimed at the respondents' view about fire. The respondents were asked to agree or disagree, either strongly or somewhat, as the statements were read out. This gave an indication of some of the respondents' beliefs concerning fire, their actions in some situations and their belief in how quickly the Fire Service is able to arrive. The question asks why the respondent does or does not feel that their work place is more fire safe than their home.

A difficulty arose in this section in that some of the respondents, even after repetitive questioning did not answer with one of the four given responses. Instead they described what they would do, or they were continuously vague. With these respondents the strength of their reply was used to judge a strong or a somewhat agreement or disagreement with the statement.

### **1        There is little I can do to prevent a fire in my home.**

Nearly all (97%) of the respondents disagreed that there is little that they can do to prevent a fire in their home. Seventy-five percent disagreed strongly with the statement while 22% disagreed somewhat. Three percent of respondents agreed somewhat with the statement and no one agreed strongly.

### **2        The chances of my being in a fire in the future are slim.**

In the period 1986-1994, inclusive [1], the New Zealand Fire Service attended 198,846 fire incidents, an average of 22,100 each year. Of this total, 21% were domestic fires (an average of 4668 fires each year).

New Zealands fire death rate over the period 1986-1994, inclusive, was calculated as 9.6 deaths per million population (pmp). This compares well to Finlands death rate at 22.7 pmp, but shows that there is room for improvement when compared to Switzerland at 4.2 pmp [1].

The majority (54%) of respondents agreed that their chances of being in a fire in the future are slim. Fourteen percent agreed strongly and 40% agreed somewhat. Thirty-three percent of the respondents somewhat disagreed and 13% strongly disagreed.

### **3        Most people who die in fires are killed by the smoke or lack of oxygen, and not by the flames.**

As Table 5.1 [1] shows, more people died in the period 1986-1994, inclusive, of smoke than of burns. Overall, there were 1701 injuries and 292 fatalities in this period.



Table 5.1 Cause of death and injury, 1986 - 1994,

CAUSE OF DEATH OR INJURY	DIED	INJURED
Due to Burns	9%	39%
Due to Smoke/Asphyxia	16%	39%
Due to Burns and Smoke/Asphyxia	66%	13%
Other	9%	9%

Most respondents (96%) agreed that people are killed by the smoke from the fire or lack of oxygen rather than from the flames. Eighty percent agreed strongly while 16% agreed somewhat. Four percent of respondents somewhat disagreed. No one strongly disagreed.

#### **4 Fires occur so infrequently that I am not concerned with fire prevention.**

Most respondents (91%) disagreed with the statement that fires occur so infrequently that they need not concern themselves with fire prevention. Sixty-seven percent disagreed strongly and 23% disagreed somewhat. Seven percent of respondents agreed somewhat with the statement and 2% strongly agreed.

#### **5 Most people will panic in a fire.**

Panic is an acute fear reaction marked by flight behaviour. In fleeing, people do not weigh social consequences of their action. They are also highly individualistic and self centred in their flight with regard to one another. Their behaviour is nonrational and nonsocial. Panic is frequently, and often incorrectly, equated with any apparently ineffective behaviour. Overall, it does not occur very often, even in extreme stress situations. Presently panic is frequently equated with any apparently ineffective behaviour in a fire [24].

This statement allowed people to decide their own definition of panic. The majority of respondents (89%) believed that most people would panic in a fire. Forty-nine percent agreed strongly that most people will panic, and 40% agreed somewhat. Ten percent somewhat disagreed with the statement and 1% strongly disagreed.

Considering that most of the respondents believed that people would panic in a fire, they either have different definition of panic, or an incorrect belief of human behaviour in fires.

**6 If I found a large fire in a room of my house I would immediately close the room door, leave the house and call the brigade.**

Most respondents (89%) agreed that if they found a large fire in their house, they would close the door, leave the house and call the brigade. Sixty-seven percent agreed strongly and 22% agreed somewhat with the statement. Nine percent of respondents somewhat disagreed and 1% strongly disagreed.

**7 I would not go back into a burning house to look for my partner or child.**

Six percent of injuries and 2% of fatalities occurred in the period 1986-1994, inclusive, when a person re-entered a burning building to attempt a rescue [1]. It is strongly recommended by a variety of sources [19, 20, 21, 22, 23] that people should not go back in to a burning building for any reason.

The majority of respondents (84%) disagreed with the statement. That is, 119 of the 141 respondents said that they would return into a burning house. Fifty-three percent somewhat disagreed and 31% strongly disagreed. Nine percent somewhat agreed with the statement and 6% strongly agreed with the statement.

**8 If a fire started in my home, fire fighters will get here before the fire leads to serious consequences.**

The majority of respondents (57%) disagreed with the statement. Thirty-six percent somewhat disagreed and 21% strongly disagreed. Thirty-three percent agreed somewhat that firefighters would arrive in time and 9% strongly agreed.

## **9        The building that I work in is more fire safe than my home**

The majority of respondents (65%) agreed that their work place was safer than their home. Thirty-five percent agreed strongly and 30% agreed somewhat. Twenty-six disagreed somewhat and 9% strongly disagreed.

## **10      Why would you say that your work place more/less fire safe than your home?**

Most people who considered their work place as safer than their home said that this was because of sprinklers, alarms and drills at work. Many mentioned that they thought that a concrete building was safer than their wooden home.

People who considered their home safer said that they felt it was easier to exit from their home (usually only one level compared to multi-level work places) and the equipment at work and lack of alarms made work more dangerous.

## **5.2 SITUATIONS**

This section is aimed at discovering if people know the correct and safe responses to a variety of fire situations. The final question in this section asks if people know about the operation of typical sprinkler systems.

## **11      What would you do right now if your clothing caught on fire?**

If a persons clothing catches on fire, it is recommended that they "stop, drop and roll" [20, 25, 26], while covering their face with their hands and continue rolling until the fire goes out. If this action is not possible, due to a disability or to age, the flames should be smothered with a blanket [26].

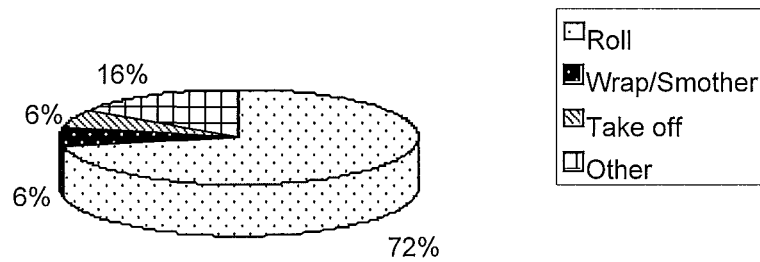


Fig 5.1 Actions for clothes on fire.

Figure 5.1 shows that the majority of people would act in an appropriate fashion by either rolling on the ground (72%) or wrapping or smothering themselves with something such as a rug (6%). The remaining actions, whether it be removing their clothing (6%) or some other response (16%), such as running for water, are considered inappropriate.

## 12 What would you do if you woke up at night, smelled smoke, and found that your bedroom door was shut and was hot when you touched it?

A door should not be opened if it feels warm, as the fire will be on the other side [19]. If the door does feel warm, an alternative exit (such as a window) should be used [26]. Escape may not be possible through an alternative exit if the respondent sleeps in a room high above ground level or if they have a physical disability that may limit their mobility. In these cases the door should be kept closed while the occupants wait for the fire service [27].

To open the door to a fire which is on the other side is potentially fatal. The heat from a fire is so intense that it can cause the human body to stop functioning [22].

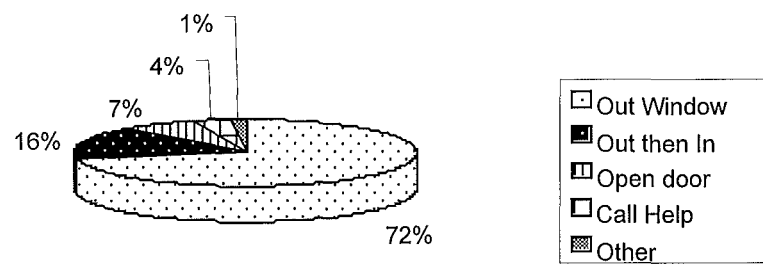


Fig 5.2 Actions for fire at night.

Figure 5.2 shows that the majority of people said that they would leave their bedroom via a window (or an alternative door) then go for help (72%). The only other appropriate action is remaining in the room and calling for help (4%) for people who can not evacuate from their room.

The other responses expose the occupant to a greater risk of getting injured by the fire. Opening the door (7%) is dangerous as it could expose the occupant to extreme heat. Re-entering the building (the 'out then in' category) to warn other occupants or to see what is happening (16%) could cause the respondent to become trapped in the burning building.

### 13 What would you do if the grease in your frying pan caught fire?

If a pan catches fire during cooking the heat should be turned off if it is safe to do so and can be done without leaning over the pan. The pan should then be covered with a damp cloth and left to cool for at least 30 minutes [19]. The pot lid, an oven tray, or a fire blanket can also be used to cover the pan [21, 23].

The pan should not be moved and neither should water be put on it. Smothering with baking soda, salt, or other types of solid material could work, but the action may be risky. Similarly the use of a fire extinguisher may be risky. Responses other than smothering the fire with a lid or similar object have the potential to permit or increase the spread of fire [2].

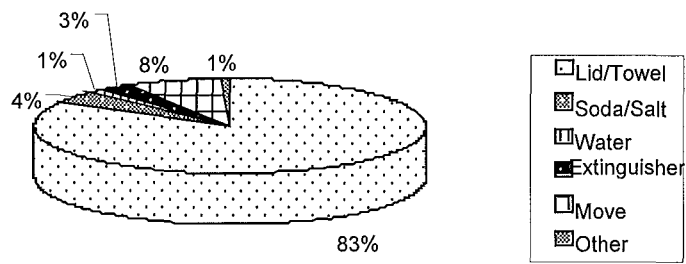


Fig 5.3 Actions for a pan fire.

Figure 5.3 shows that most people (83%) gave the appropriate response of using a lid and/or a damp teatowel. Eight percent of respondents would move the pan. The remaining responses (baking soda or salt, 4%; extinguisher, 3%; or water, 1%) have the potential to permit or increase fire spread with a smothering agent that will itself burn, leave gaps for the fire to grow, or spread the fire around the kitchen.

#### 14 What would you do if you found your only exit route out of the house was full of smoke in a fire?

If a person has to move through smoke to leave the house, they should get down low and crawl out. If at all possible they should try to cover their nose and mouth with a moist cloth. Crawling is recommended as there is less smoke and heat nearer the floor due to the fact that smoke rises [20, 23, 25, 26, 28, 29].

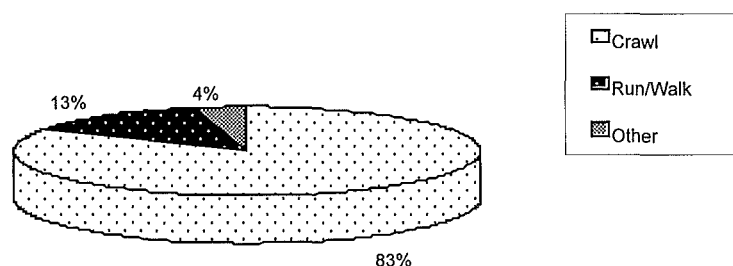


Fig 5.4 Actions for moving through smoke.

Figure 5.4 shows that the majority of people (83%) correctly stated that they would crawl through smoke. Thirteen percent of the respondents would walk or run through the smoke to their nearest exit. The other response (4%) included lying on the floor and calling for help, and not knowing what to do.

## 15 What would your actions be if you found your entire lounge on fire?

If a fire starts in a room of a house, there is only a short time available for everyone to get out. If it is possible, people should close the door on the room of fire origin and all other doors as they are leaving. This will help delay the spread of fire and smoke [19, 26]. Once out, everybody should go to a designated meeting place and someone should call the fire service from a neighbour or phone box [26, 28, 30].

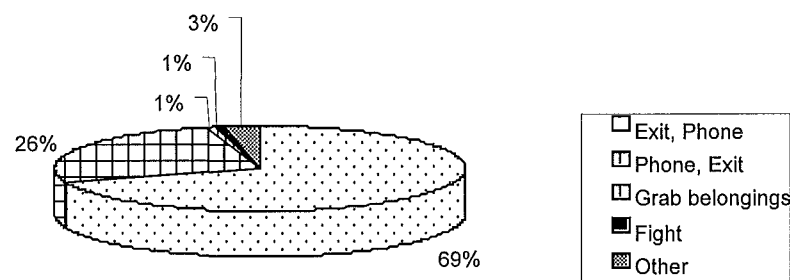


Fig 5.5 Actions if found entire lounge on fire.

Figure 5.5 shows that the majority of people (69%) would perform the appropriate response of leaving the house and phoning for the Fire Service from somewhere else. Twenty-six percent of people would attempt to phone the brigade first before leaving the house. By delaying their evacuation, these respondents could be endangering their lives. Collecting belongings (1%) and fighting the fire (1%) could also waste valuable evacuation time.

## 16 What would your actions be if you found a small fire on the couch?

When a small fire is discovered, it may be possible to extinguish it with a hose or fire extinguisher [31]. However, if extinguishment is attempted, a clear escape route must

be available at all times [21, 30]. If the fire is not extinguished immediately, the house must be evacuated [23].

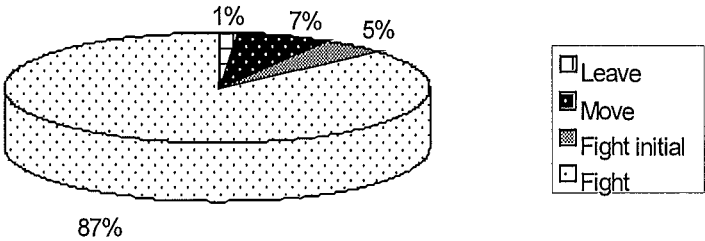


Fig 5.6 Actions for a couch fire.

Figure 5.6 shows that the majority of the respondents would fight (87%) a small fire that they had discovered on the couch, or they would initially fight it (5%). This second category of respondents, who said that they would initially fight the fire, was for people who stated that they would attempt to put the fire out, but if they did not succeed within one or two minutes they would evacuate the house. Seven percent of respondents would move the couch or the burning cushion and 1% of respondents would leave the house.

Moving the couch or cushion could spread the fire and is thus not considered to be an appropriate action. Fighting a couch fire would be appropriate if the respondents realised that the fire could grow quickly and that they need to maintain a clear escape route the whole time.

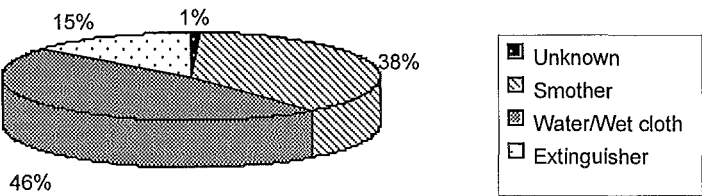


Fig 5.7 Actions for fighting couch fire.



Figure 5.7 shows that of the 129 respondents who would fight the fire, most would fight it by getting a container of water or a wet cloth (46%). However, by the time they had returned with the water the fire could be too large to extinguish. A similar problem could occur for the respondents who said that they would use a fire extinguisher (15%). If the fire extinguisher was far from the fire, or the respondent was not familiar with the device, time could be wasted and the fire could grow. Smothering the fire (38%) with a cushion or rug as soon as the fire was found could be the quickest way to extinguish the fire. One respondent did not say how they would fight the fire.

#### 17a What would your first response be, in your home to hearing a smoke detector?

Disconnecting a smoke detector is dangerous, even if there is not a real fire. There is a risk that people may forget to put the smoke detector back together after dismantling it. They may also leave it dismantled on purpose. If the smoke detector is dismantled, the detector can not warn people of a real fire [32]. People should never ignore the sound of a smoke detector, as there must be a reason for its activation [22].

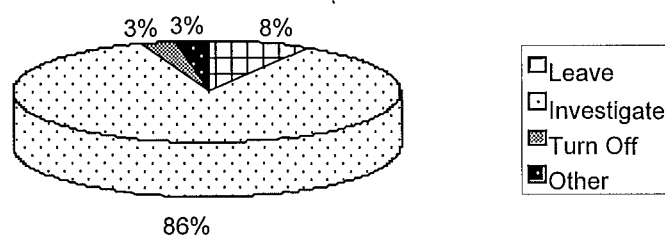


Fig 5.8 Actions for hearing smoke detector.

Figure 5.8 shows that the majority of respondents would investigate (85%) the noise and find out why the device is activating. Nine percent of the respondents would leave the house while 3% would immediately disconnect the smoke detector.

**17b What would your first response be, in your home, to smelling smoke?**

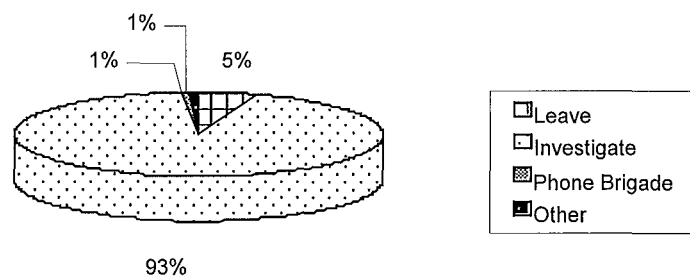


Fig 5.9 Actions for smelling smoke.

As with the smoke detector, Figure 5.9 shows that most people would investigate (93%). Five percent of respondents would leave their homes while 1% would phone the Fire Service.

**18 Who would you phone and what number would you dial if you saw a fire?**

Once everyone is out of a burning building, someone should immediately call the Fire Service from a neighbour or phone box [19, 20, 22, 23, 28]. Within New Zealand the emergency services number is 111.

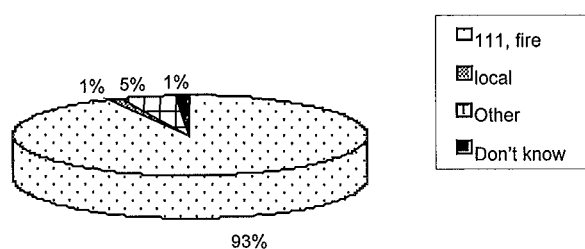


Fig 5.10 Who would you phone and what number.

Figure 5.10 shows that 93% of the respondents would correctly dial 111 and ask for the Fire Service. Five percent would dial the wrong number. Of those people dialling the wrong number, five people said that they would dial 911 and one person said 999. One person who worked at the University of Canterbury replied that they would dial

6111. This is the security number at the University. One percent of respondents said that they would call their local brigade, feeling that they would get a quicker response this way. One percent of respondents did not know who they would call in the event of the fire.

**19 If there was a large fire in your home, where would you call from?**

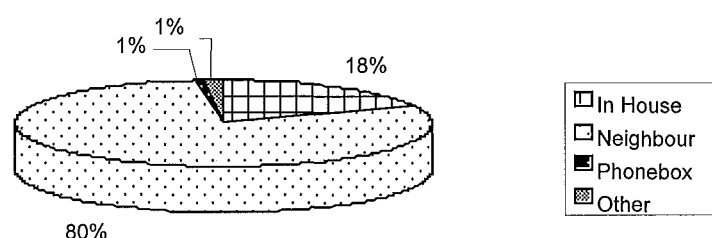


Fig 5.11 Where would you call from.

Figure 5.11 shows that 80% of respondents gave an appropriate response of calling from a neighbour's house or from a phone box in the event of a fire in their house. Some of the respondents who answered with going to a neighbour also said that they might take their mobile or cell phone with them and call from outside. If they can get the phone immediately on the way out it should not delay evacuation time.

Eighteen percent of respondents said that they would phone for the Fire Service from within their house. Some stated that they would only call from inside if they thought they had enough time to do so. However, it is not certain if these people have a realistic idea of the speed of fire spread and how long it could take for them to reach the Fire Service.

One percent of the respondents said that they would do something else such as use their car phone.

**20 What would you do if an alarm went in a public place, such as a movie theatre or shopping mall?**

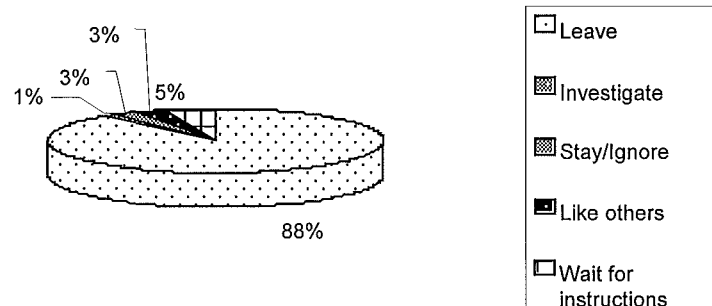


Fig 5.12 Actions for fire alarm in a public place.

Figure 5.12 shows that the majority of the respondents said that they would leave (88%) the public place via the nearest exit. Five percent said that they would wait for instructions from a staff member or from somebody in a position of authority. Three percent would stay and ignore the alarm, while another 3% would wait and see what other people were doing. One percent of the respondents would investigate what was happening.

**21 If a sprinkler system operates, where does it operate?**

The most commonly used sprinkler system in New Zealand is a wet pipe system. Automatic sprinklers are connected to piping such that each sprinkler protects an assigned building area. When the fire heats the sprinkler, the heat will cause that sprinkler to operate, discharging water over its area of protection [33].

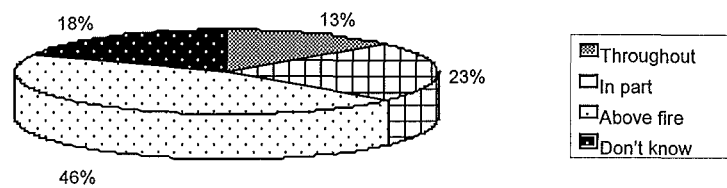


Fig 5.13 Operation of Sprinkler Systems.

Figure 5.13 shows that most people correctly believe that when a standard sprinkler system operates it sprays water directly above the fire (46%). This response is followed by 23% of respondents believing that the sprinkler will go off in part of the building, such as a floor or wing. Eighteen percent of respondents did not know how a sprinkler system operates and 13% believe that the sprinkler system operates in the entire building.

Television often gives a false impression of how sprinklers work. In many programmes a head is knocked and every head in the entire building operates. One person stated that his ideas of sprinkler operation came from television.

### 5.3 SELF RATINGS

These five statements involve the respondents rating themselves on their knowledge, their feeling of security from fire and their households' preparation.

**22      Now I'd like you to rate yourself on how much you think you know about fire prevention.**

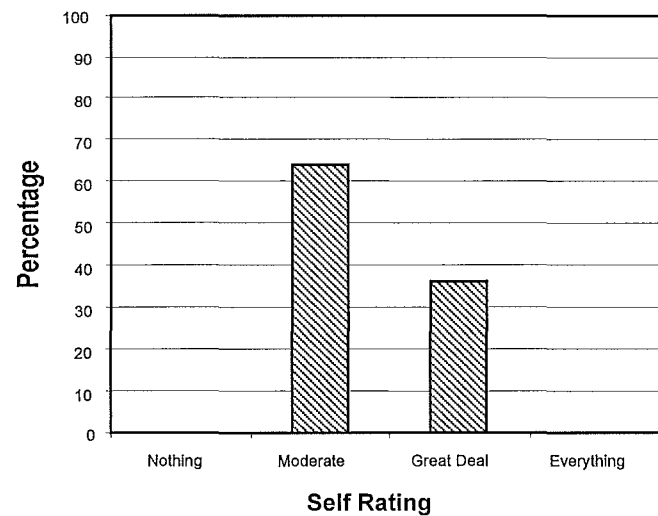


Fig 5.14 Self rating of knowledge of fire prevention

Figure 5.14 shows that the majority of respondents felt that they knew a moderate amount about fire prevention (64%). The remaining 36% of the population felt that they knew a great deal about fire prevention. Nobody rated themselves at either end of the scale (knowing nothing or knowing everything).

**23      Now I'd like you to rate yourself on how much you think you would know about what to do if a fire broke out in your home.**

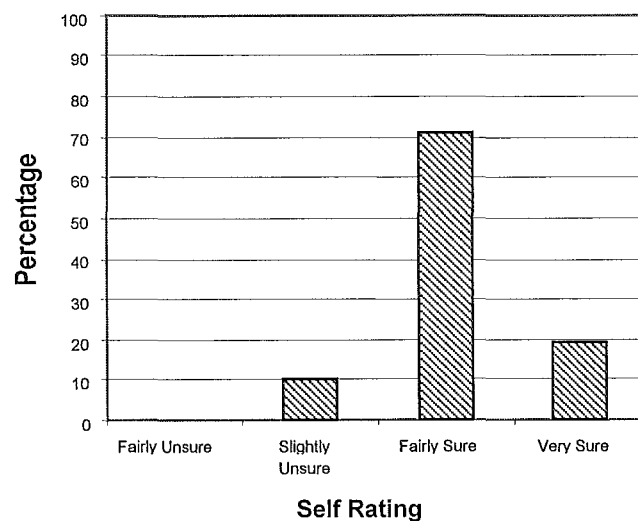


Fig 5.15 Self rating of knowledge of what to do in a fire

Figure 5.15 shows that the majority of respondents (71%) felt that they would be fairly sure about what to do if a fire broke out in their home. Nineteen percent of the respondents felt very sure about what to do and 10% felt slightly unsure. Nobody felt fairly unsure about what to do.

**24      Now I'd like you to tell me how well you would say your household is prepared for fire?**

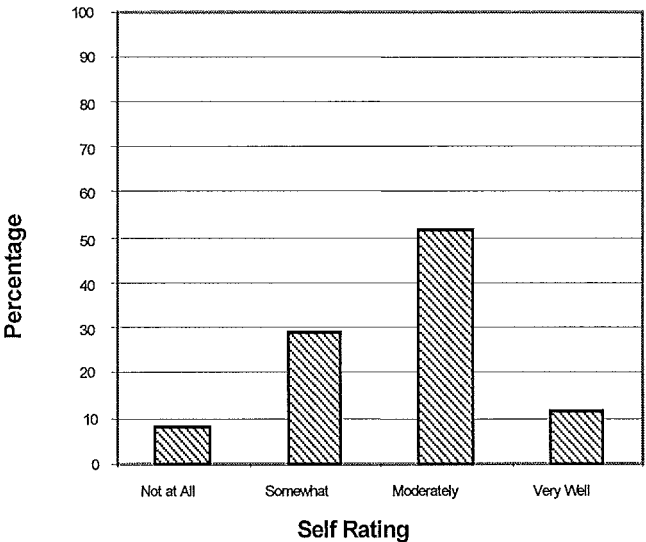


Fig 5.16 Self rating of household preparation for a fire

Figure 5.16 shows that the majority of respondents (52%) felt that their household was moderately prepared for a fire. Twenty-nine percent thought that they were somewhat prepared, 11% felt very well prepared and 8% felt that their household was not at all prepared.

**25      Now I'd like you to tell me how confident you are, that you are safe from fire?**

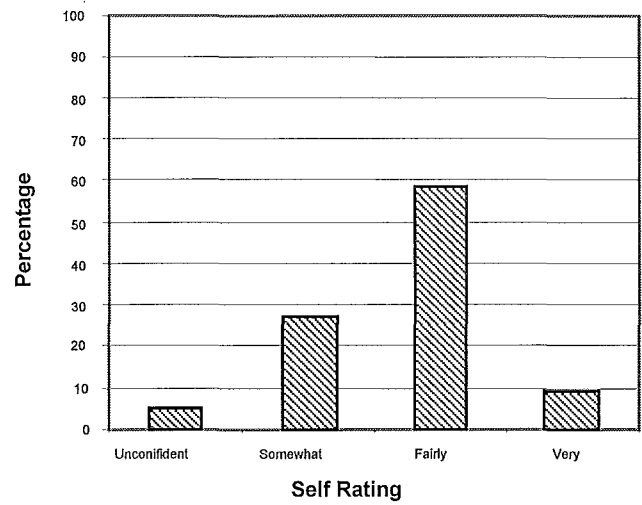


Fig 5.17 Self rating of confidence of safety from fire

Figure 5.17 shows that the majority of respondents (59%) rated themselves as being fairly confident that they are safe from fire. Twenty-seven percent felt somewhat confident, 9% felt very confident and 5% felt unconfident that they were safe from a fire in their home.

**26      Now I'd like you to tell me how probable do you think it is that a fire is going to start in your home in the next 10 years?**

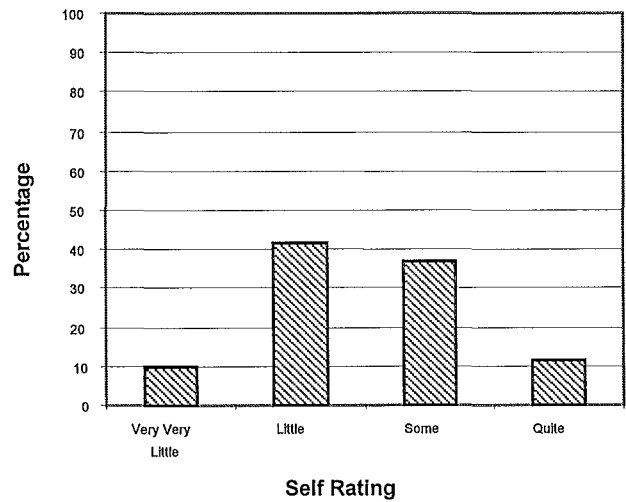


Fig 5.18 Rating of probability of a fire



Figure 5.18 shows that most respondents (42%) felt that there is little probability that a fire would start in their home in the next 10 years. This is closely followed by 37% believing that there is some probability that a fire could start in their home. Eleven percent of respondents believed that it is quite probable and 10% believed that there is very very little probability that a fire could start in their home in the next 10 years.

## **5.4 FIRE ALARM SYSTEMS**

This section deals with the fire alarm systems in the respondents' home. It is aimed at finding out what types of fire safety devices are installed in the home and if the respondent knows how to operate and maintain the devices.

Care and knowledge of the fire alarm systems and fire protection devices is important. For example, a respondent may feel that because they have a smoke detector they are safe from fire, but if the batteries are removed or the device is not working, then the smoke detector is useless and may offer a false sense of security.

The results for many of the questions are shown as a percentage of the respondents answering the question rather than for the overall number of respondents. For example, the percentage of people testing their smoke detectors was calculated using the number of people who owned smoke detectors rather than the total number of respondents interviewed.

### **27 Do you have any fire alarm systems in your house?**

In 1995, nearly half of the fires and two-thirds of the fire deaths occurred in homes in the United States without smoke detectors. In the one-third of homes which had smoke detectors installed and that had fires, the smoke detectors were non-operational [1].

Houses with smoke detectors typically have a death rate 40-50% less than what homes without smoke detectors have. It is also estimated that smoke detectors may reduce the number of fires reported to the Fire Service by 75-80% [34].

The majority (83%) of the 139 respondents who live in single dwelling houses have an alarm system that included either a smoke detector, a heat sensor, a sprinkler system or any combination of these devices. Seventeen percent of respondents do not have any type of alarm system in their homes.

**28 If yes, how many of each does it contain:**

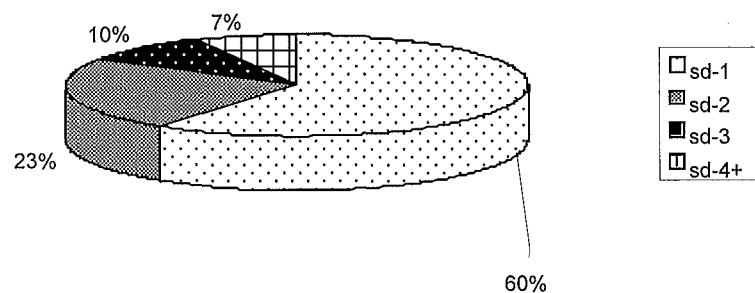


Fig 5.19 Number of smoke alarms

Of the 115 respondents living in single dwelling houses who said that they had an alarm system, all had smoke detectors. Figure 5.19 shows that 60% of respondents had one smoke detector, 23% had two detectors, 10% had three detectors and 7% had four or more smoke detectors.

Two respondents had heat sensors while no one had a sprinkler system installed in their home. One of the respondents with heat detectors had three smoke detectors, the other respondent had five. The number of respondents with heat detectors is too small to show any trends, but perhaps they are more aware of the dangers of fire and so also install more smoke detectors.

**29 Do you have any fire extinguishers in your home?**

**30 If you do have fire extinguishers in your home, how many do you have?**

A fire extinguisher increases the occupants' chances of keeping a small fire from getting out of hand. The extinguishers should be stored in each living area and in areas of potential fire hazards, such as in the kitchen [21].

A fire extinguisher should be replaced or recharged as soon as possible after use. The extinguisher should also be replaced or recharged after five or six years, as this is what the life of one is usually limited to [31].

If the fire extinguishers are not properly maintained, or the respondent does not know how to use the device, it is possible that the extinguisher will not work. This could endanger the user as they spend time in the close vicinity of the fire trying to operate the extinguisher.

Forty-two percent of the 139 respondents living in single dwelling houses said that they have a fire extinguisher in their home. Of these 59 people, 80% had one extinguisher while the remaining 20% had two or more extinguishers. The kitchen, laundry, hallway and the garage were the most common places for people to keep their fire extinguishers.

As only two of the respondents live in apartment blocks, the results for multiple dwelling units are not shown in this section (questions 31-38). For information they can be seen in Appendix 2. From question 39 onwards, results include respondents living in apartment blocks.

**39 Have you ever used a fire extinguisher?**

Fifty-six percent of the 141 respondents said they had used an extinguisher in their life. Forty-four percent said they had never used an extinguisher.

**40 If you have a fire extinguisher, when did you last have it checked by a professional?**

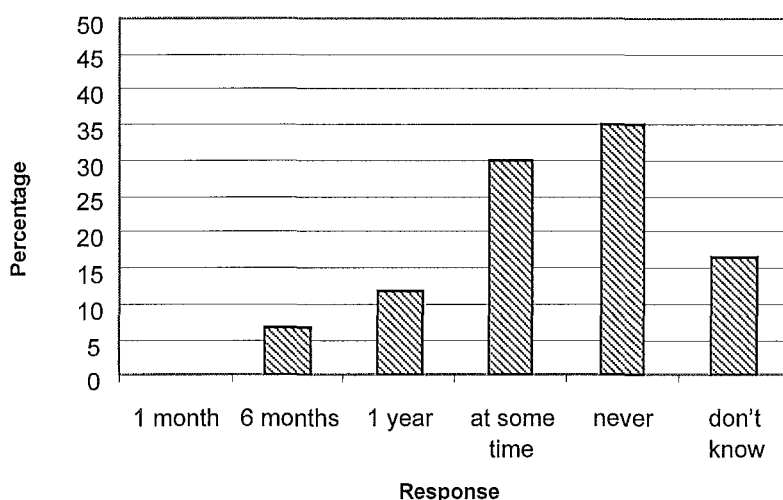


Fig 5.20 When was the extinguisher checked.

Figure 5.20 shows that most people (35%) out of the 60 respondents with a fire extinguisher said that they had never had their extinguisher checked. This was followed by respondents saying that their extinguisher had been checked at some stage (30%), perhaps many years ago. Seventeen percent of the respondents did not know if their extinguisher had ever been checked, 12% had done it in the last year and 7% of extinguishers had been checked in the last six months. None of the respondents fire extinguishers had been checked within the last month.

A lot of people felt that the fire extinguisher would not need to be checked until it had been used. In the case of one extinguisher, which was about 15 years old and never tested, it is unknown if the extinguisher would even be operable.

Many extinguishers were new and so the respondents were asked when they thought they would get them checked. Some of the respondents did not think of checking the extinguisher, it was left up to another family member. These respondents did not know about whether or not the extinguishers were working.

**41 Do you know what noise a smoke detector makes?**

Ninety-six percent of the 117 respondents with smoke detectors know what noise a smoke detector makes. Five of the respondents had never heard a smoke detector and did not know what noise a detector makes.

**42 Where is/are the smoke detector(s) located?**

As a minimum, one smoke detector should be installed on each level of the house. A better option than this is to install a detector in each room, in the corridors outside bedroom areas and at the top of any stairs [22, 28]. A special type of alarm (photoelectric) may need to be installed in kitchen areas [21].

Eighty-three of the 117 homes with smoke detectors had detectors installed in the hallways, the majority near the bedrooms with a few near the kitchen or lounge. Thirty homes had smoke detectors located in the lounge with 18 homes installing them in the bedrooms. The remaining locations included the kitchen, sunrooms, garage and roof cavity.

**43 Can you hear the smoke detector clearly from all rooms and bedrooms if the doors are closed?**

The majority of the 117 respondents with smoke detectors (82%) believed that they could hear the smoke detector in all rooms of their house through closed doors. Three percent did not think that they would hear the alarm and 15% did not know.

In responding to this question many people assumed that they could hear the smoke detector, but very few had ever tried it. In small houses of light construction there may be no difficulty in hearing the alarm, but in other cases the occupants may not be able to hear the early warning that a smoke detector provides. This is particularly relevant if any household member has a hearing impairment.

**44 If more than one smoke detector is installed in the building, are these connected in series?**

By connecting all of the smoke detectors within a house, it means that when one detector activates they all will alarm. This will ensure that they are clearly heard throughout the house.

In the homes of the 47 respondents with more than one smoke detector, 91% of the respondents did not have their detectors connected in series, 4% did not know and 4% had their detectors connected in series.

**45 If the building consists of more than one storey or several floors, are there smoke detectors on all floors where people are sleeping?**

Of the 17 respondents with smoke detectors living in houses with more than one storey, 53% had smoke detectors on each level that people are sleeping on, and 47% of respondents did not.

**46 How often is the smoke detector(s) tested?**

Smoke detectors should be tested regularly to ensure they are still working. The advice for the frequency of testing is either once a week [22, 30], or once a month [21, 25, 26, 28].

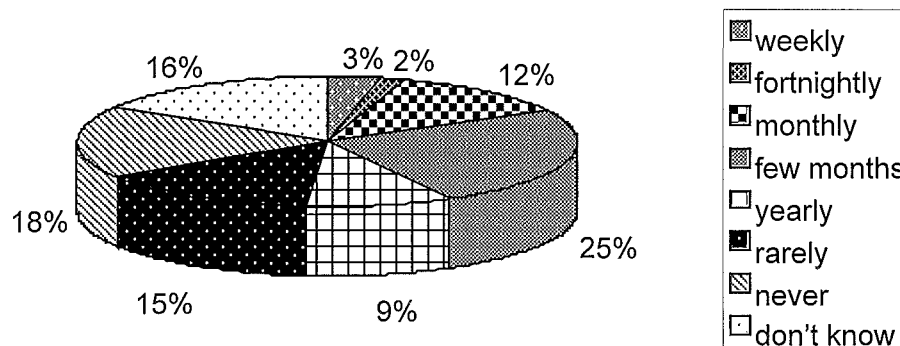


Fig 5.21 Testing of smoke detectors.

Figure 5.21 shows that out of the 117 respondents with smoke detectors, most people tested their detectors once every few months (25%). Twelve percent of respondents test their smoke detectors monthly and 3% test them weekly. Eighteen percent of respondents never test their smoke detector, 15% test them rarely, 9% yearly and 2% of respondents test their smoke detector fortnightly. Sixteen percent of respondents did not know how often their detector was tested.

Many of the elderly and some of the other respondents did not know about testing of the smoke detectors and the changing of batteries. This was left up to other family members or staff at the Retirement Villages. Some of the respondents relied on false alarms as a method of checking that the detector was working. They felt that as long as the smoke detector alarmed because of cooking or steam the device was working properly. However, if the smoke detector was not working, a real fire could occur before a false alarm.

#### 47 Are all smoke detectors functioning today?

Respondents were asked if their smoke detectors were functioning. Most of the 117 respondents with smoke detectors replied that they were working (80%), but only seven of the respondents tested their detector during the interview. Six percent of the respondents knew that their detectors were not working, while 14% were not sure.

People may be so confident about smoke detectors that they assume nothing can go wrong with them. This confidence could explain why some people rarely, if ever, test their smoke detectors. Testing of a smoke detector at one home found an inoperable device. Perhaps there are more detectors in homes that are falsely assumed to be operating.

**48 If the smoke detectors are not functioning, why are they not functioning?**

Of the seven detectors that were not functioning, four had flat batteries, two were disconnected and the reason for one being inoperable was not known.

**49 How often are the batteries changed?**

The batteries should be replaced yearly unless they warn of low batteries before this time [21, 22, 25, 26, 28, 29, 30, 35].

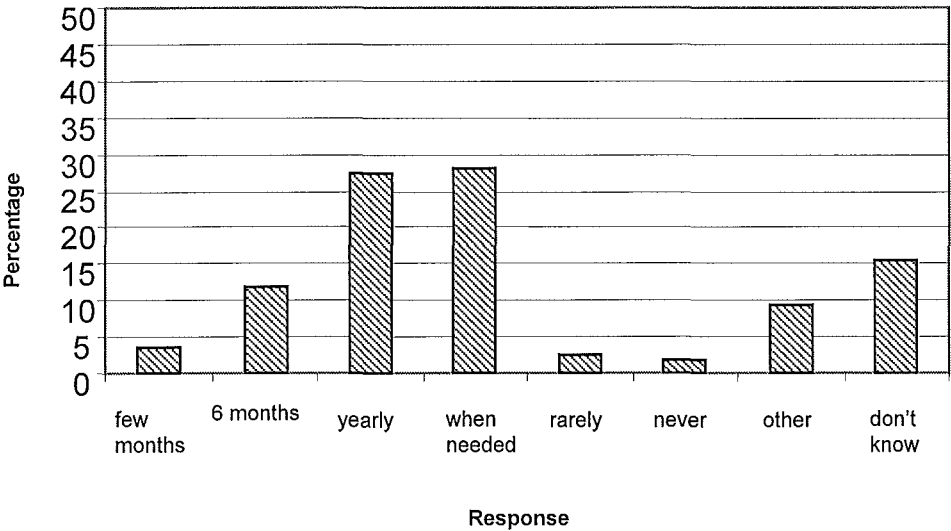


Fig 5.22 Changing of smoke detector batteries.

It is shown in Figure 5.22 that most of the 117 respondents with smoke detectors changed their batteries when they were needed (28%). That is, people would wait until the device began warning of low batteries. This was closely followed by 27% of respondents changing their batteries at the recommended period of once a year. Fifteen percent of the respondents did not know when the batteries were changed,



12% changed them every six months, 3% changed them rarely, 3% changed them every few months and 2% never changed their batteries.

The other response category (9%) included respondents with alarms that were wired into a security system, an overall system in a retirement village and long life units.

**How often is the detector vacuumed?**

The smoke detector should be vacuumed to keep it free of dust and other foreign particles [28]. It is recommend by different sources that the detector should be vacuumed monthly [28, 36], every six months [21], or every year [22].

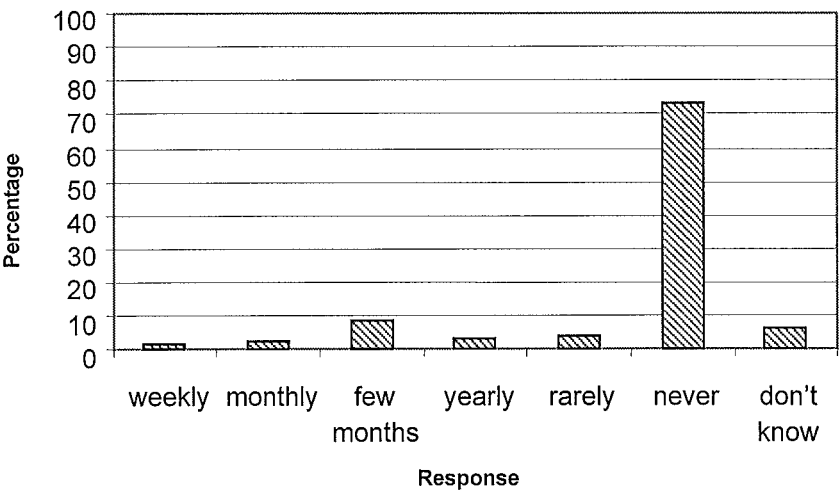


Fig 5.23 Vacuuming of smoke detector.

Figure 5.23 shows that the majority of the 117 respondents with smoke detectors said that they had never vacuumed their smoke detector (74%). Nine percent said that they vacuumed them once every few months, 6% did not know, 4% vacuumed them rarely, 3% yearly, 3% monthly and 2% vacuumed them once a week.

## 50 Have you every removed the batteries?

The batteries of a smoke detector should only be removed when they need to be replaced with a new battery [22]. If the smoke detector is disabled, the home is left without a lifesaving device.

Sixty-four percent of the 117 respondents with smoke detectors had taken the batteries out for some reason. The remaining 36% had never removed the batteries.

## 51 If you have ever removed the batteries, why did you remove the batteries?

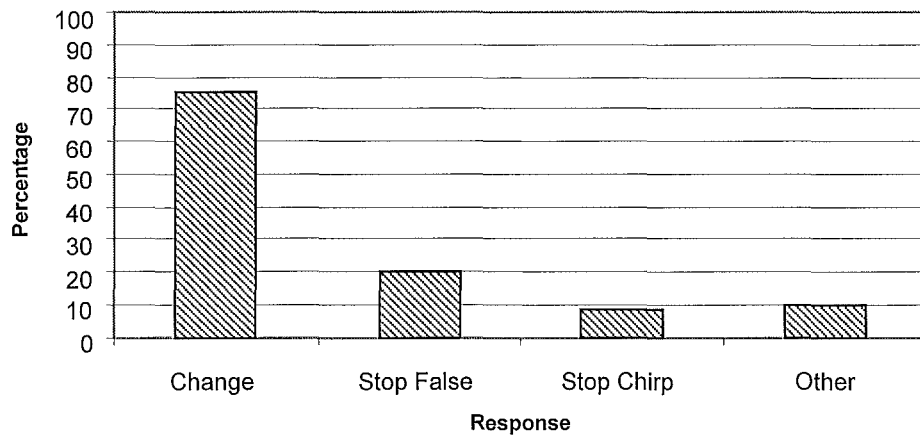


Fig 5.24 Reasons for removal of smoke detector batteries.

For this question, people could respond with more than one answer (Figure 5.24). Seventy-five percent of the 117 respondents with smoke detectors had removed the batteries to change them, 20% had removed them to stop false alarms and 9% had removed them to stop the device from warning of low batteries (chirping). Ten percent removed the batteries for other reasons such as looking at the device, using it as a battery tester and to disconnect the detector. One person took out the detector battery to use in the TV remote.

### **53 Is the smoke detector a nuisance?**

A nuisance alarm is defined as a smoke detector that sounds when there is no fire. In a study conducted by Kuklinski et al [1], 77% of nuisance alarms are caused by cooking and 18% by steam from the bathroom. Both causes of nuisance alarms are related to the distance from the smoke detector to the stove or bathroom. The problem can be addressed by smoke detector relocation [22, 29, 37], substitution of photoelectric type detectors for ionisation type detectors [37], and cleaning the smoke detectors more frequently or more effectively [1].

Eighty-seven percent of the 117 respondents with detectors did not think that the smoke detector was a nuisance, however, 13% felt that they were.

### **54 If it is a nuisance, why is it a nuisance?**

Of the 15 people that felt that their smoke detector was a nuisance, 14 said it was because of false alarms, and one person said that the chirping was a nuisance.

### **55 If it is a nuisance, what do you do about it?**

The person who found the chirping a nuisance replaced the battery to deal with it. Of the people complaining about false alarms, five people vented the room or shut a door, five disconnected the battery and four ignored it.

### **56 Does your household have an escape plan on how to leave your home in case of fire?**

The respondent may have one or more smoke detectors, but if they do not have an escape plan to maximise this extra time they may be putting their lives at risk.

Escaping from a fire is easier if there is a prepared escape plan [19, 22]. If the occupant has to jump from a window, other than from the ground floor, the fact that they had not practiced it may lead to hesitation in real fire [32]. This hesitation may

be even more likely to occur if the reason that they had not practiced the plan was that they felt that the plan was too dangerous.

The majority of the 141 respondents (70%) do not have an escape plan. Only 30% of respondents have an escape plan.

**57 If you do not have an escape plan, why do you not have one?**

The reasons for not having an escape plan included that it is easy to get out of the house and so was obvious what would need to be done if there was a fire. People also had not thought about it, talked about it or got around to doing it. Some respondents also felt that as there were only a few people in the house or that they were all adults it would not be necessary to have a plan.

**58 Have you ever practiced the escape plan?**

The escape plan should be practiced regularly [20] and until everyone is familiar with it [28]. Another source recommends practicing the plan every 6 months [26].

Of the 42 respondents with an escape plan, only 17% had ever practiced it, compared to 83% who had never practiced their escape plan.

**59 If you have not practiced the escape plan, why have you not practiced it?**

The reasons for not practicing the escape plan included that the respondents felt the plan was simple and that there were only adults in the house. Some people did not want to practice the plan as it involved breaking windows or having to get out of a second storey window. A large number of the respondents did not have a reason for not practicing the plan and some did not see the point in practicing it.

**60 If you have ever practiced the escape plan(s), how often do you have these drills?**

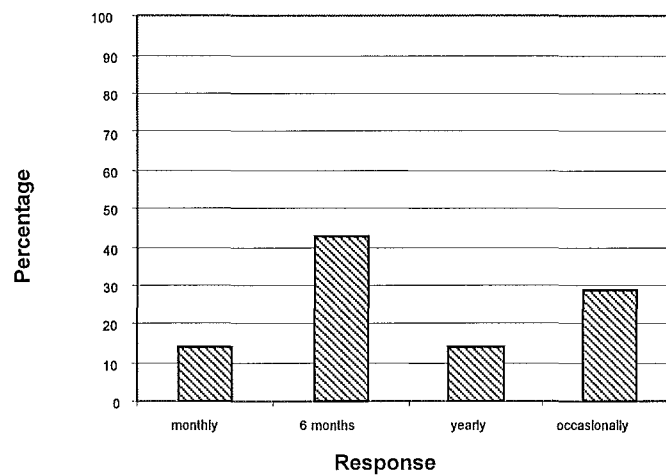


Fig 5.25 When practice escape plan.

Figure 5.25 shows the results for the seven respondents that had practiced their escape plan. Three respondents (43%) practiced the escape plan every six months. Two respondents (29%) practiced the plan occasionally. One household (14%) practiced the plan monthly, and the other household (14%) practiced it yearly.

**61 Do you practice ways of leaving the house other than through the doors?**

Only 13% of the 141 respondents have practiced leaving their house by some other way than using the door. The elderly or disabled may have difficulty in exiting in any other manner than through the doors. They may not be able to practice an escape plan at all.

**62 If leaving through a window, other than the ground floor, do you have an escape ladder?**

The majority of the 25 respondents who live in a building with more than one floor do not have an escape ladder (92%). Only eight percent of respondents have an escape ladder.

### 63 Do you have an agreed place to meet after leaving the house?

If the household has an agreed meeting place, it makes it easier to know who is safe [22], therefore everyone can be accounted for [23]. Without a meeting place a group of household members may think that someone who has not joined the group is trapped inside the building and may go back for them, when in reality they are safe somewhere else.

Of the 107 respondents who do not live alone, only 25% have an arranged meeting place.

## 5.5 GENERAL FIRE KNOWLEDGE

This section is aimed at the respondents' beliefs and understanding of fire.

### 64 Where do you feel safest from fire?

Table 5.2 Location of Deaths and Injuries, 1986-1994 inclusive

LOCATION	Deaths	Injuries
Domestic structures	174	1177
Hotels, Motels, Lodges and Boarding Houses	24	39
Offices	1	11
Schools	-	8
Shops and Department Stores	-	37

As Table 5.2 [1] shows, home fires cause the majority of deaths and injuries, making it the least safe place from fire. Hotels are the next place with a high number of deaths and injuries and the remaining locations only have very few or no injuries and deaths.

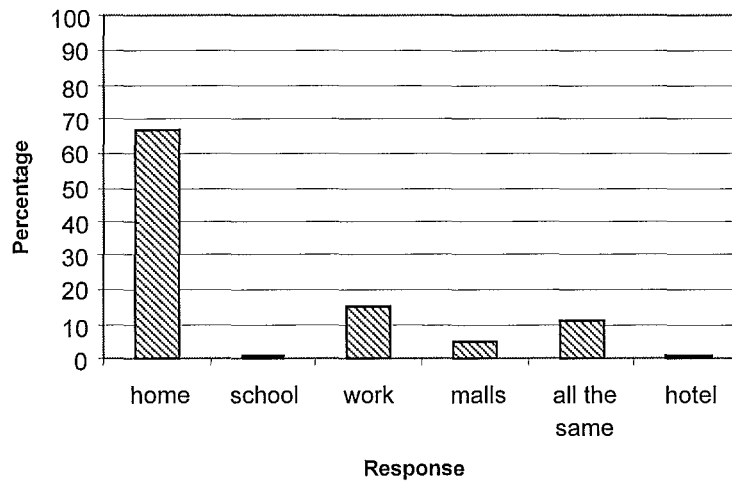


Fig 5.26 Safest from Fire

Figure 5.26 shows that the majority of the respondents (67%) feel safest in their own homes. Although most of the respondents interviewed felt safest in their own homes, Table 5.2 shows that the home is where 60% of fire deaths occur.

Sixteen percent of the respondents felt safest at work, 5% at shopping malls, 1% in school and 1% in hotels. Eleven percent of people felt equally safe in all places.

As the age of respondents was limited to people over 18 years, it was expected that very few people would spend much time in schools. Perhaps for this questionnaire this option should have been removed.

## 65 Is it a good idea in general to close all windows and doors during a fire?

It is a good idea, if at all possible, for people to close the house doors when they are escaping from a fire. This action slows down the spread of the fire [20, 22] and confines it to the immediate fire involved region [27].

The majority of respondents (94%) believed that it is a good idea to close doors during a house fire. People were not so sure about closing windows, but thought it could be a good idea to do so at the same time as closing doors. One person (1%) did not think that closing doors and windows was a good idea while 5% of the respondents were not sure.

**66      How threatened do you feel by fire?**

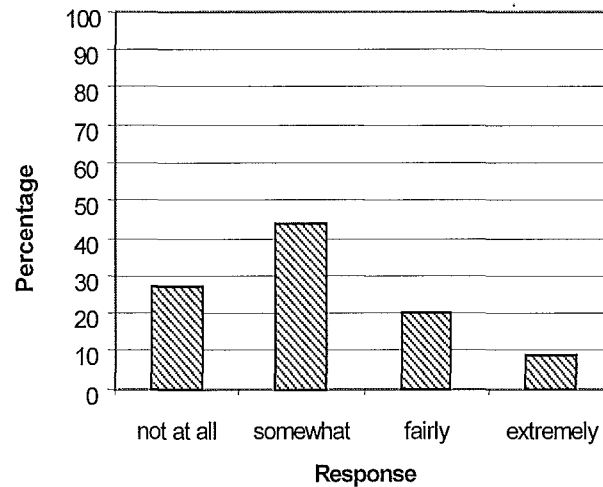


Fig 5.27 Threatened by fire.

Figure 5.27 shows that most of the respondents (44%) felt somewhat threatened by fire. Twenty-seven percent of respondents felt not at all threatened and 20% felt fairly threatened by fire. Nine percent of respondents felt extremely threatened by fire.

**67      How many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a bed?**

This question, and the following question is aimed at finding out if people have a realistic idea how quickly a small fire can grow into one that involves the entire room. If people have an unrealistic idea of the time involved, they may believe they have a lot longer to escape from a burning building than what is actually available. They may waste time investigating the fire and gathering belongings, and so become trapped and risk injury or even death. By educating people on the speed of fire, people may be more inclined to evacuate immediately, and so lives may be saved.

Within a couple of minutes of a fire starting, the house could be full of smoke [19]. Home fires grow fast enough to kill everyone in just two to three minutes [21, 29, 32], with the entire house consumed by fire in less than 5 minutes [22].



This question and the following question could have asked about any rooms in the house. However these two rooms that were chosen have the highest incidence of domestic fatalities. In the period 1986 to 1994, 38.2% of fatalities occurred in bedrooms and 25.9% occurred in the lounge and dining area.

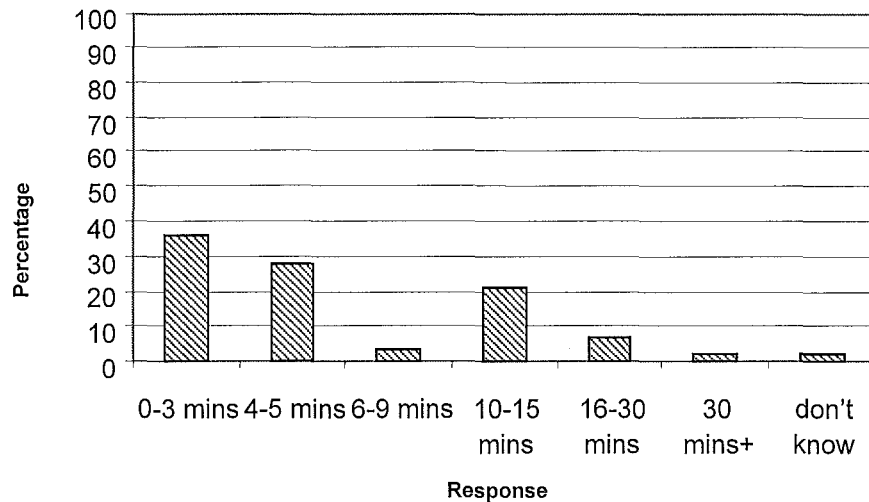


Fig 5.28 Time for a bedroom fire.

Figure 5.28 shows that 36% of respondents believed that if a fire started on a bed, it would take less than three minutes for the entire room to become involved. This was taken as a realistic estimation for the time of a bedroom fire. Twenty-eight percent of the respondents believed that it would take four to five minutes and 21% believed that it would take 10-15 minutes for the room to become fully involved. Seven percent of respondents believed that it would take 16-30 minutes, 4% thought 6-9 minutes and 2% thought it would take over 30 minutes for the room to become fully involved. Two percent of respondents were not sure how long it would take.

**68      How many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a couch in your lounge?**

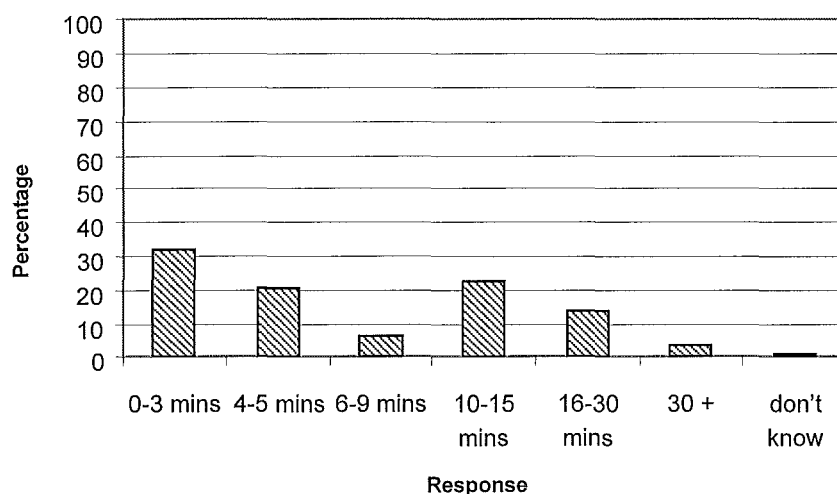


Fig 5.29 Time for a lounge fire.

Figure 5.29 shows that 32% of respondents believed that if a fire started on a couch, it would take less than three minutes for the entire room to become involved. This was taken as a realistic estimation for the time of a lounge fire. Twenty-three percent of the respondents believed that it would take 10-15 minutes and 21% believed that it would take 4-5 minutes for the room to become fully involved. Fourteen percent of respondents felt that it would take 16-30 minutes, 6% believed it would take 6-9 minutes and 4% believed it would take over 30 minutes for the room to become fully involved. One percent of the respondents were not sure how long it would take.

With these two questions people felt that the time would vary depending on the material that the couch or bed was made of and what was in the room. This however would not significantly increase the time it takes for the room to become fully involved.

**69      Do you sleep with the bedroom door open or closed?**

At present there is very little information available to the public on how they should position their bedroom door while sleeping. The New Zealand Fire Service

recommends that the door should be closed, but there has been no recent education programmes on this. People often do not follow the recommended advice, instead they keep their doors open or closed depending on their personal situation.

If the bedroom door is closed, it can slow the spread of fire, allowing more time for the occupants to escape [26, 28]. However, the safest advice is to have a smoke detector in each bedroom to ensure that all occupants can hear a smoke detector [26]. This is because a person may not hear a detector in the hallway if their bedroom door is closed [35] and they are in a deep sleep. A smoke detector in the hall may not detect a bedroom fire early enough for occupants to be able to evacuate safely if the door is closed.

A probabilistic risk assessment performed by Palmer [40] found that for a typical New Zealand house it is safest to leave the bedroom doors closed while people are sleeping. This study was carried out in a typical New Zealand house with one smoke detector in the hallway.

The majority of respondents (78%) sleep with their bedroom door open.

**70 Why do you sleep with your door opened/closed?**

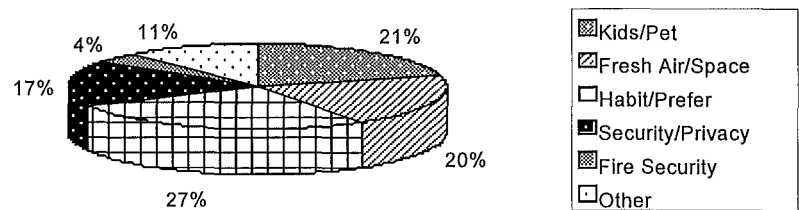


Fig 5.30 Reasons for bedroom door situation.

Figure 5.30 shows that the most common reason, for how people leave their doors when sleeping, is that it is out of habit or it is a preference (27%). The next most common reason (21%) is for children and/or pets. The door is either left open for

parents to be able to hear their children, or its position depends on whether people want their pets in their room or not. This reason is closely followed (20%) by respondents who leave the door open for fresh air or space (makes small rooms seem larger). Seventeen percent of people leave their doors closed for privacy or positioned for personal feelings of security, and 4% leave the doors for fire security reasons. The remaining 11% have other reasons for positioning their doors, such as not having doors in the house.

Of the seven respondents (4%) who replied that they positioned their door for fire safety reasons, two left the door open and four left it closed.

**71      How likely do you think it would be that you would wake up at night if there was a fire?**

The toxic smoke and gases from a fire can harm an occupant before the fire actually arrives [27, 38]. In particular, the smoke from some household furnishings is highly poisonous and can kill the occupants of the house [19].

People can die in their sleep, suffocated by smoke without ever waking up. Fire death statistics from 1992-1996 showed that 41% of deaths in structures (including domestic structures) occurred when the victim was asleep [39].

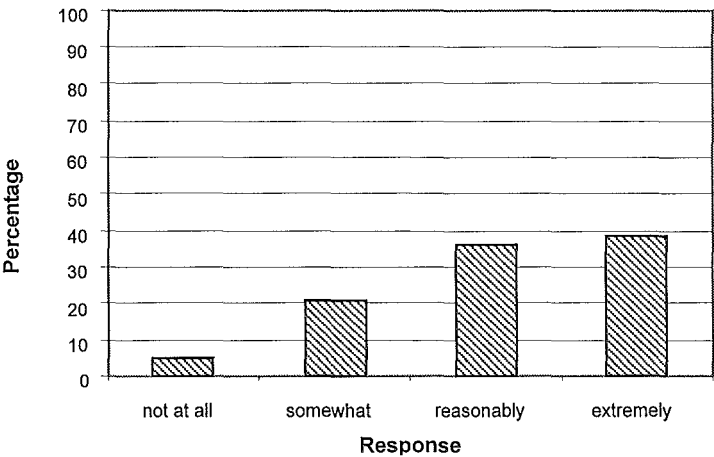


Fig 5.31 Likelihood of waking.

Figure 5.31 shows that 38% of the respondents thought that it would be extremely likely that they would wake up at night if there was a fire. This is closely followed by 36% believing that it would be reasonably likely that they would wake up. Twenty-one percent felt that it would be somewhat likely that they would wake and 5% believed that it would be not at all likely that they would wake if there were a fire at night.

## **72 What would wake you during a fire at night?**

For this question the respondents were able to reply with more than one answer. Most of the respondents thought that more than one thing could wake them.

- 88% of respondents thought that a smoke detector would wake them
- 67% thought that the noise from the fire would wake them
- 57% thought that the smell of the smoke would wake them
- 54% thought that the heat from the fire would wake them
- 43% of respondents thought that a pet would wake them
- 1% did not think that anything would wake them
- 35% thought that something else, such as a neighbour or another family member, would wake them

This question could have been clearer for the respondents. Some people replied to this question with anything that could wake them and others only considered what was in their household at the time of the interview.

## **73 Could you estimate for me, how many people are killed in New Zealand each year in home fires?**

From Table 5.2, 19 people die (on average) each year between 1986 and 1994 in home fires [1]. Some fatalities however, may go unrecorded if a person injured in a fire dies later in hospital from their injuries.

When only one person dies in a fire, it is often not given the same media coverage as multiple fatalities. This lack of media coverage may affect the estimates of the number of fatalities occurring in domestic fires.

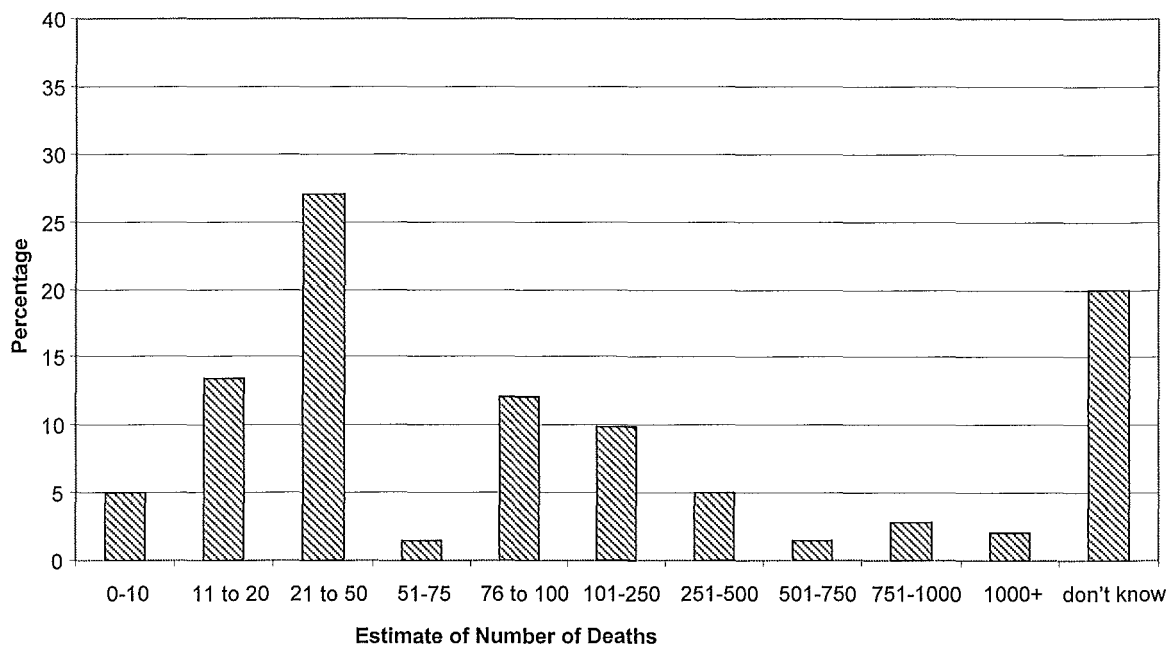


Fig 5.32 Number of deaths.

Estimates for the number of deaths in home fires (Figure 5.32) ranged from single figures to over 1000. Most respondents (27%) thought that 21-50 people die in home fires each year. Thirteen percent thought that 11-20 people die while 12% of the respondents thought that 76-100 people die. Ten percent said that 101-250 people die in home fires, 5% said 251-500, 5% thought 0-10, 5% thought 751-1000 and 2 percent thought that over 1000 people died in home fires each year. One percent believed that 51-75 people die in home fires and another 1% thought that 501-750 people were killed. Twenty percent of the respondents did not have any idea how many people are killed each year.

Most of the respondents over estimated the number of people killed each year in home fires. Taking 19 deaths per year during the period of 1992-1996 [1], 62% of the respondents thought that more than 20 people die in home fires each year.

## 74      **Where did you learn about fire safety?**

Again, respondents could select more than one option.

- 38% of respondents learnt about fire safety through work
- 31% learnt about fire safety through school
- 28% learnt about fire safety through their life experiences
- 13% of people learnt about fire safety through television or radio
- 11% learnt about fire safety from their parents
- 9% learnt about fire safety from other people such as their children or partner
- 6% learnt about fire safety through reading
- 17% of respondents learnt about fire safety through other means such as during the war, social clubs and first aid courses

## **5.6 BACKGROUND**

Background information relevant to the respondent is left to the end of the questionnaire. By asking these questions in the final part of the questionnaire the respondent is familiar with the inquiry and rapport should be at a maximum. The respondent is less likely to be sceptical or uncooperative. Some respondents may terminate the interview at this point or refuse to answer some of the questions. However, by this section, they have provided the bulk of the data.

The first set of questions asks about the respondents' demographic details. By asking these questions, analysis can be aimed at discovering if there are any trends in behaviour and knowledge of fire that are related to the respondents' age, gender, race or marital status, for example. If there are groups of New Zealanders more at risk from fire than others and if these groups can be identified, an education programme can be devised to target that specific group.

## 75 How old are you?

Within New Zealand certain age groups are more at risk from dying in domestic fires than other age groups are. For males, the rate of death is very high for under five year olds (20.4%) with a low injury rate (4.6%). This is also similar to the over 55 year age group (excluding 90+, as a flaw may be present with the recording system and the transfer of data to the FIRS<sup>3</sup> database) with 11.7% injured and 25.9% killed. The 20-24 year old age group is the only age group with a relatively high injury rate (11.8%) and death rate (9.3%) [1].

For females, there is again the high death rate (19.7%) and low injury rate (6.1%) for the zero to four year age group. Similarly a high death rate of 9.8% with a lower injury rate (2.6%) occurs for the 75-79 age group [1].

These figures fit with those of elsewhere around the world. That is, the very young and very old are at greatest risk of casualties from fire. Typically the very young do not have the knowledge or mobility to escape from fire and the old do not have the mobility or time to escape.

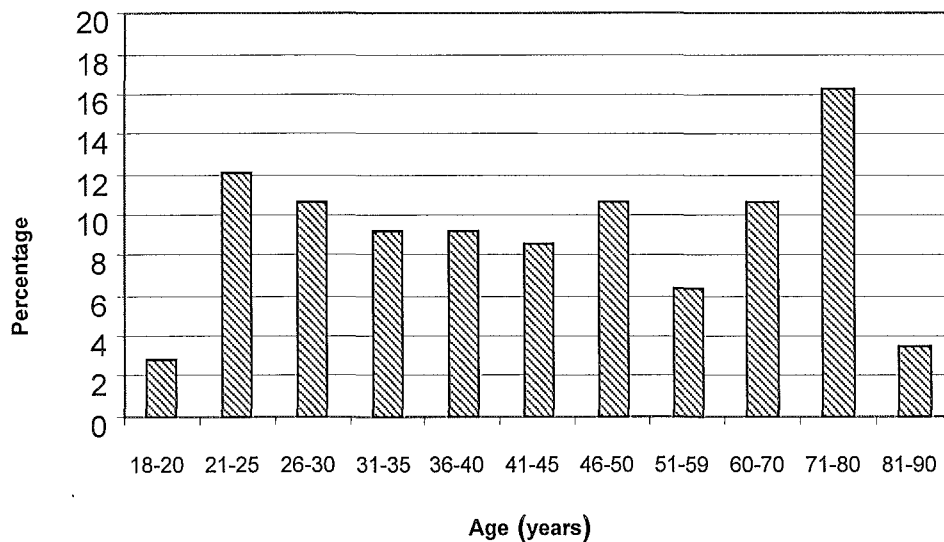


Fig 5.33 Age of respondents.

<sup>3</sup> Fire Incident Reporting System



Figure 5.33 shows that the age of the respondents varied between 18 and 90 years. In Figure 5.34, the respondents are placed in three age groups, young, middle aged and aged. Twenty-six percent of the respondents were classed as young (18-30 years). Forty-four percent of the respondents were classified as the middle-aged group (31 – 59 years). Thirty percent were classed as aged (over 60 years).

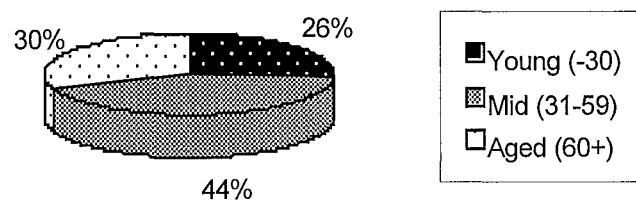


Fig 5.34 Age grouping of respondents.

As the social clubs for the aged in Christchurch, New Zealand, start at 60 years, the same age grouping was used for this report. Thirty years was chosen as the break between the young and middle-aged group.

## **76 Are you male or female?**

Fifty-three percent of the respondents were male and 47% were female.

**77 Can you tell me which ethnic group(s) you belong to:**

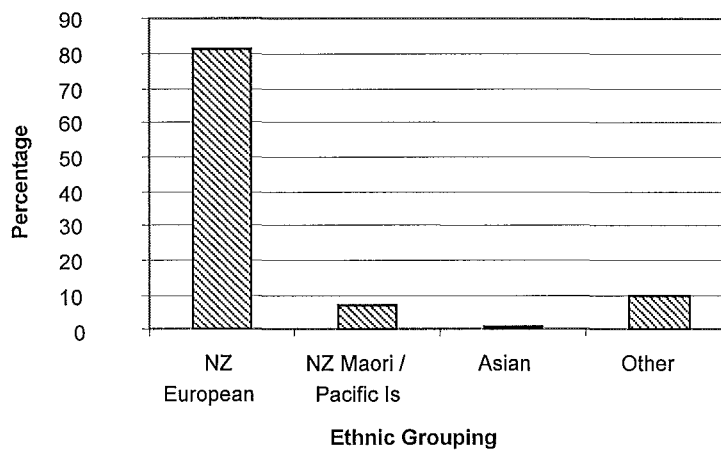


Fig 5.35 Ethnic grouping of respondents.

Figure 5.35 shows that the majority of the respondents were New Zealand European (82%). Only one respondent was a Pacific Islander, so that respondent was added to the New Zealand Maori group to make a combined category (7%). One percent of the respondents were Asian and 10% fell into the other category. This included British, American and Dutch.

**78 What is your present marital status?**

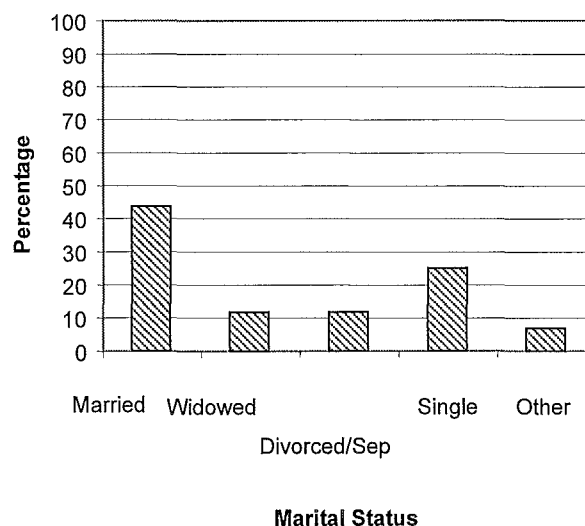


Fig 5.36 Marital status of respondents.

Figure 5.36 shows that 44% of the respondents were married and 25% were single. Twelve percent were widowed and another 12% were divorced or separated. The remaining 7% were in defacto relationships.

## 79 How many people live in the house?

The next questions were asked to find out the number of people living in the house and thereby give an indication of the type of household. It also asks if children and/or disabled people are living in the house.

People living on their own had fatal fires 2½% more than could be expected from their proportion in the population from 1986-1990. The number of fire deaths for unrelated people living together (flatters) was also out of proportion to the number as a whole in the population for this period [38].

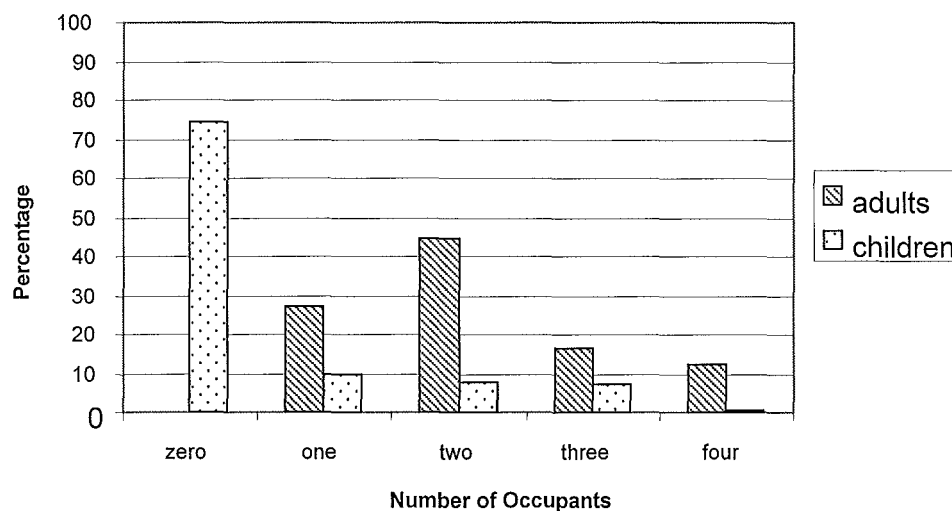


Fig 5.37 Number of adults and children in the household.

Of the respondents interviewed, Figure 5.37 shows that 45% of the households had two adults, 27% had one adult, 16% had three adults and 12% had four or more adults living in the house. Also, the majority of these households (74%) had no children. Ten percent of households had one child, 8% had two children, 7% had three children and 1% had four or more children.

**80 Are there any people in the house with disabilities that may require assistance in the case of a fire?**

In the majority of households (87%), there was no one with a disability that might need assistance in the case of fire. Some respondents did not consider very young children as having a disability, but they would require assistance out of the house. For this reason the question could have been clearer.

**81 If there are children under 18 years old, what are their ages?**

Of the 36 respondents with children, there were nineteen 7 to 10 year olds, sixteen 0 to 3 year olds, sixteen 12 to 15 year olds, fourteen 4 to 6 year olds, and eight 16 to 18 year olds.

**82 How much education have you had?**

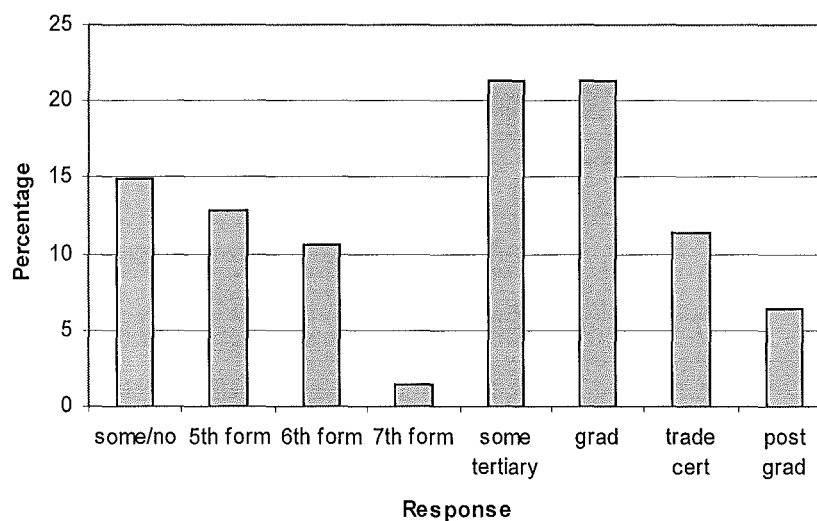


Fig 5.38 Education of respondents.

Figure 5.38 shows that 21% of respondents had either some tertiary education or were a tertiary graduate. These two groups were followed by 15% having only one or two years of secondary education, or none at all. This group mainly included the elderly, as they were not required to stay at secondary school when they were younger.

Thirteen percent of respondents had completed 5<sup>th</sup> form, 11% had completed 6<sup>th</sup> form and another 11% had a trade certificate. Six percent of respondents had higher education such as a post graduate degree and 1% had completed 7<sup>th</sup> form.

Although the highest qualification was asked for, there was variation in previous qualifications. Some respondents completed a trade certificate or tertiary education after doing little secondary education, while some finished secondary school before continuing with tertiary education.

**83      Are you employed?**

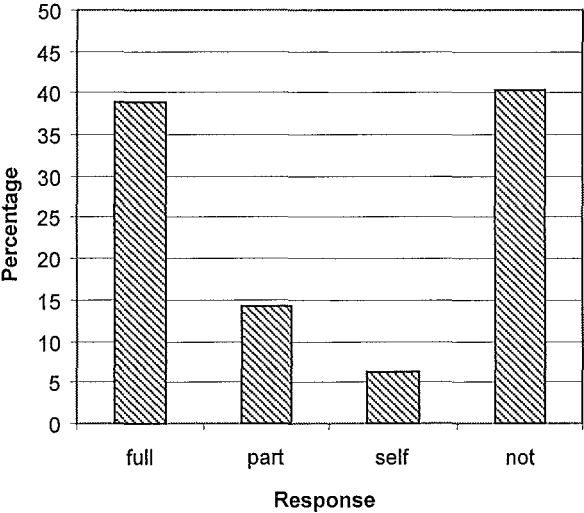


Fig 5.39 Employment of respondents.

Figure 5.39 shows that slightly more people were unemployed (40%) than were employed full-time (39%). Part of the reason for this could include the fact that many respondents were students and some were not working during the Christmas holiday break. Fourteen percent of respondents were employed part-time and 6% were self-employed.

**84 Estimate of total combined yearly income of all household members before tax or anything else was taken out of it. For the 12 month period of January to December 1998.**

Virtually all studies show that lower levels of income are either directly or indirectly tied to an increased risk of fire [13]. Studies reviewed within this project, from overseas and within New Zealand, have shown that the lower socioeconomic group has a higher risk of fire [1, 10, 11, 12, 14].

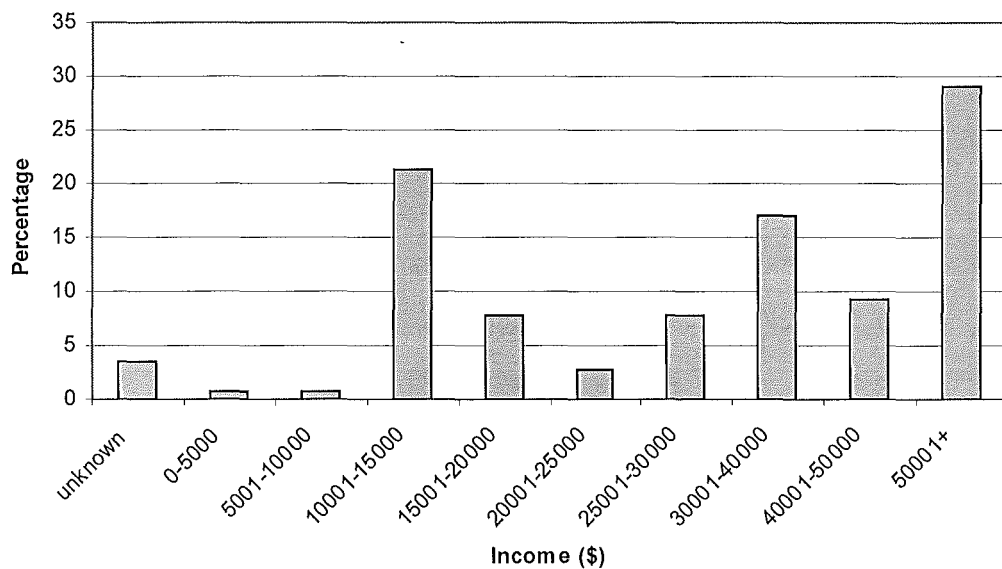


Fig 5.40 Income of respondents.

Twenty-nine percent of households earned over \$50,000 (Figure 5.40). Most of these households consisted of people flatting together, combining four or five incomes. Twenty-one percent of respondents earned between \$10,001-\$15,000. This group mainly consisted of the elderly, living on their retirement benefit.

Seventeen percent of respondents' income was in the \$30,001-\$40,000 category, 9% earned \$40,001-\$50,000, 8% earned \$25,001-\$30,000 and 8% earned \$15,001-\$20,000. Three percent of households earned \$20,001-\$25,000 and one percent of the respondents fitted in each of the remaining two income groups. Four percent of respondents would not answer the question.

**85      Do you smoke tobacco products regularly (that is, one or more a day)?**

The primary category for equipment that was involved in the ignition of domestic fires within New Zealand (1986-1994) was the category of no equipment (57.3%). This included the heat of ignition from smoking materials. Smoking materials and open flames (such as candles) made up 15.5% of the form of heat of ignition. Smoking is also included in ignition factors. Three and a half percent of fires were caused by an abandoned heat source, this includes cigarettes and other burning matter which are discarded in a manner that provides heat to ignite other material [1].

Another ignition factor for this period was misuse of heat of ignition. These account for 5.6% of fires. Part of this category includes people falling asleep (1.4%) and people smoking who fall asleep and a fire results from smoking materials. It also includes occasions where the occupant was impaired by drugs or alcohol (0.3%) [1].

Eighteen percent of the respondents in this survey said that they smoke.

**86      Do you ever smoke in bed?**

Nineteen percent of the 26 respondents who smoke said that they smoke in bed.

## 87 How would you describe your drinking habits?

People who drink heavily have also been shown to be at higher risk from fire [14].

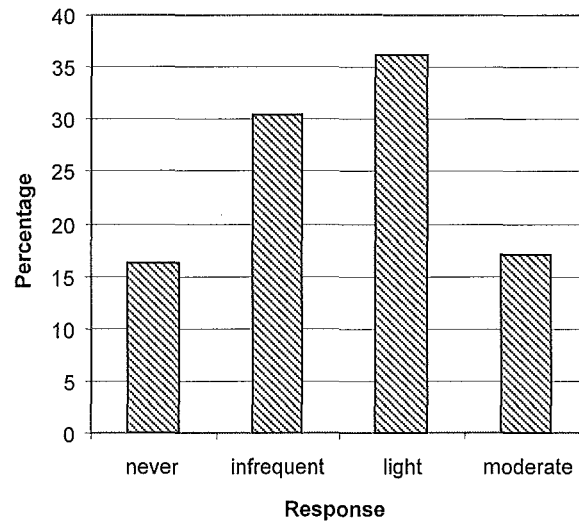


Fig 5.41 Drinking.

Figure 5.41 shows that 36% of respondents described themselves as light drinkers closely followed by 31% who said that they are infrequent drinkers. Seventeen percent of respondents said that they are moderate drinkers and 16% never drink. No one said that they were a heavy drinker.

This question was open to a lot of personal interpretation. Instead of asking the respondents for what they thought that their drinking habits were, the questionnaire should have given an example of what amounts of drinking each category included.

## 88 Do you own an electric blanket?

Electric blankets made up 2.5% of equipment involved in domestic fires [1] from 1986-1994.

Forty-seven percent of the interviewed respondents own an electric blanket.



**88      If you do own an electric blanket, when do you turn it off?**

Safety advice in New Zealand recommends that electric blankets should only be used to warm the bed [29] and should always be turned off before getting into bed [21]. The manufacturers of the blankets recommend that as long as the blanket is left on a low setting it can be left on all night. Electricians however, disagree.

The majority of the 66 respondents who own an electric blanket turn it off before they go to bed (67%). Fifteen percent turn it off after having the blanket on for an hour before bed and fourteen percent turn their blanket off after having it on for 20 minutes before going to bed. Five percent of the respondents turn the blankets off in the morning.

**90      Do you ever use candles in your home?**

Fifty-seven percent of the 141 respondents do not use candles in their home. People who only kept candles in their home in case of a power cut were included in this category.

**91      If you do use candles, do you ever leave burning candles unattended?**

Of the 60 respondents who use candles, 32% have at some time left candles burning unattended.

## 92 What type of building do you live in?

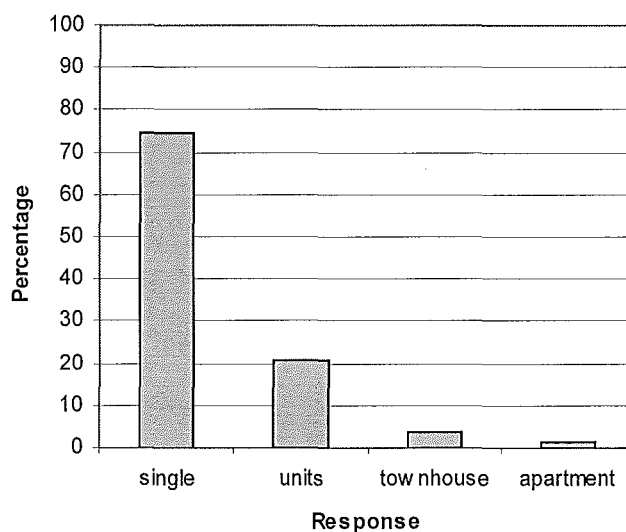


Fig 5.42 Type of building.

Figure 5.42 shows that the majority of the respondents (74%) live in a single dwelling house. Twenty-one percent live in units joined together, 4% live in town houses and 1% live in apartment blocks.

## 93 How many stories in your house?

The majority of the respondents (82%) live in single storey houses. Fifteen percent of respondents live in two storey homes and 3% live in three storey homes. Nobody who was interviewed lived in a home of four stories or more.

## 94 Is your home owned/being bought by you or is it rented?

Overseas studies [13, 14, 15] have shown that people who own their home are less at risk than people who rent their home. Owner-occupiers are also more likely to have fire protection devices installed than people who rent. A study in New Zealand showed that rented properties appear to be more at risk from fire than owner-occupier properties. Of the fatal fires from 1986-1990, 55% were in rented properties [38].

The majority of respondents (69%) owned their own homes. Thirty-one percent rent their homes.

**95      Approximately how old is your house?**

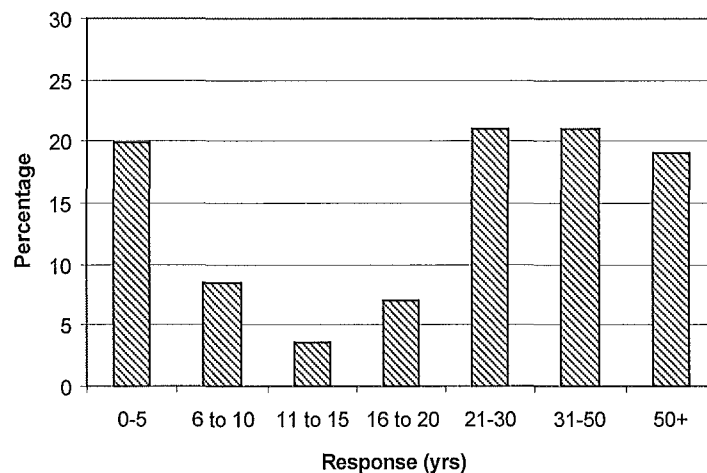


Fig 5.43 Age of home.

Figure 5.43 shows that the most common age of the respondents' homes was the 21-30 year category (21%) and the 31-50 year category (21%). This is closely followed by homes under five years (20%) and over 50 years (19%). Eight percent of respondents homes are 6-20 years and 7% are 16-20 years. Four percent of homes are 11-15 years old.

**96      Can you tell me, which of the following are ever used to heat this house?**

As respondents were asked what forms of heating were used in their home, more than one answer could be given. All of the respondents used some form of heating with 95% using electricity as their primary or secondary form of heating. Thirty-one percent of respondents used a log burner, 23% used bottled gas and 11% used an open fire. Four percent used coal at some stage and 1% used a solar heating system. One respondent (1%) fitted into the other category with a heat pump.

**97 Have you ever been in a major fire?**

Fourteen percent of respondents had been in some type of major fire. This category included bush fires as well as large house fires.

**98 Have you ever had a minor fire in your home?**

Forty-two percent of respondents had been in a minor fire at some stage in their lives. These fires included pan fires, electric fires and other fires of a similar size.

**99 If you have had a minor fire in your home, did you report it to the fire service?**

Of the 59 respondents who had had a minor fire in their home only 25% reported it to the Fire Service.

**100 If you did not report it to the fire service, why not?**

The 44 respondents (75%) who had not reported the fire to the Fire Service all said that they put the fire out themselves. A few said that the fire was only minor or trivial and one respondent admitted to being embarrassed about the fire.

## 6.0 CALCULATED RESULTS

A Chi-square analysis was performed on a variety of background characteristics to find if there were any differences in behaviours or knowledge among groups within the population. If certain portions of the population were shown to be more at risk than other groups education can be targeted to these groups.

Four background characteristics were used in a Chi-square analysis [41, 42]. These four background characteristics for the respondents were:

- With or without children
- Own or rent home
- Age grouping
- Gender

The four background characteristics were chosen as they were felt to be important groups within the population. They also had enough respondents within each sub-grouping to be able to give reasonable results. For each of the characteristics 13 results were used:

- ‘How many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a couch in your lounge?’
- ‘How many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a bed?’
- ‘What would you do right now if your clothing caught on fire?’
- ‘What would you do if you woke up at night, smelt smoke, and found that your bedroom door was shut and was hot when you touched it?’
- ‘What would you do if the grease in your frying pan caught fire?’
- ‘What would you do if you found your only exit route out of the house was full of smoke in a fire?’
- ‘Do you have any smoke detectors in your house?’
- ‘Does your household have an escape plan on how to leave your home in case of fire?’

- ‘Do you have an agreed place to meet after leaving the house?’
- If they learnt about fire safety from other people
- If they learnt about fire safety from television, reading or radio
- ‘How threatened do you feel by fire?’
- ‘How often is the smoke detector tested?’

Each result was split into a preferred practice (or realistic estimation) and a discouraged practice (or unrealistic estimation). The basis for this distinction came from the information on recommended behaviours provided in Section 5.0 of this report. The last four results stayed in the same form as in the questionnaire.

An example below, Table 7.1, shows the layout of the responses for the 141 respondents, divided between those with children and those without. A realistic estimation to the question “how many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a couch in your lounge” was the category “0-3 minutes”. Every other estimation, from four minutes and up, as well as “don’t know”, was classed as an unrealistic estimation.

Table 7.1 Peoples responses for estimation of time for a lounge fire.

	With Children	Without Children
Realistic Estimation	15	36
Unrealistic Estimation	21	69

Chi-square ( $\chi^2$ ) analyses were performed to assess if any of the 13 results of the respondents’ behaviours were related to any background information (see Appendix 3 for full results). A significance level of 0.05 was used throughout the analysis. However, because a number of Chi-square tests were performed this may have inflated the Type 1 errors. These Type 1 errors are the probability that observed differences among groups were real differences when in fact they were chance occurrences.

The following sections show where the Chi-square analysis yielded significance, that is, there is evidence that the result is not random, but there is some effect due to the background characteristic. The percentages of appropriate responses are calculated by dividing the number of correct responses by the total number of respondents in each background category.

## **6.1 CHILDREN**

Six of the responses were significantly related to whether or not the respondent had children. These were:

- ‘What would you do if you woke up at night, smelt smoke, and found that your bedroom door was shut and was hot when you touched it?’ Forty-four percent of respondents with children responded with a preferred practice compared to 87% without children.
- ‘What would you do if the grease in your frying pan caught fire?’ Eighty-nine percent of respondents with children responded with a preferred practice compared to 77% without children.
- ‘What would you do if you found your only exit route out of the house was full of smoke in a fire?’ Ninety-four percent of respondents with children responded with a preferred practice compared to 79% without children.
- ‘Does your household have an escape plan on how to leave your home in case of fire?’ Fifty-three percent of respondents with children responded with a preferred practice compared to 22% without children.
- ‘Do you have an agreed place to meet after leaving the house?’ Fifty percent of respondents with children responded with a preferred practice compared to 9% without children.
- ‘How often is the smoke detector tested?’ Twenty-three percent of respondents with children checked their smoke detector batteries up to once a month compared to 15% without children.

## 6.2 HOME OWNERSHIP

One response was significantly related to whether or not the respondent owned or rented their home. This was:

- ‘How many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a couch in your lounge?’ Forty-nine percent of respondents who rent their home responded with a realistic estimate compared to 31% who own their home.

## 6.3 AGE

Four of the responses were significantly related to the respondents’ age. These were:

- ‘How many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a couch in your lounge?’ Sixteen percent of aged respondents responded with a realistic estimation compared to 42% of young respondents and 47% of middle-aged respondents.
- ‘What would you do if you woke up at night, smelt smoke, and found that your bedroom door was shut and was hot when you touched it?’ Ninety-one percent of aged respondents responded with a preferred practice compared to 75% of young respondents and 66% of middle-aged respondents.
- ‘How threatened do you feel by fire?’ Forty-two percent of the aged respondents felt not at all threatened by fire (middle aged 23% and young 17%). Sixty-four percent of the young respondents felt somewhat threatened by fire (middle aged 40% and aged 33%). Fifteen percent of the middle aged respondents felt extremely threatened by fire (young 6% and aged 5%).
- ‘How often is the smoke detector tested?’ Eleven percent of aged respondents checked their smoke detector batteries up to once a month compared to 22% of middle aged and 18% of young respondents.



## 6.4 GENDER

Two of the responses were significantly related to whether the respondent was male or female. These were:

- ‘What would you do right now if your clothing caught on fire?’ Eighty-six percent of females responded with a preferred practice compared to 70% of males.
- ‘What would you do if you found your only exit route out of the house was full of smoke in a fire?’ Seventy-four percent of females responded with a preferred practice compared to 91% of males.



## **7.0 RECOMMENDATIONS FOR RESPONDENTS**

After gathering information from the 141 questionnaires and then analysing it, recommendations can be made to the general population as well as to specific groups.

It is recommended that information on the care of smoke detectors and fire extinguishers becomes more widely available and easily accessible. Although instructions for the location, testing and maintenance of smoke detectors is included in the smoke detector packet, from people's responses it appears that it is not read by many people. Perhaps the brochure could be made more appealing and interesting, or an entirely different media could be used to convey information about smoke detectors to the population. Even if people do read the instructions they may throw the brochure away once they have finished with it. At a later date when something goes wrong, such as low batteries or a false alarm they may not remember what to do. Regular information on the television or radio may remind people continuously about what to do in such situations.

Also of great importance is the need for every household to have and to practice an escape plan. Again regular broadcasts on the television and radio may reach people. Maybe organising a national evacuation day similar to the day organised by the NFPA in the United States could be beneficial [43].

The analysis highlighted areas where there was evidence that a background characteristic affected the proportion of the respondents replying with the appropriate or realistic response. The following sections summarises what these are and, where it is clear, explains why.

### **7.1 CHILDREN**

Evidence shows that people with children are more likely to respond with an inappropriate behaviour to waking up to a fire at night than are people without children. These respondents with children would be more likely to respond to the situation by saying that they would return to a burning building to attempt a rescue or

open the bedroom door. While this is an understandable response for a parent to take, they need to be aware of the risks involved in re-entry.

People without children are less likely to have an escape plan and a meeting place, to check their smoke detector batteries at least monthly, to correctly move through smoke and to safely deal with a pan fire. This may be because children are receiving fire education at school and then bringing it home to their parents. Parents may also be more safety conscious because they are responsible for their child and so make more of an effort to learn correct behaviours and actions.

## **7.2 HOME OWNERSHIP**

People who rent their home are more likely to reply with a realistic estimation for the time of a lounge fire than those respondents who own their homes are. It is unclear why this is so, especially as there is no evidence that home ownership has any affect on the realistic estimation of the time for a bedroom fire.

## **7.3 AGE**

Aged people (over 60 years) are more likely to reply with an incorrect estimation for the time for a lounge fire than the other two age groups. Perhaps the elderly are less aware of the speed of fire. They may have been exposed to less information about the speed of fire than what other age groups have received. Considering that there is no evidence that age has any affect on the realistic estimation of the time for a bedroom fire it is unclear what the reason for the difference in time estimation for a lounge fire was.

Aged people are less likely to check their smoke detector batteries at the recommended period of at least once a month. This is most likely due to the fact that many elderly respondents leave the care of the smoke detector to another family member or to the staff at the Retirement Village.

Aged people are also more likely to respond with an appropriate behaviour if there was a fire at night. This could be related to the education people have received in the past. The older members of the population may have received a greater emphasis on leaving immediately if they found that their bedroom door was hot compared to younger people. Many elderly live by themselves, and so would not need to consider returning to a burning building to rescue another person.

The age of people appears to affect how threatened they feel by fire. Young people are more likely to feel somewhat threatened by fire, middle aged people extremely threatened and aged people not at all threatened. Young people may only feel somewhat threatened by fire, as they believe they are unlikely to ever be in that situation. The feeling of immortality and invincibility may apply to fire as well as other activities when a person is young. By the time people are middle aged they may become more aware of their mortality and more aware of the risks in life. Once they are older the risk of fire may seem small again, of less concern than other risks to their lives.

## **7.4 GENDER**

Females are more likely to reply with an appropriate behaviour if their clothes are on fire, but less likely for moving through smoke. Perhaps men and women respond differently to different forms of education. Investigation into forms of education may show differences in teaching methods. If there are differences, modifications could be made to the way fire safety is taught to different genders.



## 8.0 CONCLUSION

The results of a survey of fire awareness and knowledge administered to a random sample of Christchurch residents have been presented.

To summarise, in general it was found that most respondents had a reasonable knowledge about what to do in fire situations and about fire in general. The positive points that were discovered were that:

- Most people are concerned with fire prevention and feel that they can prevent a fire in their home.
- 92% knew the correct emergency services number.
- 82% of respondents living in single dwelling homes have one or more smoke detectors.
- 87% felt that their smoke detector is not a nuisance.

However, on a negative side:

- 84% of respondents would return to a burning building to rescue their child or partner.
- 22% of respondents would do something other than rolling or smothering if their clothes caught fire.
- 24% of respondents would do something other than leave via an alternative exit if there was a fire at night. 7% would open a hot door.
- 17% of people would use some other method than crawling to move through smoke.
- 17% of respondents would do something other than use a lid and/or a damp tea towel to cover a pan fire.
- If there was a large fire in the lounge, 31% of respondents would do something (phone for help, grab belongings or fight the fire) before exiting.
- 18% of respondents would phone about a fire in their lounge from within their home.
- 43% have fire extinguishers, but 82% of those respondents have not had the extinguisher checked in the last year, or ever.
- 70% of respondents do not have an escape plan.

- 75% of respondents who live with at least one other person do not have a meeting place.
- 92% of respondents who sleep on a floor other than the ground floor do not have an escape ladder.
- 23-26% of respondents knew that a fire could take under three minutes to involve an entire room. 21-29% believed that it could take over 10 minutes.
- 96% of respondents knew that the smoke and toxic gases from a fire is more likely to kill them than the flames, yet 40% of respondents believed that the smoke from a fire could wake them.

People with children need to be reminded of the risks if returning into a burning building. Perhaps if they have faith in the Fire Service arriving immediately and performing a quick rescue they may be more inclined to wait. It is doubtful though that any education process could convince parents to wait outside if their child was trapped in a burning building.

Although people with children are more likely to have an escape plan than those without, by repeating the idea of escape plans and the practice of the plans the situation of someone being trapped in a burning house should arise very rarely. All groups of the population need to be reminded about the benefits of having a prepared and practiced escape plan.

The reasons for differences in results due to age, gender and home ownership seem less clear than differences between families with children and those without. At this point, there is not enough information to account for some of these results. Further study is needed to explain these observed differences.



## **9.0 RECOMMENDATIONS and FUTURE WORK**

### **9.1 THE QUESTIONNAIRE**

Overall, there seemed to be little difficulty with people understanding most of the questions. However, after interviewing the 141 respondents, a few improvements to the questionnaire became apparent. The addition of some new questions and the alteration of some existing questions could improve the questionnaire for future use. These changes are:

- The age of the respondents' fire extinguisher(s) should be asked in conjunction with how often they are tested. This would show if people own old extinguishers that have never been checked.
- The respondents need to be asked to test their smoke detector to see if it is actually working. This will be difficult for the respondent to do if they are not in their home at the time of the interview. Another option could be to ask them, if they say that their smoke detector is functioning, why they think that the smoke detector is functioning.
- The question regarding time for an entire room to be on fire if a small fire started on a bed or on a couch needs to be clearer. A specific mention that smouldering is to be ignored may help.
- The questions regarding time for a room fire and estimation of domestic fire deaths should have provided set options for responses. This would have made it easier to group the results for presenting and analysing.
- The question regarding what would wake people at night needs to be altered. Some respondents considered what was in their house, others what could possibly wake them, even if they did not have it in their house at the time.
- Asking respondents about whether or not there are people with disabilities in the household could be clarified. Some respondents did not regard babies as being disabled, but they would require assistance. Perhaps the word disabled could be deleted.

- When the respondents were asked about their drinking habits, examples of what each category meant should have been included. This would remove personal interpretation and make the results more standard.
- Asking about the type of family living in the household would be another useful background question. The respondent could be asked if their household is a nuclear family, a group of unrelated flatters or more than one family living together. This makes it more obvious than trying to deduce the household composition by the number of adults and children in the house.
- As well as asking people where they learnt about fire safety, they could also be asked about what education programmes they remember. This could show if certain types of programmes reach certain types of people and also what programmes are best remembered.
- People could also be asked if they know what to say when calling the emergency services number, 111.
- A question could be added asking people where they think they are most at risk from dying in a fire.
- When the respondent is asked if they have ever had a minor fire in their home, they could also be asked more about that fire, such as what caused it.

To achieve better results the interviewing process needed to begin earlier so that more respondents could be interviewed. By the time the questionnaire was written and approved by the University Ethics Committee, Christmas was just over a month away. Because many organisations closed over the Christmas period and many people were busy it was difficult to contact a wide variety of respondents.

With more respondents interviewed, more Chi-square tests could have been performed on other background characteristics. These include type of housing, income, ethnic grouping and if the respondents had been in a fire.

Between 500 and 1000 respondents would most likely have given better results as the larger the sample is, the lower the sampling error. No sample of people is likely to produce results that are precisely the same as those for the entire population of Christchurch. There is always some chance that those who are included in the sample

are not perfectly representative of the whole population. If the difference between the sample data and the population data results purely by random chance, then this is known as sampling error.

Smaller samples are more likely to be different from the population than are large ones, so smaller samples have more sampling error. The higher the sampling error, the lower the reliability. This means that the smaller the sample, the lower the reliability of the data.

## **9.2 AT RISK GROUPS**

With more time, more of the 'at risk' groups, such as low income, Maori and Pacific Island groups could be interviewed. To reach these 'at risk' groups in the future a variety of organisations and community groups could be contacted. Community Cottages<sup>4</sup> throughout the city would have a supply of potential volunteers from various backgrounds. The Mission, Salvation Army, and church groups would also be good sources of respondents.

Had more respondents of the 'at risk' groups been interviewed, an analysis could have been performed on the income groups and ethnic groups. This analysis would have been performed in the same way as for the four background characteristics in Section 6.0 by using a Chi-square test. After the questionnaire was completed, it was found that there were not enough low income groups or ethnic minorities to make an analysis useful. Although there were 32 respondents earning under \$15 000 most of them were the elderly living on a retirement benefit. It was felt that any variation in the results was more likely to be due to age than to income.

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<sup>4</sup> Places where people in the neighbourhood can drop in for a chat or advice.

### 9.3 ALTERNATIVE METHODS

By interviewing people, it gives them time to think about their response and especially to think about the correct response. In a real situation, the number of people performing the correct action could be lower.

By looking at fire statistics, an idea of what people were doing at the time of a fire may give an idea of the number of people doing the correct action. People who survived a fire could be asked what they were doing when the fire broke out and what they were doing up until they moved away from the fire. A questionnaire could be put together to target these people. The problem with this idea is that there would be a limited pool of people to interview. It may have been a traumatic event, especially if a death was involved, making people reluctant to talk about the fire. People may also not be able to remember accurately what they were doing. It would be difficult or even impossible to find out what a person was doing if they died in the fire.

Another option is to simulate situations. This could have ethical constraints if the situations were made realistic enough to get accurate results. In addition, by putting people into an unfamiliar environment, such as a test facility, and telling them that something could happen may increase the correct behaviours, as peoples awareness is raised. It may be possible to perform the simulations without the respondents' knowledge if care was taken. However, a lot of preparation would be required as well as a stringent safety programme.

The safest option would be, once this is available, to use virtual reality. However, as with simulation, it would be difficult to ensure that the correct behaviours were not increased as people were aware of something different.

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## APPENDIX 1

### QUESTIONNAIRE

#### *What People Know About Fire*

NOTE: You are invited to participate in the research project "What People Know About Fire" by completing the following questionnaire. The project is being carried out as a requirement for a Masters of Fire Engineering degree by Sarnia Rusbridge (phone 364 2564, ex 6564) under the supervision of Charlie Fleischmann (at the University of Canterbury, phone 366 7001). They will be pleased to discuss any concerns you may have about participation in the project.

The results need to be as accurate as possible. It is therefore important that you are honest and answer according to your personal experience. Anonymity is the basic assumption for the survey and your personal safety will be ensured in several ways.

1. The questionnaire is anonymous.
2. Results and diagrams are not going to be created in a way so that a single person will be recognised.
3. The pages of the survey will be destroyed after the data has been entered in the programme.

You may at any time withdraw your participation, including withdrawal of any information you have provided.

**By completing the questionnaire, however, it will be understood that you have consented to participate in the project, and that you consent to publication of the results of the project with the understanding that anonymity will be preserved.**

I'd like to begin this questionnaire by reading you a list of statements. For each statement I read, I would like you to tell me if you strongly agree with the statement, somewhat agree with the statement, somewhat disagree with the statement or strongly disagree with the statement.

My first statement is:

1. There is little I can do to prevent a fire in my home

StrongA	SomeA	SomeD	StrongD
---------	-------	-------	---------

2. The chances of my being in a fire in the future are slim

StrongA	SomeA	SomeD	StrongD
---------	-------	-------	---------

3. Most people who die in fires are killed by the smoke or lack of oxygen, and not by the flames

StrongA	SomeA	SomeD	StrongD
---------	-------	-------	---------

4. Fires occur so infrequently that I am not concerned with fire prevention

StrongA	SomeA	SomeD	StrongD
---------	-------	-------	---------

5. Most people will panic in a fire

StrongA	SomeA	SomeD	StrongD
---------	-------	-------	---------

6. If I found a large fire in a room of my house I would immediately close the room door, leave the house and call the brigade.

StrongA	SomeA	SomeD	StrongD
---------	-------	-------	---------

7. I would not go back into a burning house to look for my partner or child.

StrongA	SomeA	SomeD	StrongD
---------	-------	-------	---------

8. If a fire started in my home, fire fighters will get here before the fire leads to serious consequences.

StrongA                      SomeA                      SomeD                      StrongD

9. The building that I work in is more fire safe than my home

StrongA                      SomeA                      SomeD                      StrongD

10. Why would you say that your work place is more/less fire safe than your home?

Now I'm going to read you some possible situations you might be in one day and I'd like to know what you think you would do if you were in such a situation. Please give me the first thing that comes into your mind.

The first situation is:

11. What would you do right now if your clothing caught on fire?

12. What would you do if you woke up at night, smelled smoke, and found that your bedroom door was shut, and was hot when you touched it?

13. What would you do if the grease in your frying pan caught fire?
14. What would you do in a fire if you found your only exit route out of the house was full of smoke?
15. What would your actions be if you found your entire lounge on fire?
16. What would your actions be if you found a small fire on the couch?

17. What would your first response be, in your home, to:

- Hearing a smoke detector?

- Smelling smoke?

18. Who would you phone and what number would you dial if you saw a fire?

19. If there was a large fire in your home, where would you call from?

20. What would you do if a fire alarm went in a public place, such as a movie theatre or a shopping mall?

21. If a sprinkler system operates, does it

- Spray water throughout the building

☐

- Spray water in part of the building

☐

- Spray water above the fire

☐

- Other → Which would be?

22. Now I'd like you to rate yourself on how much you think you know about fire prevention. Would you say (1) you know nothing about fire prevention, (2) a moderate amount about fire prevention, (3) a great deal about fire prevention, or (4) do you know everything about fire prevention?

1

2

3

4

23. Now I'd like you to rate yourself on how much you think you would know about what to do if a fire broke out in your home. Would you say that you would be (1) fairly unsure about what to do, (2) slightly unsure about what to do, (3) fairly sure about what to do, or (4) very sure about what to do.

1

2

3

4

24. Now I'd like you to tell me how well you would say your household is prepared for fire? Would you say that (1) your household is not at all prepared for a fire, (2) is somewhat prepared, (3) is moderately prepared, or (4) is very well prepared for a fire.

1

2

3

4

25. Now I'd like you to tell me how confident you are, that you are safe from fire in your home? Would you say that you are (1) unconfident, (2) somewhat confident, (3) fairly confident or (4) very confident that you are safe from fire.

1

2

3

4

26. Now I'd like you to tell me how probable do you think it is that a fire is going to start in your home in the next 10 years? Would you say that (1) there is very very little probability, (2) that there is little probability, (3) that there is some probability, or (4) that it is quite probable that a fire is going to start in your building in the next 10 years.

1

2

3

4

Now I'd to ask you about fire alarm systems.

FOR SINGLE DWELLING UNITS ONLY

27. An alarm system can be made up of heat sensors, smoke detectors, a sprinkler system, or any combination of these devices. Do you have any fire alarm systems like this in your house?

Yes ☐

No ☐

Do not know ☐

28. If yes, how many of each does the fire alarm system contain?:

• Heat sensor

• Smoke detector

• Sprinkler system

29. Do you have any fire extinguishers in your home?

Yes ☐

No ☐

Do not know ☐

30. If you do have fire extinguishers in your home, how many do you have?

FOR MULTIPLE DWELLING UNITS ONLY

31. An alarm system can be made up of heat sensors, smoke detectors, a sprinkler system, a manual call point or any combination of these devices. In the public areas of your building, like the hallways, stairs, laundry room or basement, is there a fire alarm system?

Yes ☐

No ☐

Do not know ☐

32. If yes, how many of each does the fire alarm system contain?:

• Heat sensor

• Smoke detector

• Sprinkler system

• A manual call point

33. Are there any fire extinguishers in the public areas of the building?

Yes ☐

No ☐

Do not know ☐

34. If there are fire extinguishers in the public areas, how many are there?

35. Where is the closest fire extinguisher to your apartment?



36. And what about the apartment itself. Does it have a fire alarm system?

Yes ☐

No ☐

Do not know ☐

37. If yes, how many of each does the fire alarm system contain?:

- Heat sensor ☐
- Smoke detector ☐
- Sprinkler system ☐
- Manual call point ☐

38. Are there fire extinguishers in your apartment?

Yes ☐

No ☐

Do not know ☐

FOR ALL DWELLINGS

39. Have you ever used a fire extinguisher?

Yes ☐

No ☐

40. If you have a fire extinguisher, when did you last have it checked by a professional?

If you have a smoke detector:

41. Do you know what noise they make?

Yes ☐

No ☐

42. Where is it/they located?

43. Can you hear the smoke alarm clearly from all rooms and bedrooms if the doors are closed?

Yes ☐

No ☐

Do not know ☐

44. If more than one smoke detector is installed in the building, are these connected in series (so that all the smoke detectors are set off if one of them discovers smoke)?

Yes ☐

No ☐

Do not know ☐

45. If the building consists of more than one storey or several floors, are there smoke detectors on all floors where people are sleeping?

Yes ☐

No ☐

Do not know ☐

46. How often is the smoke detector(s) tested?

47. Are all smoke detectors functioning today?

Yes ☐

No ☐

Do not know ☐

48. If the smoke detectors are not functioning, why are they not functioning?

49. How often are the batteries changed?

50. How often is the smoke detector vacuumed?

51. Have you every removed the batteries?

Yes ☐

No ☐

52. If you have ever removed the batteries, why did you remove the batteries?

53. Is the smoke detector a nuisance?

Yes ☐

No ☐

54. If it is a nuisance, why is it a nuisance?

55. If it is a nuisance, what do you do about it?

56. Does your household have an escape plan on how to leave your home in case of fire?

Yes ☐

No ☐

57. If you do not have an escape plan, why do you not have one?

58. Have you ever practiced the escape plan(s)?

Yes ☐

No ☐

59. If you have not practiced the escape plan, why have you not practiced it?

60. If you have practiced the escape plan(s), how often do you have these drills?

61. Do you practice ways of leaving the house other than through the doors?

Yes ☐

No ☐

62. If leaving through a window, other than the ground floor, do you have an escape ladder?

Yes ☐

No ☐

63. Do you have an agreed place to meet after leaving the house?

Yes ☐

No ☐

Now I'd like to ask you some general questions about fire.

64. Where do you feel safest from fire?

- At home ☐
- At school ☐
- At work ☐
- At shopping malls ☐
- At a hotel ☐

65. Is it a good idea in general to close all windows and doors during a fire?

Yes ☐

No ☐

Do not know ☐

66. How threatened do you feel by fire?

• Not at all ☐

• Somewhat threatened ☐

• Fairly threatened ☐

• Extremely threatened ☐

67. How many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a bed?

68. How many minutes/hours do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a couch in your lounge?

69. Do you sleep with your bedroom door open or closed?

Open ☐

Closed ☐

70. Why do you sleep with your bedroom door opened/closed?

71. How likely do you think it would be that you would wake up at night if there was a fire?

- Not at all likely ☐
- Somewhat likely ☐
- Reasonably likely ☐
- Extremely likely ☐

72. What would wake you during a fire at night? (Tick as many as needed)

- Smoke detectors ☐
- Smell of smoke ☐
- Noise ☐
- Heat ☐
- Pet ☐
- Nothing ☐
- Other → Which would be?

73. Could you estimate for me, how many people are killed in New Zealand each year in home fires?

74. Where did you learn about fire safety?

Now some questions for background information.

75. How old are you?

76. Are you:

- male ☐
- female ☐

77. Can you tell me which of the following ethnic group(s) you belong to:

- New Zealand European ☐
- New Zealand Maori ☐
- Pacific Island ☐
- Asian ☐
- Other European → Which would be?
- Other → Which would be?

78. What is your present marital status?

- Registered Married ☐
- Widowed ☐
- Divorced or Separated ☐
- Single ☐
- Other Partnership ☐



79. How many people live in the house?

- Adults
- Children (under 18 years old)

80. Are there any people in the house with disabilities that may require assistance in the case of a fire?

Yes ☐

No ☐

81. If there are children under 18 years old, what are their ages?

82. How much education have you had?

- Completed 5th form ☐
- Completed 6<sup>th</sup> form ☐
- Completed 7<sup>th</sup> form ☐
- Some tertiary education ☐
- Tertiary graduate ☐
- Trade Certificate ☐
- Higher education ☐

83. Are you employed:

- Full-time ☐
- Part-time ☐
- Self-employed ☐
- Not at present ☐

84. Estimate of total combined yearly income of all household members before tax or anything else was taken out of it. For the 12 month period of January to December 1998

- Under \$5000 ☐
- \$5001 - \$10,000 ☐
- \$10,001 - \$15,000 ☐
- \$15,001 - \$20,000 ☐
- \$20,001 - \$25,000 ☐
- \$25,001 - \$30,000 ☐
- \$30,001 - \$40,000 ☐
- \$40,001 - \$50,000 ☐
- \$50,001 or more ☐

85. Do you smoke tobacco products regularly (that is, one or more a day)?

Yes ☐

No ☐

86. Do you ever smoke in bed?

Yes ☐

No ☐

87. Would you describe yourself as a:

- Person who never drinks ☐
- Infrequent drinker ☐
- Light drinker ☐
- Moderate drinker ☐
- Heavy drinker ☐

88. Do you own an electric blanket?

Yes ☐

No ☐

89. If you do own an electric blanket, do you:

- Turn it off after having it on for 20 minutes? ☐
- Turn it off after having it on for one hour? ☐
- Turn it off as you go to bed? ☐
- Turn it off in the morning? ☐

90. Do you ever use candles in your home?

Yes ☐

No ☐

91. If you do use candles, do you ever leave burning candles unattended?

Yes ☐

No ☐

92. What type of building do you live in? Is it a:

- Single Dwelling House ☐
- Units joined together ☐
- Town House ☐
- Apartment Block ☐
- Other → Which would be?

93. How many stories in your building?

94. Is your home owned/being bought by you or is it rented?

Owned ☐

Rented ☐

95. Approximately how old is your house?

96. Can you tell me, which of the following are ever used to heat this house?

- Never use any form of heating ☐
- Electricity ☐
- Bottled gas ☐
- Wood, open fire ☐
- Wood, log burner ☐
- Coal ☐
- Solar heating system ☐
- Other ☐

97. Have you ever been in a major fire?

Yes ☐

No ☐

98. Have you ever had a minor fire in your home?

Yes ☐

No ☐

99. If you have had a minor fire in your home, did you report it to the fire service?

Yes ☐

No ☐

100. If you did not report it to the fire service, why?



## APPENDIX 2

### RESULTS

Results are listed by the number of people (total number of respondents is 141).

**1. There is little I can do to prevent a fire in my home.**

Strongly agree	0
Somewhat agree	4
Somewhat disagree	31
Strongly disagree	106

**2. The chances of my being in a fire in the future are slim.**

Strongly agree	20
Somewhat agree	56
Somewhat disagree	47
Strongly disagree	18

**3. Most people who die in fires are killed by the smoke or lack of oxygen, and not by the flames.**

Strongly agree	113
Somewhat agree	22
Somewhat disagree	6
Strongly disagree	0

**4. Fires occur so infrequently that I am not concerned with fire prevention.**

Strongly agree	3
Somewhat agree	10
Somewhat disagree	33
Strongly disagree	95

**5. Most people will panic in a fire.**

Strongly agree	69
Somewhat agree	56
Somewhat disagree	14
Strongly disagree	2

**6. If I found a large fire in a room of my house I would immediately close the room door, leave the house and call the brigade.**

Strongly agree	95
Somewhat agree	31
Somewhat disagree	13
Strongly disagree	2

**7. I would not go back into a burning house to look for my partner or child.**

Strongly agree	9
Somewhat agree	13
Somewhat disagree	75
Strongly disagree	44

**8. If a fire started in my home, fire fighters will get here before the fire leads to serious consequences.**

Strongly agree	13
Somewhat agree	47
Somewhat disagree	51
Strongly disagree	30

**9. The building that I work in is more fire safe than my home**

Strongly agree	30
Somewhat agree	26
Somewhat disagree	22
Strongly disagree	8

**10. Why would you say that your work place more/less fire safe than your home?**

Most people who felt that their work place was safer felt that this was because of sprinklers and the construction (usually concrete). People felt that their home was safer because of the equipment at work (welding equipment for example) at that exiting was easier at home.

**11. What would you do right now if your clothing caught on fire?**

Roll	101
Wrap self/Smother	9
Take clothes off	9
Other	22



**12. What would you do if you woke up at night, smelled smoke, and found that your bedroom door was shut and was hot when you touched it?**

Get out another way	102
Get out then go in	22
Open the door	10
Call the brigade	5
Other	2

**13. What would you do if the grease in your frying pan caught fire?**

Lid and/or wet tea-towel	117
Baking soda or salt	6
Water	2
Fire extinguisher	4
Move the pan	11
Other	1

**14. What would you do if you found your only exit route out of the house was full of smoke in a fire?**

Crawl	117
Walk or run	19
Other	5

**15. What would your actions be if you found your entire lounge on fire?**

Exit then phone brigade	98
Phone brigade then exit	37
Grab stuff then exit	1
Fight the fire	1
Other	4

**16. What would your actions be if you found a small fire on the couch?**

Exit the house	2
Move the couch	10
Initially fight the fire	7
Fight the fire	122
• Smother the fire	49
• Water or wet cloth	60
• Fire extinguisher	19
• Unknown	1

**17. What would your first response be, in your home to:**

**Hearing a smoke detector?**

Leave	12
Investigate	121
Turn it off	4
Other	4

**Smelling smoke?**

Leave	7
Investigate	132
Phone brigade	1
Other	1

**18. Who would you phone and what number would you dial if you saw a fire?**

Fire brigade, 111	130
Local brigade	2
Other number	7
Don't know	2

**19. If there was a large fire in your home, where would you call from?**

Home	26
Neighbour	112
Phone box	1
Other	2

**20. What would you do if an alarm went in a public place, such as a movie theatre or shopping mall?**

Exit	125
Investigate	1
Ignore it	4
Do what others do	4
Other	7

**21. If a sprinkler system operates, does it:**

Spray water throughout the building	19
Spray water in part of the building	32
Spray water above the fire	64
Other	26

**22. Now I'd like you to rate yourself on how much you think you know about fire prevention. Would you say you know:**

1 - nothing	0
2 - a moderate amount	90
3 - a great deal	51
4 - everything	0

**23. Now I'd like you to rate yourself on how much you think you would know about what to do if a fire broke out in your home. Would you say that you would be:**

1 - fairly unsure	0
2 - slightly unsure	14
3 - fairly sure	100
4 - very sure	27

**24. Now I'd like you to tell me how well you would say your household is prepared for fire? Would you say that your household is:**

1 - not prepared at all	11
2 - somewhat prepared	41
3 - moderately prepared	73
4 - very well prepared	16

**25. Now I'd like you to tell me how confident you are, that you are safe from fire? Would you say that you are:**

1 - unconfident	7
2 - somewhat confident	38
3 - fairly confident	83
4 - very confident	13

**26. Now I'd like you to tell me how probable do you think it is that a fire is going to start in your home in the next 10 years? Would you say that there is:**

1 - very very little probability	14
2 - little probability	59
3 - some probability	52
4 - quite probable	16

FOR SINGLE DWELLING UNITS ONLY

**27. Do you have any fire alarm systems in your house?**

Yes	115
No	24

**28. How many of each does it contain:**

Heat sensor	2
Smoke detector	
• one -	69
• two -	27
• three -	11
• four + -	8
Sprinkler system	0

**29. Do you have any fire extinguishers in your home?**

Yes	59
No	80

**30. If you do have fire extinguishers in your home, how many do you have?**

One	47
Two +	12

FOR MULTIPLE DWELLING UNITS ONLY

**31. In the public areas of your building, like the hallways, stairs, laundry room or basement, is there a fire alarm system?**

Yes	2
No	0

**32. How many of each does it contain:**

Heat sensor 0

Smoke detector

- one - 1
- two - 0
- three - 0
- four - 0
- five - 1

Sprinkler system 1

Manual alarm 1

**33. Are there any fire extinguishers in the public areas of the building?**

Yes 0

No 2

**34. If there are fire extinguishers in the public areas, how many are there?**

None

**35. Where is the closest fire extinguisher to your apartment?**

NA

**36. And what about the apartment itself. Does it have a fire alarm system?**

Yes 2

No 0

**37. How many of each does it contain:**

Heat sensor 0

Smoke detector

- one - 1
- two - 1

Sprinkler system 1

Manual alarm 0

**38. Are there fire extinguishers in your apartment?**

Yes 1

No 1

FOR ALL DWELLINGS

**39. Have you ever used a fire extinguisher?**

Yes	79
No	62

**40. When did you last have it checked by a professional?**

Monthly	0
6 months	4
Yearly	7
At some time	18
Never	21
Don't know	10

**41. If you have one, do you know what noise a smoke detector makes?**

Yes	112
No	5

**42. Where is it/they located?**

Majority are in the halls outside the bedrooms.

**43. Can you hear the smoke detector clearly from all rooms and bedrooms if the doors are closed?**

Yes	96
No	3
Don't know	18

**44. If more than one smoke detector is installed in the building, are these connected in series?**

Yes	2
No	43
Don't know	2

**45. If the building consists of more than one storey or several floors, are there smoke detectors on all floors where people are sleeping?**

Yes	9
No	8

**46. How often is the smoke detector(s) tested?**

Weekly	4
Fortnightly	2
Monthly	14
Every 6 months	29
Every year	11
Rarely	17
Never	21
Don't know	19

**47. Are all smoke detectors functioning today?**

Yes	94
No	7
Don't know	16

**48. If the smoke detectors are not functioning, why are they not functioning?**

Flat battery	4
Disconnected	2
Unknown	1

**49. How often are the batteries changed?**

Few monthly	4
6 months	14
Yearly	32
Rarely	3
When needed	33
Never	2
Other	11
Don't know	18

**50. How often is the detector vacuumed?**

Weekly	2
Monthly	3
Few months	10
Every year	4
Rarely	5
Never	86
Don't know	7

**51. Have you every removed the batteries?**

Yes	69
No	39

**52. If you have ever removed the batteries, why did you remove the batteries?**

Change	52
Stop false alarms	14
Stop chirping	6
Other	7

**53. Is the smoke detector a nuisance?**

Yes	15
No	102

**54. If it is a nuisance, why is it a nuisance?**

False alarm	14
Chirping	1

**55. If it is a nuisance, what do you do about it?**

Disconnect	5
Ignore/vent	10

**56. Does your household have an escape plan on how to leave your home in case of fire?**

Yes	42
No	99

**57. If you do not have an escape plan, why do you not have one?**

The reasons for not having an escape plan included that it is easy and obvious how to get out of the house. People also had not thought about it, talked about it or got around to doing it. Some felt that as there were only a few people in the house (all adults) it would not be necessary to have a plan.

**58. Have you ever practiced the escape plan?**

Yes	7
No	35



**59. If you have not practiced the escape plan, why have you not practiced it?**

The reasons for not practicing the escape plan included that the plan was simple and there were only adults in the house. Some people did not want to practice the plan as it involved breaking windows or having to get out of a second storey window. A large number of the respondents did not have a reason for not practicing the plan and some did not see the point.

**60. If you have ever practiced the escape plan(s), how often do you have these drills?**

Monthly	1
Every 6 months	3
Every year	1
Occasionally	2

**61. Do you practice ways of leaving the house other than through the doors?**

Yes	18
No	123

**62. If leaving through a window, other than the ground floor, do you have an escape ladder?**

Yes	2
No	24

**63. Do you have an agreed place to meet after leaving the house?**

Yes	27
No	80

**64. Where do you feel safest from fire?**

Home	94
School	1
Work	22
Shopping malls	7
Hotel	1
All the same	16

**65. Is it a good idea in general to close all windows and doors during a fire?**

Yes	133
No	1
Don't know	7

**66. How threatened do you feel by fire?**

Not at all	38
Somewhat threatened	62
Fairly threatened	28
Extremely threatened	13

**67. How many minutes do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a bed?**

0-3	51
4-5	39
6-9	5
10-15	30
16-30	10
30+	3
Don't know	3

**68. How many minutes do you think it would take for an entire room to be on fire if nothing was done to stop a small fire that had started on a couch in your lounge?**

0-3	45
4-5	29
6-9	9
10-15	32
16-30	20
30+	5
Don't know	1

**69. Do you sleep with the bedroom door open or closed?**

Open	110
Closed	31

**70. Why do you sleep with your door opened/closed?**

Kids/pet	29
Fresh air/space	28
Habit/preference	38
Security/privacy	24
Fire security	6
Other	16

**71. How likely do you think it would be that you would wake up at night if there was a fire?**

Not at all likely	7
Somewhat likely	29
Reasonably likely	51
Extremely likely	54

**72. What would wake you during a fire at night?**

Smoke detectors	124
Smell of smoke	80
Noise	95
Heat	76
Pet	60
Nothing	1
Other	49

**73. Could you estimate how many people are killed in New Zealand each year in home fires?**

0-10	7
11-20	19
21-50	38
51-75	2
76-100	17
101-250	14
251-750	2
750-1000	4
1000+	3
Don't know	28

**74. Where did you learn about fire safety?**

School	43
TV/radio	19
Reading	9
Other people	13
Parents	15
Work	53
Life experience	40
Other	24

**75. How old are you?**

18- 20 yrs	4
21-25 yrs	17
26-30 yrs	15
31-35 yrs	13
36-40 yrs	13
41-45 yrs	12
46-50 yrs	15
51-59 yrs	9
60-70 yrs	15
71-80 yrs	23
81-90 yrs	5
91 yrs and over	0

**76. Are you:**

Male?	75
Female?	66

**77. Can you tell me which of the following ethnic group(s) you belong to:**

New Zealand European	115
Maori / Pacific Island	10
Asian	2
Other	14

**78. What is your present marital status?**

Registered Married	62
Widowed	17
Divorced or Separated	17
Single	35
Other Partnership	10

**79. How many adults live in the house?**

1	38
2	63
3	23
4+	17

**How many children (under 18 years old) live in the house?**

0	105
1	14
2	11
3	10
4+	1

**80. Are there any people in the house with disabilities that may require assistance in the case of a fire?**

Yes	18
No	123

**81. If there are children under 18 years old, what are their ages?**

0-3	16
4-6	14
7-11	19
12-15	16
16-18	8

**82. How much education have you had?**

Some/no education	21
Completed 5th form	18
Completed 6th form	15
Completed 7th form	2
Some tertiary education	30
Tertiary graduate	30
Trade Certificate	16
Post Graduate	9

**83. Are you employed:**

Full-time	55
Part-time	20
Self-employed	9
Not at present	57

**84. Estimate of total combined yearly income of all household members before tax or anything else was taken out of it.**

Unknown	5
Under \$5000	1
\$5001 - \$10,000	1
\$10,001 - \$15,000	30
\$15,001 - \$20,000	11
\$20,001 - \$25,000	4
\$25,001 - \$30,000	11
\$30,001 - \$40,000	24
\$40,001 - \$50,000	13
\$50,001 or more	41

**85. Do you smoke tobacco products regularly (that is, one or more a day)?**

Yes	26
No	115

**86. Do you ever smoke in bed?**

Yes	5
No	21

**87. Would you describe yourself as a:**

Person who never drinks	23
Infrequent drinker	43
Light drinker	51
Moderate drinker	24
Heavy drinker	0

**88. Do you own an electric blanket?**

Yes	66
No	75

**96. Can you tell me, which of the following are ever used to heat this house?**

Electricity	134
Bottled gas	32
Wood, open fire	16
Wood, log burner	43
Coal	6
Solar heating system	1
Other	1

**97. Have you ever been in a major fire?**

Yes	20
No	121

**98. Have you ever had a minor fire in your home?**

Yes	59
No	82

**99. If you have had a minor fire in your home, did you report it to the fire service?**

Yes	15
No	44

**100. If you did not report it to the fire service, why?**

Everyone put the fire out themselves.

## APPENDIX 3

### ANALYSIS OF RESULTS

Results in the tables are those observed when questioning the respondents. The results in brackets are those that would be expected if there was no effect due to the background information.

Cochran [40] pointed out that the rule that all expected frequencies must be greater than five for a Chi-square test to be reliable is too stringent. He suggests that 'if relatively few expectations are less than five (say, one cell out of five or more, or two cells out of ten or more) a minimum expectation of one is allowable in computing  $\chi^2$ '. This has been followed for tables A3.12, A3.25, A3.48 and A3.49.

#### WITH OR WITHOUT CHILDREN

Table A3.1 Peoples responses for estimation of time for a lounge fire.

	With Children	Without Children
Realistic Estimation	15 (13.021)	36 (37.979)
Unrealistic Estimation	21 (22.979)	69 (67.021)

Respondents=141,  $\chi^2=0.631$ , df=1, P=0.427

No evidence that having children has any effect on the proportion whom had a realistic estimation.

Table A3.2 Peoples responses for estimation of time for a bed fire.

	With Children	Without Children
Realistic Estimation	14 (11.489)	31 (33.511)
Unrealistic Estimation	22 (24.511)	74 (71.489)

Respondents=141,  $\chi^2=1.082$ , df=1, P=0.298

No evidence that having children has any effect on the proportion whom had a realistic estimation.

Table A3.3 Peoples responses for clothes on fire.

	With Children	Without Children
Preferred Practice	29 (28.085)	81 (81.915)
Discouraged Practice	7 (7.915)	24 (23.085)

Respondents=141,  $\chi^2=0.182$ , df=1, P=0.670

No evidence that having children has any effect on the proportion whom had a preferred practice.

Table A3.4 Peoples responses for fire at night.

	With Children	Without Children
Preferred Practice	16 (27.319)	91 (79.681)
Discouraged Practice	20 (8.681)	14 (25.319)

Respondents=141,  $\chi^2=26.117$ , df=1, P<0.001

Sufficient evidence to show that the respondents with children are less safe than those without.

Table A3.5 Peoples responses for pan fire.

	With Children	Without Children
Preferred Practice	32 (26.553)	85 (70.532)
Discouraged Practice	4 (6.128)	20 (17.872)

Respondents=141,  $\chi^2=5.077$ , df=1, P=0.024

Sufficient evidence to show that the respondents with children are safer than those without.



Table A3.6 Peoples responses for moving though smoke.

	With Children	Without Children
Preferred Practice	34 (29.872)	83 (87.128)
Discouraged Practice	2 (6.128)	22 (17.872)

Respondents=141,  $\chi^2=4.50$ , df=1, P=0.034

Sufficient evidence to show that the respondents with children are safer than those without.

Table A3.7 Peoples responses for having smoke detectors.

	With Children	Without Children
Preferred Practice	31 (29.872)	86 (87.128)
Discouraged Practice	5 (6.128)	19 (17.872)

Respondents=141,  $\chi^2=0.313$ , df=1, P=0.576

No evidence that having children has any effect on the proportion whom had a preferred practice.

Table A3.8 Peoples responses for having an escape plan.

	With Children	Without Children
Preferred Practice	19 (10.723)	23 (31.277)
Discouraged Practice	17 (25.277)	82 (73.723)

Respondents=141,  $\chi^2=12.218$ , df=1, P<0.001

Sufficient evidence to show that the respondents with children are safer than those without.

Table A3.9 Peoples responses for having a meeting place.

	With Children	Without Children
Preferred Practice	18 (9.084)	9 (17.916)
Discouraged Practice	18 (26.916)	62 (53.084)

Respondents=107,  $\chi^2=17.639$ , df=1, P<0.001

Sufficient evidence to show that the respondents with children are safer than those without.

Table A3.10 If people learn about fire safety from other people.

	With Children	Without Children
Learn from People	7 (6.894)	20 (20.106)
Do not learn from People	29 (29.106)	85 (84.894)

Respondents=141,  $\chi^2=0.011$ , df=1, P=0.916

No evidence that having children has any effect on the proportion whom learnt fire safety from other people.

Table A3.11 If people learn about fire safety from television, reading or radio.

	With Children	Without Children
Learn from TV etc	8 (6.383)	17 (18.617)
Do not learn from TV etc	28 (29.617)	88 (86.383)

Respondents=141,  $\chi^2=0.668$ , df=1, P=0.414

No evidence that having children has any effect on the proportion whom learnt fire safety from TV etc.

Table A3.12 How threatened people feel by fire.

	With Children	Without Children
Not at all	6 (9.702)	32 (28.298)
Somewhat	18 (15.830)	44 (46.170)
Fairly	7 (7.149)	21 (20.851)
Extremely	5 (3.319)	8 (9.681)

Respondents=141,  $\chi^2=3.443$ , df=3, P=0.203

No evidence that having children has any effect on how threatened people feel by fire.

Table A3.13 How often people test their smoke detector batteries.

	With Children	Without Children
Up to monthly	7 (5.299)	13 (14.701)
Monthly-Yearly	17 (10.598)	23 (29.402)
Rarely or never	7 (10.068)	31 (27.932)
Don't know	0 (5.034)	19 (13.966)

Respondents=117,  $\chi^2=14.124$ , df=3, P=0.003

Sufficient evidence to show that the respondents with children test their batteries more often.

## OWN OR RENT HOME

Table A3.14 Peoples responses for estimation of time for a lounge fire.

	Rent	Own
Realistic Estimation	17 (13.723)	28 (31.277)
Unrealistic Estimation	26 (29.277)	70 (66.723)

Respondents=141,  $\chi^2=4.310$ , df=1, P=0.038

Sufficient evidence to show that the respondents who rent are safer than those who own their home.

Table A3.15 Peoples responses for estimation of time for a bed fire.

	Rent	Own
Realistic Estimation	21 (15.553)	30 (35.447)
Unrealistic Estimation	22 (27.447)	68 (62.553)

Respondents=141,  $\chi^2=1.172$ , df=1, P=0.279

No evidence that owning home has any effect on the proportion whom had a realistic estimation.

Table A3.16 Peoples responses for clothes on fire.

	Rent	Own
Preferred Practice	33 (33.546)	77 (76.454)
Discouraged Practice	10 (9.454)	21 (21.546)

Respondents=141,  $\chi^2=0.059$ , df=1, P=0.808

No evidence that owning home has any effect on the proportion whom had a preferred practice.

Table A3.17 Peoples responses for fire at night.

	Rent	Own
Preferred Practice	16 (32.631)	75 (74.369)
Discouraged Practice	11 (10.369)	23 (23.631)

Respondents=141,  $\chi^2=0.07$ , df=1, P=0.791

No evidence that owning home has any effect on the proportion whom had a preferred practice.

Table A3.18 Peoples responses for pan fire.

	Rent	Own
Preferred Practice	33 (35.681)	84 (81.319)
Discouraged Practice	10 (7.319)	14 (16.681)

Respondents=141,  $\chi^2=1.702$ , df=1, P=0.192

No evidence that owning home has any effect on the proportion whom had a preferred practice.

Table A3.19 Peoples responses for moving though smoke.

	Rent	Own
Preferred Practice	36 (35.681)	81 (81.319)
Discouraged Practice	7 (7.319)	17 (16.681)

Respondents=141,  $\chi^2=0.024$ , df=1, P=0.877

No evidence that owning home has any effect on the proportion whom had a preferred practice.

Table A3.20 Peoples responses for having smoke detectors.

	Rent	Own
Preferred Practice	32 (35.681)	85 (81.319)
Discouraged Practice	11 (7.319)	13 (16.681)

Respondents=141,  $\chi^2=3.21$ , df=1, P=0.073

No evidence that owning home has any effect on the proportion whom had a preferred practice.

Table A3.21 Peoples responses for having an escape plan.

	Rent	Own
Preferred Practice	13 (12.809)	29 (29.191)
Discouraged Practice	30 (30.191)	69 (68.809)

Respondents=141,  $\chi^2=5.7 \times 10^{-3}$ , df=1, P=0.940

No evidence that owning home has any effect on the proportion whom had a preferred practice.

Table A3.22 Peoples responses for having a meeting place.

	Rent	Own
Preferred Practice	16 (18.168)	11 (8.832)
Discouraged Practice	56 (53.832)	24 (26.168)

Respondents=107,  $\chi^2=1.058$ , df=1, P=0.304

No evidence that owning home has any effect on the proportion whom had a preferred practice.

Table A3.23 If people learn about fire safety from other people.

	Rent	Own
Learn from People	7 (8.234)	20 (18.766)
Do not learn from People	36 (34.766)	78 (79.234)

Respondents=141,  $\chi^2=0.329$ , df=1, P=0.566

No evidence that owning home has any effect on learning fire safety from other people.

Table A3.24 If people learn about fire safety from television, reading or radio.

	Rent	Own
Learn from TV etc	4 (7.624)	21 (17.376)
Do not learn from TV etc	39 (35.376)	77 (80.624)

Respondents=141,  $\chi^2=3.013$ , df=1, P=0.083

No evidence to show that owning home has any effect on learning fire safety from TV, reading or radio.

Table A3.25 How threatened people feel by fire.

	Rent	Own
Not at all	12 (11.589)	26 (26.411)
Somewhat	20 (18.908)	42 (43.092)
Fairly	6 (8.539)	22 (19.461)
Extremely	5 (3.965)	8 (9.035)

Respondents=141,  $\chi^2=1.588$ , df=3, P=0.662

No evidence that owning home has any effect on the proportion whom felt threatened by fire.

Table A3.26 How often people test their smoke detector batteries.

	Rent	Own
Up to monthly	8 (5.470)	12 (14.530)
Monthly-Yearly	5 (10.940)	35 (29.060)
Rarely or never	14 (10.393)	24 (27.607)
Don't know	5 (5.197)	14 (13.803)

Respondents=117,  $\chi^2=7.783$ , df=3, P=0.051

No evidence that owning home has any effect on how often respondents change their batteries.

## MALE OR FEMALE

Table A3.27 Peoples responses for estimation of time for a lounge fire.

	Female	Male
Realistic Estimation	21 (23.872)	30 (27.128)
Unrealistic Estimation	45 (42.128)	45 (47.872)

Respondents=141,  $\chi^2=1.018$ , df=1, P=0.313

No evidence that gender has any effect on the proportion whom had a realistic estimation.

Table A3.28 Peoples responses for estimation of time for a bed fire.

	Female	Male
Realistic Estimation	17 (21.064)	28 (23.936)
Unrealistic Estimation	49 (44.936)	47 (51.064)

Respondents=141,  $\chi^2=2.165$ , df=1, P=0.141

No evidence that gender has any effect on the proportion whom had a realistic estimation.

Table A3.29 Peoples responses for clothes on fire.

	Female	Male
Preferred Practice	57 (51.489)	53 (58.511)
Discouraged Practice	9 (14.511)	22 (16.489)

Respondents=141,  $\chi^2=5.044$ , df=1, P=0.025

Sufficient evidence to show that females are safer than males.

Table A3.30 Peoples responses for fire at night.

	Female	Male
Preferred Practice	50 (50.085)	57 (56.915)
Discouraged Practice	16 (15.915)	18 (18.085)

Respondents=141,  $\chi^2=0.001$ , df=1, P=0.975

No evidence that gender has any effect on the proportion whom had a preferred practice.

Table A3.31 Peoples responses for pan fire.

	Female	Male
Preferred Practice	56 (54.766)	61 (62.234)
Discouraged Practice	10 (11.234)	14 (12.766)

Respondents=141,  $\chi^2=1.307$ , df=1, P=0.253

No evidence that gender has any effect on the proportion whom had a preferred practice.

Table A3.32 Peoples responses for moving though smoke.

	Female	Male
Preferred Practice	49 (54.766)	68 (62.234)
Discouraged Practice	17 (11.234)	7 (12.766)

$\chi^2=6.704$ , df=1, P=0.01

Sufficient evidence to show that males are safer than females.

Table A3.33 Peoples responses for having smoke detectors.

	Female	Male
Preferred Practice	55 (54.766)	62 (62.234)
Discouraged Practice	11 (11.234)	13 (12.766)

Respondents=141,  $\chi^2=0.01$ , df=1, P=0.920

No evidence that gender has any effect on the proportion whom had a preferred practice.

Table A3.34 Peoples responses for having an escape plan.

	Female	Male
Preferred Practice	19 (19.660)	23 (22.340)
Discouraged Practice	47 (46.340)	52 (52.660)

Respondents=141,  $\chi^2=0.059$ , df=1, P=0.808

No evidence that gender has any effect on the proportion whom had a preferred practice.

Table A3.35 Peoples responses for having a meeting place.

	Female	Male
Preferred Practice	13 (15.140)	14 (11.860)
Discouraged Practice	47 (44.860)	33 (35.140)

Respondents=107,  $\chi^2=0.920$ , df=1, P=0.337

No evidence that gender has any effect on the proportion whom had a preferred practice.

Table A3.36 If people learn about fire safety from other people.

	Female	Male
Learn from People	16 (12.638)	11 (14.362)
Do not learn from People	50 (53.362)	64 (60.638)

Respondents=141,  $\chi^2=2.079$ , df=1, P=0.149

No evidence that gender has any effect on the proportion whom had a preferred practice.

Table A3.37 If people learn about fire safety from television, reading or radio.

	Female	Male
Learn from TV etc	16 (11.702)	9 (13.298)
Do not learn from TV etc	50 (52.298)	66 (61.702)

Respondents=141,  $\chi^2=3.364$ , df=1, P=0.067

No evidence that gender has any effect on the proportion whom had a preferred practice.

Table A3.38 How threatened people feel by fire.

	Female	Male
Not at all	14 (17.787)	24 (20.213)
Somewhat	33 (29.021)	29 (32.979)
Fairly	10 (13.106)	18 (14.894)
Extremely	9 (6.085)	4 (6.915)

Respondents=141,  $\chi^2=6.551$ , df=3, P=0.088

No evidence that gender has any effect on the proportion whom had a preferred practice.

Table A3.39 How often people test their smoke detector batteries.

	Female	Male
Up to monthly	9 (9.402)	11 (10.598)
Monthly-Yearly	20 (18.803)	20 (21.197)
Rarely or never	15 (17.863)	23 (20.137)
Don't know	11 (8.932)	8 (10.068)

Respondents=117,  $\chi^2=1.946$ , df=3, P=0.584

No evidence that gender has any effect on the proportion whom had a preferred practice.

## AGE GROUPING

Table A3.40 Peoples responses for estimation of time for a lounge fire.

	18-30 yrs	31-59 yrs	60+ yrs
Realistic Estimation	15 (13.021)	29 (22.426)	7 (15.532)
Unrealistic Estimation	21 (22.979)	33 (39.574)	36 (27.447)

Respondents=141,  $\chi^2=10.842$ , df=2, P=0.004

Sufficient evidence to show that aged respondents are less safe than the young and middle age groups.

Table A3.41 Peoples responses for estimation of time for a bed fire.

	18-30 yrs	31-59 yrs	60+ yrs
Realistic Estimation	13 (11.489)	24 (19.787)	8 (13.723)
Unrealistic Estimation	23 (24.511)	38 (42.213)	35 (29.277)

Respondents=141,  $\chi^2=4.115$ , df=2, P=0.076

No evidence that age has any effect on the proportion whom had a realistic estimation.

Table A3.42 Peoples responses for clothes on fire.

	18-30 yrs	31-59 yrs	60+ yrs
Preferred Practice	31 (28.085)	46 (48.369)	33 (33.546)
Discouraged Practice	5 (7.915)	16 (13.631)	10 (9.454)

Respondents=141,  $\chi^2=1.946$ , df=2, P=0.378

No evidence that age has any effect on the proportion whom had a preferred practice.

Table A3.43 Peoples responses for fire at night.

	18-30 yrs	31-59 yrs	60+ yrs
Preferred Practice	27 (27.319)	41 (47.050)	39 (32.631)
Discouraged Practice	9 (8.681)	21 (14.950)	4 (10.369)

Respondents=141,  $\chi^2=8.397$ , df=2, P=0.015

Sufficient evidence to show that aged respondents are safer than the young and middle age groups.

Table A3.44 Peoples responses for pan fire.

	18-30 yrs	31-59 yrs	60+ yrs
Preferred Practice	29 (29.872)	52 (51.447)	36 (35.681)
Discouraged Practice	7 (6.128)	10 (10.553)	7 (7.319)

Respondents=141,  $\chi^2=0.478$ , df=2, P=0.787

No evidence that age has any effect on the proportion whom had a preferred practice.

Table A3.45 Peoples responses for moving though smoke.

	18-30 yrs	31-59 yrs	60+ yrs
Preferred Practice	32 (29.872)	52 (51.447)	33 (35.681)
Discouraged Practice	4 (6.128)	10 (10.553)	10 (7.319)

Respondents=141,  $\chi^2=2.109$ , df=2, P=0.348

No evidence that age has any effect on the proportion whom had a preferred practice.

Table A3.46 Peoples responses for having smoke detectors.

	18-30 yrs	31-59 yrs	60+ yrs
Preferred Practice	28 (29.872)	51 (51.447)	38 (35.681)
Discouraged Practice	8 (6.128)	11 (10.553)	5 (7.319)

Respondents=141,  $\chi^2=1.512$ , df=2, P=0.470

No evidence that age has any effect on the proportion whom had a preferred practice.

Table A3.47 Peoples responses for having an escape plan.

	18-30 yrs	31-59 yrs	60+ yrs
Preferred Practice	13 (10.723)	18 (18.468)	11 (12.809)
Discouraged Practice	23 (25.277)	44 (43.532)	32 (30.191)

Respondents=141,  $\chi^2=1.069$  df=2, P=0.586

No evidence that age has any effect on the proportion whom had a preferred practice.

Table A3.45 Peoples responses for having a meeting place.

	18-30 yrs	31-59 yrs	60+ yrs
Preferred Practice	10 (8.579)	14 (13.121)	3 (5.299)
Discouraged Practice	24 (25.421)	38 (38.879)	18 (15.701)

Respondents=107,  $\chi^2=1.727$ , df=2, P=0.422

No evidence that age has any effect on the proportion whom had a preferred practice.

Table A3.46 If people learn about fire safety from other people.

	18-30 yrs	31-59 yrs	60+ yrs
Learn from People	9 (6.894)	12 (11.872)	6 (8.234)
Do not learn from People	27 (29.106)	50 (50.128)	37 (34.766)

Respondents=141,  $\chi^2=1.546$ , df=2, P=0.462

No evidence that age has any effect on the proportion whom learnt about fire safety from other people.

Table A3.47 If people learn about fire safety from television, reading or radio.

	18-30 yrs	31-59 yrs	60+ yrs
Learn from TV etc	7 (6.383)	12 (10.993)	6 (7.624)
Do not learn from TV etc	29 (29.617)	50 (51.007)	37 (35.376)

Respondents=141,  $\chi^2=0.605$ , df=2, P=0.739

No evidence that age has any effect on the proportion whom learnt about fire safety from TV etc.

Table A3.48 How threatened people feel by fire.

	18-30 yrs	31-59 yrs	60+ yrs
Not at all	6 (9.702)	14 (16.709)	18 (11.589)
Somewhat	23 (15.830)	25 (27.262)	14 (18.908)
Fairly	5 (7.149)	14 (12.312)	9 (8.539)
Extremely	2 (3.319)	9 (5.716)	2 (3.965)

Respondents=141,  $\chi^2=14.396$ , df=6, P=0.002

Sufficient evidence to show that age affects how threatened people feel by fire.

Table A3.49 How often people test their smoke detector batteries.

	18-30 yrs	31-59 yrs	60+ yrs
Up to monthly	5 (4.786)	11 (8.718)	4 (6.496)
Monthly-Yearly	10 (9.573)	20 (17.436)	10 (12.991)
Rarely or never	11 (9.094)	16 (16.564)	11 (12.341)
Don't know	2 (4.547)	4 (8.282)	13 (6.171)

Respondents=117,  $\chi^2=14.413$ , df=3, P=0.002

Sufficient evidence to show that aged respondents test their batteries less often.

**89. If you do own an electric blanket, do you:**

Turn it off after having it on for 20 minutes?	9
Turn it off after having it on for one hour?	10
Turn it off as you go to bed?	44
Turn it off in the morning?	3

**90. Do you ever use candles in your home?**

Yes	60
No	81

**91. If you do use candles, do you ever leave burning candles unattended?**

Yes	19
No	41

**92. What type of building do you live in? Is it a:**

Single Dwelling House	105
Units joined together	29
Town House	5
Apartment Block	2

**93. How many stories?**

1	116
2	21
3	4

**94. Is your home owned/being bought by you or is it rented?**

Owned/being bought	98
Rented	43

**95. Approximately how old is your house?**

Under 5 yrs	28
6-10 yrs	12
11-15 yrs	5
16-20 yrs	10
21-30 yrs	30
31-50 yrs	29
50 yrs +	27



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