Analysis of Preventable Fire Fatalities of Older People and People with Disabilities:

Risk Reduction Advice for the Community Care Sector

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ABSTRACT

This report presents a comprehensive fire fatality study of all preventable residential fire fatalities that occurred within the Metropolitan Fire District of Melbourne, Australia between 2000 and 2010. Older people and people with disabilities were found to have been at a greater risk of fire fatality. Recent fatalities have also identified those in this cohort who are also community care recipients. Given that the community care sector is in a unique position to assist these vulnerable groups, we aimed to provide simple fire safety solutions for the sector to utilise and potentially incorporate into policy. We also identified ways in which the MFB could support this and improve data collection related to these fatalities.

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We would like to acknowledge the individuals who have helped and guided us through this research project. It is with their assistance that we are able to present this finished report to the Metropolitan Fire and Emergency Services Board (MFB) and other stakeholders who are interested in improving fire safety for older people and people with disabilities.

First, we would like to thank Commander Frank Stockton AFSM, former head of Fire Investigation and Analysis (FIA) and current Manager of Public Education for his help in obtaining the FIA reports, which were the primary source of fire fatality data for the project. His extensive knowledge about fire fatality incidents was instrumental in performing the analysis on specific case studies and determining what preventive measures or other means could have prevented the fatality. We would also like to thank Julie Harris, Community Ageing Strategist for the MFB, for identifying the problem of fire fatalities among older people and people with disabilities and creating this research project to address it. Her expertise with the subject matter and the community care sector was an essential component of this project and in forming our recommendations.

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ACRONYM REFERENCE TABLE

ACRONYM	MEANING
ABS	Australian Bureau of Statistics
ACAP	Aged Care Assessment Program
ACAS	Aged Care Assessment Service
ACAT	Aged Care Assessment Team
AFAC	Australasian Fire and Emergency Services Authorities Council
BAC	Blood Alcohol Content
CACP	Community Aged Care Packages
CALD	Culturally and Linguistically Diverse
CCC	Community Care Coalition
CPR	Cardio-Pulmonary Resuscitation
CS&HISC	Community Services & Health Industry Skills Council
DHS	Department of Human Services
DoHA	Department of Health and Ageing
DPCD	Department of Planning and Community Development
DSD	Disability Services Division
DVA	Department of Veterans' Affairs
EACH	Extended Aged Care at Home
EACH-D	Extended Aged Care at Home – Dementia
EMR	Emergency Medical Response
FIA	Fire Investigation and Analysis
HACC	Home and Community Care
MDS	Minimum Data Set
MFB	Metropolitan Fire and Emergency Services Board
MFD	Metropolitan Fire District
NDR	National Data Repository
NFPA	National Fire Protection Association
PPRR	Prevention, Preparedness, Response, and Recovery
RDNS	Royal District Nursing Service
RFR	Reduced Fire Risk
RIP	Reduced Ignition Propensity
TAC	Transport Accident Commission
USFA	United States Fire Administration
VHC	Veterans' Home Care

EXECUTIVE SUMMARY

International studies have repeatedly shown that older people and people with disabilities are at an increased risk of fire fatality. In 2005, the Australasian Fire and Emergency Services Authorities Council (AFAC) found that people over the age of 65 were over two times as likely to be a fire fatality as the general population, and accounted for 23% of all fire deaths (AFAC, 2005). In America, the United States Fire Administration (USFA) reported similar findings (UFSA, 2011). This problem is expected to increase as the proportion of older people and people with disabilities grows due to declining birth-rates and increasing life expectancy.

Government-funded programs such as Home and Community Care (HACC) and other care organisations help older people and people with disabilities with many aspects of day-to-day life, putting those organisations in a unique position to assist with fire safety needs for these groups. However, the overburdened community care sector must prioritise the amount and types of service it delivers due to its many constraints and limited resources, which can lead to less attention to fire safety needs.

The goal of this study was to provide simple fire safety solutions for the community care sector to utilise and potentially incorporate into policy, to ultimately assist in reducing the risk of fire fatality for their clients. In order to understand the problem of the overrepresentation of older people and people with disabilities among preventable residential fire fatalities and prioritise needs, we analysed the rate and underlying causes of such fatalities within these two groups.

Research Methods

To complete this study, we created a profile of preventable residential fire fatalities in order to find specific risk factors and common features among fatal fires. We also developed a projection of future fire fatalities to analyse the magnitude of the future problem, if the risk remains the same for older people. Finally, six fire fatality incidents involving community care clients were studied in detail to identify underlying factors of the fatalities and potential ways to reduce the risk of fire fatality for future clients in similar situations.

The primary source of data used in this study was the Fire Investigation and Analysis (FIA) database. The FIA database is maintained by the Metropolitan Fire and Emergency Services Board (MFB) and records every fire fatality within the Metropolitan Fire District (MFD). It contains demographic information about the victim(s), in addition to a detailed report about the circumstances and nature of the fire. The FIA database was used to identify all preventable residential fire fatalities that occurred within the MFD between the financial years 2000 and 2010. A *preventable* fire fatality was defined as any fire that was started accidentally. This classification was explicitly stated in the FIA reports for each fire. The corresponding detailed FIA reports from each incident provided information about fire and victim characteristics, and were analysed in order to identify if age or disability was a factor in the fatality. The reports were also examined for evidence that might indicate if a victim was a community care client. This involved examining the body of the report, fire-call details, related pictures, interviews, and appendices that might indicate some type of disability or age related illness.

With the information gathered from the FIA reports, we determined common characteristics and high-risk factors of the fire fatalities and calculated several of their corresponding relative risks. In addition to analysing the fire fatality data quantitatively, we studied specific representative fire fatalities in order to further identify the reasons behind the incident and to determine if there are potential opportunities for the community care sector to help prevent fires and fatalities involving similar factors in the future. We used our database and profile of fatalities involving older people and those with disabilities to find specific fire fatality events among community care clients. Each event studied in detail examines one or more high-risk factors that were identified through the quantitative analysis.

Findings

In total, 62 preventable residential fire fatalities were identified within the MFD from financial years 2000 to 2010. The quantitative analysis was limited by the amount of information provided in the FIA reports. In most instances all desired information was available. However, in some cases the data were unavailable due to its absence in the FIA report or from the evidence being destroyed by the fire. When some information was not available for all fatalities, data are reported as percentages of cases in which the information was known. While the percentage unknown is a limitation of the analysis, it was never large enough to severely impact the results. The following is a summary of key findings from the quantitative analysis from this study:

- Older people (65+) and people with disabilities had an increased risk of fire fatality, making up 66% (n=41) of all fatalities.
- People aged 65 and older were 3.7 times as likely to be a fire fatality as the general population.
- People with a disability were 4.2 times as likely to be a fire fatality as the general population.
- Smoking materials were the leading cause of preventable residential fires, accounting for 34% (n=21) of fatalities.
- The most common room of origin in fatal fires was the bedroom, accounting for 46% (n=28) of fatalities.
- Most homes did not have working smoke alarms, with 58% (n=36) of fatalities occurring in homes with a non-existent or non-functioning smoke alarm.
- Most fire fatalities occurred at night, with 69% (n=38) of fatalities occurring between 8:00 p.m. and 8:00 a.m.
- 63% (n=36) of all fire fatality victims lived alone, which made people who lived alone 7.1 times as likely to be a fire fatality as the general population.
- 19% (n=12) of fatalities were known to be hoarders.
- At least 35% (n=22) of fatalities were smokers.

We found that older people (65+) accounted for 50% of all fire fatalities. In order to estimate the magnitude of this problem in the future, we created a projection of the proportion of fire fatalities that older people will make up over the next twenty years. Assuming relative

risk for older people stays the same over that time frame, the percentage of older people alone in fire fatalities is estimated to increase to 62% by 2021 and 73% by 2031. This is influenced by the increasing percentage that people aged 65 and older are predicted to make up in the population, as estimated by the Australian Bureau of Statistics (ABS) and other sources.

This projection uses the most conservative estimates by the ABS in terms of how much the proportion of older people is expected to increase. The accuracy of this projection is limited by the population estimates from the ABS and several other factors. The assumption that relative risk will remain constant for such a long period of time is unlikely, and presents a limitation for this projection. There are several factors such as the introduction of fire-safe cigarettes, the increasing number of older people, and better fire-safe technology that can have a positive or negative effect on relative risk.

In addition to the quantitative analysis, six fatal fires involving community care clients were studied in detail in order to reveal underlying factors of the incidents and ways to potentially prevent similar fatalities in the future. A qualitative approach such as this has the advantage of telling a story that can reveal specific information on what could have been done to prevent such an incident. Given the in-depth nature of such an approach, we could only perform a small number of case studies. With this limitation comes the risk of misrepresenting the larger group of all fire fatalities studied, and not being able to cover every risk factor identified. To address these concerns, we selected cases that exhibited one or more of the common high-risk features identified by our quantitative analysis. The following are the key findings that resulted from the case studies:

- Smoke alarms were not always present and could have helped alert the occupant or neighbours to the fire emergency, which could have helped notify emergency services more quickly.
- Failure to be alerted to the fire reduced the time that the occupant had to respond.
- Each individual has unique needs and identifying the specific fire risks for each person can help in preventing fires.
- Failure to quickly notify emergency services was a large factor that contributed to the fatality.

Recommendations

To create recommendations, we combined and synthesised information from statistical analyses of fire fatality data and qualitative information gathered from case studies. While the quantitative findings on high-risk factors were the basis for the recommendations, we combined them with information from several case studies in order to determine how the community care sector might assist its clients to reduce their fire risk. This involved taking into account the various constraints the sector faces, such as time, increased burden, and resource allocation. The community care sector has to prioritise the amount and types of service it can deliver due to these constraints, which can limit attention to fire safety. Our recommendations aim to utilise existing processes to maximise fire safety while minimising the impact on the service provider. All recommendations for the community care sector fall into two main categories: smoke alarms and individualised risk assessment.

Smoke Alarms

As most fatal fires occur at night, smoke alarms may aid in alerting the occupant to a fire emergency. While it is mandated by the state of Victoria to have a smoke alarm in every residential building, only 29% of fatal fires examined had a smoke alarm known to be in working condition. This finding stresses the need for the community care sector to help ensure their clients meet this state-wide fire safety standard. The following recommendations on smoke alarms take into account certain high-risk groups but also apply to the general population.

Recommendation 1: We recommend that every home be fitted with a standalone photoelectric smoke alarm, with a 10-year long life battery.

Recommendation 2: We recommend that every household have a smoke alarm in every bedroom that is used.

Recommendation 3: We recommend the use of interconnected smoke alarms for some specific high-risk scenarios.

Recommendation 4: We recommend that smoke alarm options, such as smoke alarms that can be controlled via remote and smoke alarms that are linked to personal medical alarms, be considered for clients on an individual basis.

Recommendation 5: We recommend that, if it is possible for family, friends, and neighbours to install and maintain smoke alarms, they do so in order to lower the burden on the community care sector. In cases that this occurs, we also recommend that the community care provider work in conjunction with the MFB to provide knowledge on the proper selection, installation, and maintenance of smoke alarms.

Recommendations for Community Care Sector Workers

Installing smoke alarms in homes and individually assessing clients for high-risk behaviours that could lead to fire fatalities is beneficial, but taking these actions only go so far. Community care sector workers go into the homes of their clients and care for them on a regular basis, and therefore are in the best position to ensure that fire hazards in the home are properly addressed as recommended above. Care workers and their involvement in the homes of their clients are the point at which the community care sector has its opportunity to improve and preserve the fire safety of older people and people with disabilities.

Recommendation 6: We recommend that all community care workers receive the Basic Home Fire Safety Training Materials developed specifically for the community care sector and available free via download from every fire services website, in order to better assist their clients' safety needs and properly address fire safety issues.

Individualised Risk Assessment

A key component in reducing fatal fires will be in identifying high-risk behaviours and factors that are known to increase the risk of fire fatality. Given that all care clients receive an assessment prior to receiving services, we recommend that such assessments take notice of fire safety concerns. If one or more fire safety concerns are found during assessment, specific action should be taken to reduce the risk, or the MFB should be consulted. Specific things to look for include:

- Is the client a smoker?
- Is the client a hoarder?
- Is the client living alone?
- Is the client's mobility limited?
- Is there evidence of previous fires or burn marks?

Recommendation 7: We recommend that all rooms in which the client smokes contain a heavy, high-sided ashtray or closed container for disposal of smoking materials, placed on a stable, non-combustible surface.

Recommendation 8: We recommend that all rooms in which the client smokes be fitted with a photoelectric smoke alarm, which can more easily detect low-burning, smouldering fires, such as those started by smoking materials.

Recommendation 9: If the client smokes in bed, we recommend the use of flame retardant bedding and/or a flame retardant mattress.

Recommendation 10: In hoarding households, we recommend that clear paths be maintained in order to ensure quicker and easier egress, in case of an emergency. We also support the MFB's risk management advice regarding hoarding households, as seen in Appendix D.

Recommendation 11: For older clients who live alone, we recommend the use of a personal medical alarm that allows the client to call an agency if help is needed.

Recommendation 12: If the client uses a personal medical alarm, we recommend that the client not list a community care service as their emergency contact, but rather a neighbour, or family member, who can attend to and assess the emergency much faster.

Recommendation 13: If the client has limited mobility, we recommend that walking aids or wheelchairs be left near their bed each night so that the client is able to escape in case of emergency.

Recommendation 14: If the client has limited mobility, we recommend that the client have a bedroom on the ground floor. .

Recommendation 15: We recommend that the community care sector work in conjunction with the MFB to educate clients who have started fires previously on the dangers related to their high-risk behaviour and proper safety methods to avoid the same happening again.

Recommendation 16: In a household where burns from previous fires are detected in combination with other risk factors, we recommend the installation of a sprinkler system or a portable sprinkler in rooms where the fire risk is high for the client

1 INTRODUCTION

In the United States, United Kingdom, and Australia more than 2,500 people die in residential fires every year (United States Fire Administration [USFA], 2010; Australasian Fire Authorities Council [AFAC], 2005; Department for Communities and Local Government, 2010). In fact, preventable residential fire fatalities are a problem that persists in almost all parts of the world. More specifically, international studies repeatedly show that older people and people with disabilities are at an increased risk of fire fatality. In 2007, the USFA found that people aged 65 years and older were over two times as likely to be a fire fatality as the general population, accounting for 32% of all fire deaths (USFA, 2011). In 2008, a report from the UK found that people over 80 years of age were over three times as likely to die in a fire compared to the national average (Department for Communities and Local Government, 2010). In an Australian study, the AFAC reported that people aged 65 years and older accounted for 23% of all preventable residential fatalities, and people aged 80 years and older were over three times as likely to be a fire fatality as the general population (AFAC, 2005). Furthermore, this problem is expected to increase as these segments of the population grow. In many industrialised countries, as birth rates decline and life expectancy grows, the proportion of older people and people with disabilities is projected to greatly increase.

With a population of about five million, Victoria, Australia currently faces this problem of fire fatalities among older people and people with disabilities. From 2000-2004, about twenty people in Victoria died every year from fires, and a disproportionate number of these victims were older people and people with disabilities. In fact, Victorians aged 70 years and older were 2.6 times as likely to perish in a fire as the average person. This was higher than the national rate, as the relative risk factor was only 2.2 for all of Australia (AFAC, 2005). These statistics suggest that this issue was persistent in Victoria, and that it may be more of a problem in this state than the rest of Australia.

To address the issue of fire fatalities among older people and people with disabilities, the Metropolitan Fire and Emergency Services Board (MFB) and other community safety organisations have launched programs and educational campaigns to reduce the rate of fire fatalities among older people and people with disabilities in the Metropolitan Fire District (MFD). The MFB provides media releases, educational brochures, online fire safety materials, and other community outreach programs to make high-risk groups aware of the key fire safety issues that affect them the most. In addition, the MFB has successfully lobbied at a national level to have Basic Home Fire Safety Training Materials incorporated into the national curriculum for new community care sector workers. The Basic Home Fire Safety Training Materials included information on high-risk groups, high-risk behaviours, and smoke alarms, as well as suggestions for procedures on how to resolve fire safety issues. While it is too soon to tell whether these safety efforts have made the intended impact, it is generally regarded that more can be done to address the problem.

Government-funded programs like Home and Community Care (HACC) and other care organisations support older people and people with disabilities with many aspects of day-to-day life, putting them in a unique position to assist with fire safety needs for these groups. However, this overburdened sector is expected to see rising demand in the near future

due to deinstitutionalisation and other factors that are contributing to an increase in "in-home" care. The rising demand on the sector and the increasing number of potential clients demonstrates a need to address the risk of fire fatalities by forming fire safety standards for the sector. While community care sector assessment processes include identification of various risks in the home, they do not specifically include assessment of fire risks, which may result in a lack of attention to fire safety. Specific policies can ensure that these organisations aid their clients through the use of appropriate fire safety advice to develop targeted and sustainable procedures. In partnership with fire services nationally, the MFB has already taken a first step by developing Basic Home Fire Safety Training Materials, which are now included in the national curriculum. The training materials are available for use by the community care sector; however, there is currently no mandate within the sector to ensure all workers receive the information unless they complete the relevant certificate contained in the national training packages.

The goal of this study was to provide simple fire safety solutions for the community care sector to utilise and potentially incorporate into policy, to ultimately assist in reducing the risk of fire fatality for their clients. We first analysed fire fatality data from financial years 2000 to 2010 in the Fire Investigation and Analysis database to determine the number of community care clients who perished in residential fires within the MFD. We also researched community care programs to learn what is currently being done about fire safety in order to identify opportunities for improvement. Using our research and data that were gathered, we hoped to assist the MFB in raising awareness about the issue and also provided recommendations to community care policy makers that have the potential to reduce future fire fatalities among older people and those with disabilities.

2 LITERATURE REVIEW

The following chapter explores some of the reasons why older people and people with disabilities make up a disproportionate amount of fire fatalities. Several international studies are reviewed that discuss fire fatality statistics and give explanations for why certain groups are at high risk. Next, current fire prevention measures are examined in terms of their impact and suitability for older people and people with disabilities. Fire safety campaigns, smoke alarms, and fire response are among the primary concerns. In an effort to describe what is currently being done to assist older people and people with disabilities, several government and community care programs are reviewed along with the specific services that are offered. Factors such as the ageing population of Victoria and trends toward community care that might increase the demand on the community care sector in the near future are also considered. Finally, current programs and preventive measures from the MFB and other stakeholders are reviewed in order to provide an understanding of what is being done to support older people and people with disabilities prevent fires that may lead to fatalities.

2.1 Fire Fatalities among Older People and People with Disabilities

Historically, older people and people with disabilities have made up a disproportionate amount of residential fire fatalities compared to the rest of the population. Numerous international studies have identified both older people and people with disabilities as among the highest risk groups with respect to fire fatalities. This section will review several studies and examine reasons why these groups are high-risk, as well as discuss the ageing trend in populations in most first world countries, most specifically Australia, and how this trend may affect fire fatalities.

2.1.1 Fire Fatalities among Older People

Several studies conducted worldwide have concluded that older people have a much greater risk of fire fatalities than the rest of the population. In the United States in 2006, the fire fatality rate for older people was more than three times the national average, and this rate has been increasing (United States Fire Administration [USFA], 2010). Approximately one-quarter of all fire fatalities in Scotland were people aged 75 years and older (Elder, 1996). In most cases, the number of fatalities among older people has been increasing in recent years. In Victoria, Australia, individuals aged 65 years and older were twice as likely to die in a preventable residential fire compared to the average person, based on fire fatality data from 1997 to 2003 (AFAC, 2005).

Throughout the majority of the related studies, the main causes of fires that led to fatalities among older people have been the same. Some of these causes include smoking- and alcohol-related incidents, and social and financial disadvantage. These causes, however, had relatively low rates compared to some others; one study found that about 50% of fires that led to fatalities among older people were caused by poorly maintained electrical appliances, space heaters, and electric blankets (Elder, 1996). Oftentimes, older people do not

take care of these appliances, leading to the start of a fire in their home due to an electrical fault. In general, older people live in older houses, which may be poorly maintained and have less adherence to current fire safety practises.

In most fire fatality studies, there is also a clear pattern in the reasons why there was a fatality. The majority of fire fatalities, at any age, occurred between midnight and 8:00 a.m. Fires that occur at night tend to be fatal more often than those that occur during the day due to several factors, such as there not being a smoke alarm present, failure to maintain a working smoke alarm, smoke alarms that fail to wake the victim, alcohol or medications that impair alertness (especially sleeping aids), and limited mobility. Many studies have shown a disturbing lack of working smoke alarms in the homes of older people. In New Zealand, a study found that, out of 212 fatalities, 63% of the victims had no functioning smoke alarms in their home.

One of the greatest risks for fire fatalities among older people is the living situation. A majority of the studies conducted conclude that older people who live alone have a much higher risk of dying in a fire than those who live with one or more other people. A family carer or care worker can take an important role in supporting the older person with respect to advocating fire safety and aiding them in the event of a fire. Often, older people living alone do not take measures to avoid a fire, and when faced with a fire situation, are unable to take action.

As people age, they are more likely to develop disability which may be physical or cognitive as a result of ageing, chronic illness, dementia, terminal illness and injury, which may make surviving a fire much more difficult. An older person with a physical disability may be unable to escape due to a necessity to use mobility aids (e.g. wheel chairs, walkers) or inability to escape by a means of exit other than a door. In addition, sensory impairments worsen with age, which again decreases the chance of escape from a fire (Miller & Davery, 2007). An older person affected by dementia, a terminal illness, may not necessarily realize the threat in regards to both prevention methods and the fire itself, and could potentially contribute to the threat, which can be especially dangerous if the person lives alone. Additionally, in an emergency, a person with dementia may be just as unable to respond as a person with a physical disability.

The combination of all these causes, in addition to the growing number of older people worldwide, is leading to a constantly increasing number of fire fatalities among older people. The percentage of the population that is older is growing, due to increased life expectancy and the ageing of the baby boom generation. Thus, without proper care and prevention education, the rate of fire fatalities among older people will likely continue to increase.

2.1.2 Fire Fatalities among People with Disabilities

People with disabilities also make up a disproportionate amount of fire fatalities. In 2005, Hall, on behalf of the National Fire Protection Association (NFPA), conducted a study of U.S. fires which found that people with disabilities, defined as anyone with impaired mental or physical capabilities, made up 28% of all fire victims. In a different study in 1990, Warda found the relative risk of fire injury among people with disabilities to be 6.5, meaning that a person with disabilities was 6.5 times as likely to be injured in a fire as a person with

no disabilities. There are many factors that led this disproportion, and they vary between the different disabilities.

In 2010, Kecklund et al. conducted a case study to explore these factors for the different forms of physical disabilities, which they split into three categories: auditory, visual, and mobility based impairment. In order to do this they asked people with disabilities about the challenges they find during fire escapes. Those with an auditory-based disability stated that their primary difficulty during an emergency was a lack of ability to perceive the situation; in other words, they had a hard time being alerted to the emergency. They further said that this difficulty occurred because most alarm systems are based on sound and people who have auditory disabilities either might not or cannot hear depending on the level of their disability. Kecklund concluded that alarm systems should include visual alarms as well, but many older buildings and temporary accommodations still lack these. Specific problems and limitations of current smoke alarms with respect to older people and people with disabilities are discussed more in detail in Section 2.2.1.

The next group that Kecklund and her team talked to was people with vision-based disabilities. A visual disability does not always mean complete blindness, just a level of impaired vision that corrective lenses cannot fix. According to their subjects' responses, people with visual disabilities found their greatest challenge in an emergency to be orientation. As the confusion of an emergency descended upon them, they had increased difficulty in maintaining their orientation. This in turn led them to not follow the correct fire evacuation route. People with visual disabilities also provided a list of obstacles that stand in their way during the course of their evacuation. One of these was small or highly located evacuation signage. More obstacles were poor contrasts in the built environment, which can make navigation difficult for those who have limited sight and spiral staircases, which turn in circles, making the visually impaired not certain which direction they are currently facing. One final obstacle that they identified was hard-to-open doors, such those with complicated opening devices or multiple locks (Kecklund, 2010).

The last group that Kecklund and her team talked to was people who had limited mobility as a result of their disability. The people with mobility disabilities said that they have little to no difficulty with direction, or being alerted to the emergency; instead they may experience difficult time getting to the exit. They stated that this is because they have a hard time overcoming obstacles in their path. These obstacles included stairs, which are the only method of traversing stories in most evacuation routes, as well as high thresholds and other physical obstructions in evacuation routes. A specific problem that they mentioned was staircases that do not have handrails, which are almost impossible for people with limited to get down safely. One last obstacle that this group mentioned was hard-to-open doors, especially those that require a two handed grip.

Intellectual disabilities can also pose challenges during a fire. Those with such disabilities might not be able to comprehend the current danger. A study conducted at Victoria University found that 54.5% of victims in an accidental fire fatality between 1998 and 2005 had an intellectual disability (Watts-Hampton, 2006). In a 2010 paper, Proulx discusses fire safety techniques for people with intellectual disability, saying that the only proven way to keep people with disabilities safe is to train them to respond to smoke alarms by evacuating the building. It found that the training must also be conducted in both the night

and the day, as well as in different environments, as it has been shown that the training for one situation does not carry into another. It also found that the training also has to be repeated periodically to increase the likelihood that the procedures learned are not forgotten. The study also stated that while a trained response could overcome their lack of comprehension, the training is very resource intensive and potentially ineffective as there is no way to cover all possible situations. Additionally, this training could not always be applied to people with cognitive issues such as dementia or acquired brain injury.

2.2 Fire Safety for Older People and People with Disabilities

Fire safety is generally divided into three distinct parts, consisting of fire prevention strategies, maintenance of working smoke alarms, and how to respond if a fire does occur. This section will discuss each of these three components of fire safety and how they relate to older people and people with disabilities. Prevention strategies include fire prevention information and related safety campaigns and fire prevention technology. Smoke alarms are reviewed for their general effectiveness and sustainable application in a community sector context, and the many different types and features of smoke alarm technology are also discussed. Finally, the importance of having an escape plan and the various challenges older people and people with disabilities face when responding to fires are examined.

2.2.1 Fire Prevention for Older People and People with Disabilities

The two techniques generally used to prevent fires are fire safety campaigns and fire prevention technology. The first is mostly done through educational campaigns and attempts to change human behaviour through education and fire safety awareness. Preventive fire-safe technology, such as fire-safe cigarettes or fire retardant bed sheets, acknowledges that human behaviour is difficult to change and instead aims to make the environment more fire-safe, irrespective of human behaviour. This section will discuss these two approaches to fire prevention and how they relate to older people and people with disabilities.

The vulnerability of older people and people with disabilities with respect to residential fires is well known and has resulted in several programs and educational campaigns about the issue at an international level (Miller & Davery, 2007). Section 2.1 reviews the primary concerns that many educational campaigns address. This section will focus more on the effectiveness, challenges, and limitations of such fire safety awareness programs.

While educational campaigns are generally considered to have a positive impact in raising awareness, some studies have raised concerns about their effectiveness (AFAC, 2005; Miller & Davery, 2007). Understanding specific risk factors and being fully aware of key fire safety issues are the main concerns that fire safety educational campaigns address. However, older people's perception of risk and awareness of fire safety programs may still be lacking. According to the AFAC, a report from the Office of the Deputy Prime Minister in 2003 found that many older people did not consider themselves to be old or in need of assistance (AFAC, 2005). It also found that many people avoided programs and campaigns that targeted the 60+

population because they did not consider themselves to be old. Multiple survey studies have found that older people underestimated the risk of fire compared to home burglary and about 25% were not worried about the risk of fire (AFAC, 2005; Miller & Davery, 2007). Some people viewed educational campaigns as an unnecessary use of time by emergency services, as stated in one account: "I'd much rather the fire brigade were there waiting to sort out a real emergency than coming around to my house to talk about fire safety" (AFAC, 2005).

In addition to having difficulty in convincing older people of their higher risk of fire fatality, many educational campaigns also have trouble reaching their target audience. A survey in the UK found that only 31% of older people had noticed any fire safety campaign in the preceding twelve months (Miller & Davery, 2007). Similar studies also indicate that people 65 years of age or older are unaware that information and/or assistance is available from local fire brigades (AFAC, 2005). One challenge is the limited time and resources that fire agencies can dedicate towards fire prevention education. Older people and people with disabilities are only one demographic that is targeted, and unlike school age children who can be educated at school, this demographic does not congregate at any one place. This makes it more difficult and time consuming for educational campaigns to reach a large number of older people or people with disabilities.

Another method used to prevent fires is the introduction of fire prevention technology, which targets common sources of fires. One notable example that has recently been introduced is the use of fire-safe cigarettes, also known as Reduced Ignition Propensity (RIP) or Reduced Fire Risk (RFR) cigarettes. In many industrialised countries, discarded smoking materials are the most common cause of residential fatal fires. In both the United States and Australia, 23% of fatal fires were caused by smoking materials (Hall, 2010; AFAC, 2005). The idea behind RFR cigarettes is that they are more likely to self-extinguish when not in use, which reduces the likelihood of causing a fire if they are improperly discarded. A study in the UK found that 91% of UK standard cigarettes caused flaming or smouldering, compared to only 34% of RFR cigarettes that were tested (Office of the Deputy Prime Minister, 2004). Other studies confirm that RFR cigarettes may be effective at reducing fire fatalities. New York was the first U.S. state to mandate RFR cigarettes in 2004, and subsequent studies have revealed a decrease of 37% in smoking-related fire fatalities since their introduction (Hall, 2010). Australia has since developed its own RFR cigarette standards and in 2010 mandated that all manufacturers and importers only produce and distribute cigarettes that meet the RFR standard.

Other fire prevention technology includes fire-safe materials such as fire retardant clothes, bed sheets, and mattresses. Studies have found discarded smoking materials, open flames, and electrical faults to be the most common causes of residential fatal fires (Hall, 2010; AFAC, 2005). In addition, a recent study by the NFPA has identified common ignition sources to be mattresses, bedding, and upholstered furniture (Hall, 2010). In response to these common causes and ignition sources, many companies now offer fire retardant clothes, bedding, and mattresses, which should reduce the risk of fire by eliminating possible ignition sources.

2.2.2 Smoke Alarms

This section discusses the effectiveness of smoke alarms in addition to the types of technology used for detection, the methods to power them, and special features. First, research related to the impact of smoke alarms on reducing fatalities is examined along with their general effectiveness at waking occupants. Next, the two types of detection techniques, ionisation and photoelectric, are reviewed and compared. The different methods for powering smoke alarms are also briefly discussed. Finally, the many available features, such as interconnectivity and use by remote control, are all examined among other special smoke alarm features.

It should be noted that while the estimates on the effectiveness of smoke alarms vary, they have been mandated for all Victorian homes, units, flats, and townhouses since 1997 (MFB, 2009). The importance of a working smoke alarm has been stressed by a number of international studies. A report from the AFAC claimed that a working smoke alarm could reduce the risk of fire fatalities by 60% (AFAC, 2005). The AFAC also found that in Australia, 72% of fire fatalities occur at night between the hours of 8:00 p.m. and 8:00 a.m., which makes the use of smoke alarms even more relevant as they are often the only fire detection measure when the occupants are asleep. Most notable in this report were findings in which households had a smoke alarm when a fire fatality occurred. Of fire fatalities in Australia in which the presence of a working smoke alarm was known, 94 of 172 incidents did not have a smoke alarm present, and an additional 24 had a smoke alarm that was not in working order. Thus, 69% (n=118) of fatalities occurred in homes with a non-existent or non-functioning smoke alarm, which suggests the importance of smoke alarms in preventing fatalities. A recent report by the MFB also studied smoke alarms and reported on their prevalence and impact (MFB, 2011). The report studied all structural fires within the MFD between 2006 and 2010 and found that 21% of all properties where a structural fire required MFB attendance did not have a smoke alarm installed. The MFB also found smoke alarms to have a large impact in terms of reducing the cost of fire damage and reducing the spread of fire. In residences with a working smoke alarm, only 8% of fires spread beyond the room of origin, compared to 20% of fires without an operational smoke alarm (MFB, 2011). This demonstrates how smoke alarms can reduce the risk of larger fires.

A recent report by Bruck and Thomas at Victoria University draws a conclusion that is contradictory to many other studies. In a review of the coroner's database, Bruck and Thomas found that only one of 110 residential fire fatalities in Victoria had a strong possibility of being prevented by a working smoke alarm (Thomas & Bruck, 2010). However, this claim has limitations and relies on many categorisations that are debatable. This study classified cases to have a strong possibility of being saved by a working smoke alarm only if the fatality occurred outside of the room the fire originated in, and if the victim was considered not impaired. Victims were considered impaired if they were less than three years old, greater than 75 years old, had a blood alcohol content (BAC) greater than 0.1, or had any known mental or physical disability (Thomas & Bruck, 2010). While this study suggests some limitations smoke alarms have in reducing fatalities, most studies conclude that alarms are effective at reducing fire fatality rates, although estimates of their effectiveness vary.

In addition to analysing smoke alarms' impact on fire fatalities, there has been much research into their general effectiveness at waking occupants. A study from Victoria

University, Melbourne looked into the effectiveness of smoke alarms with respect to many variables including age, gender, and hearing disabilities (Bruck, 2001). Similar to other studies, this report found that although most fires occur during the day, more fire fatalities occur at night, with 81% of fire fatalities occurring between 8:00 p.m. and 8:00 a.m. Additionally, 86% of victims were asleep at the time of the fire, which once again reiterates a strong need for effective smoke alarms. Older people and people with hearing disabilities were found to be at a higher risk given their reduced ability to hear high frequencies. The use of sleep medication was also found to reduce the likelihood of arousal and is more commonly used by older people (Bruck, 2001).

A similar but more recent study from Bruck and Thomas examined different smoke alarm sounds and other alerting systems such as strobe lights and pillow shakers. Specific attention was also given to the effectiveness of different alarms for older people and the hard of hearing. The main conclusion from this study was that several current smoke alarm sounds may not always be effective at waking people (Bruck & Thomas, 2010). Through experimentation, it was determined that a 520 Hz square wave sound was much more effective at waking occupants compared to conventional smoke alarms. An important finding was that this 520 Hz square wave sound was significantly better at waking the hard of hearing, proving to be more than seven times as effective as current smoke alarms. Equally as important were their findings that strobe lights and bed and pillow shakers are less effective than the 520 Hz sound in waking the hard of hearing.

In addition to research on the effectiveness of alarm sounds and alerting methods, there have also been studies that examine the two types of smoke alarm fire detection technology, ionisation and photoelectric. Several studies have compared ionisation and photoelectric smoke alarms against many metrics, and the AFAC has concluded that photoelectric is the preferred choice of smoke alarm in residential accommodations (AFAC, 2011). The AFAC justifies this decision with the following points that summarise research findings:

- Ionisation smoke alarms detect flaming fires marginally earlier than photoelectric smoke alarms.
- Photoelectric smoke alarms detect smouldering fires and fires starting in areas remote from smoke alarms significantly earlier than ionisation smoke alarms.
- Ionisation smoke alarms may not operate in time to alert occupants early enough to escape from smouldering fires.
- Photoelectric smoke alarms are likely to alert occupants in time to escape safely for both flaming fires and smouldering fires.

While photoelectric alarms are generally considered to be more effective, some models come equipped with both an ionisation and photoelectric sensor. This is arguably better than either one individually, although the downside is higher cost. In addition to these different fire detection techniques, there are also different ways to power smoke alarms, such as different types of batteries and alarms that are hardwired to the main power.

In a recent report, the MFB found that hardwired smoke alarms were far more likely to operate, with 78% of hardwired smoke alarms operating compared to 56% of battery-operated alarms (MFB, 2011). This is most likely due to the fact that hardwired smoke alarms are easier to maintain and the finding that the largest explanation for the failure of smoke alarms was a missing or dead battery (MFB, 2011). While the advantage of hardwired smoke alarms is clear, they do incur higher costs and require installation by an electrician. A recent alternative is a standalone smoke alarm that comes with a 10-year long life battery. This dramatically reduces costs, as the cost of a 10-year smoke alarm is less than the cost of the ten batteries that would be required to maintain a traditional alarm. It also substantially reduces ongoing maintenance, as it should require little attention for the ten years it is in use. Three possible 10-year standalone photoelectric alarms that meet Australian standards are made by Brooks®, Guardian®, and Orca SafetyAce®. For more details on each smoke alarm, see Appendix B.

In addition to the various types of smoke alarms and ways to power them, there are also several different features available that aim to make smoke alarms easier to use and more effective. Some of the main feature options include interconnectivity, remote controlled alarms, and smoke alarms that are linked to personal alarms. Interconnectivity seeks to solve the problem of having a limited number of smoke alarms in a limited number of rooms. If a fire originates in a room with no smoke alarm, it may take a longer time to activate the nearest one, lessening the amount of time the occupant has to escape. Interconnected smoke alarms reduce this risk by activating all alarms after one alarm detects smoke (Thomas & Bruck, 2010). The two main ways interconnectivity can be achieved is through wires or radio waves. It is also notable that the United States NFPA has required interconnected alarms in new construction since 1989, and many states have mandated this code (NFPA, 2002**)**. In addition to interconnected alarms, the concept of having multiple alarms in different rooms is also important. It was found that smoke alarms outside of the bedroom significantly reduced the odds of waking a sleeping occupant, especially if the bedroom door was closed (Thomas & Bruck, 2010). This would suggest that having smoke alarms in several rooms, specifically bedrooms, may improve response time to fires.

Some other options that are less common include smoke alarms with remote controls and smoke alarms linked to personal safety alarms. The idea behind these features is that they make smoke alarms easier to use. Remote control smoke alarms allow the user to silence or test their smoke alarm simply by pushing a button on the remote. This makes it much easier for people with limited mobility to test or silence their alarm and might reduce frustration with smoke alarms that can lead to missing batteries or non-functioning alarms. Smoke alarms linked to personal medical alarms offer a few options for their clients. When a smoke alarm is activated it may automatically notify the monitoring company, independent of the user. Alternatively, an activated smoke alarm can also activate the personal alarm. This effectively acts like an interconnected smoke alarm and also gives the user the option of alerting the monitoring company or silencing the alarm if there is no emergency.

2.2.3 Responses to Fire

In responding to a fire emergency, a person has two choices: to escape the fire or to extinguish it. As previously mentioned in Section 2.1.2, people with disabilities, specifically

limited mobility, may find it challenging to respond to a fire, whether it be escaping or fighting the fire. In the AFAC's *Essential Knowledge: Basic Home Fire Safety*, it is recommended that older people or people with disabilities escape to safety instead of fighting the fire. This recommendation is based on incidents in which older people who attempted to use home fire suppression equipment experienced a burn-related injury. Escaping the fire and not using suppression equipment is also recommended on the basis that older people and people with disabilities often require more time to escape. The Basic Home Fire Safety Training Materials also stress the need to have an escape plan and ensure that egress points are clear. In addition, research on the suitability of home fire suppression equipment for these vulnerable groups has also led to this recommendation.

Among common fire suppression equipment, fire extinguishers and fire blankets are typically the first line of defence against small fires. However, several human factors, such as knowledge or physical ability to use these tools, may severely limit their effectiveness. In an experiment done by Bruck and Thomas (2010), a controlled randomised test measured the performance of fire extinguishers and fire blankets when used in a controlled environment by older people. In the experiment, five of 23 (22%) participants failed to extinguish the fire with the fire extinguisher. Some of the challenges that were noted included difficulty in removing the fire extinguisher from the wall and an inability to remove the safety pin. In each failure to put out the fire, the participant was physically unable to remove the safety pin within the first minute of the trial. The same study conducted a similar experiment with fire blankets. The results showed that fire blankets were more effective and generally easier to use compared to fire extinguishers, but were often used incorrectly. These results suggest that there are some physical limitations of older people that may reduce the effectiveness of home fire suppression equipment. The challenges seen in using the fire extinguishers and fire blankets also suggest that a lack of fire safety education may be a contributing factor.

2.3 Community Care Services

The community care sector offers a wide range of in-home services for older people and people with disabilities to prevent premature admission to residential care, preserving their independence and involvement in the community. The presence of these organisations in the lives of these two groups gives them a unique opportunity to assist their clients with preventive fire safety measures. This section will review the nature of community care in the MFD to show what types of services are provided and how they address the fire safety needs of their clients.

2.3.1 Community Care Programs for Older People

Community care for older people is funded at both the federal and state levels. At the federal level, the Department of Health and Ageing (DoHA) funds three types of aged community care programs under *Aged Care Act 1997*: CACP (Community Aged Care Packages), EACH (Extended Aged Care at Home) and EACH-D (Extended Aged Care at Home – Dementia). These programs all require potential clients to undergo assessments

before receiving care through interviews with ACATs (Aged Care Assessment Teams), or the ACAS (Aged Care Assessment Service) as it is known in Victoria (DoHA - Directory, 2011).

According to the *Australian Government Directory of Services for Older People 2011*, the CACP program is for those who have more complex needs similar to those catered to in low-level residential care, but wish to remain at home. Some services help with daily activities such as "bathing, meals, shopping, and getting around." EACH and EACH-D, on the other hand, are for those who would need high-level care in a residential facility but wish to remain at home, with EACH-D specifically servicing clients with dementia (DoHA - Directory, 2011).

According to the *DPS Aged Care Guide*, Victoria was home to 181 organisations providing CACP services, 96 providing EACH services and 65 providing EACH-D services at the time of writing this report. The organisations providing these services were predominately not for profit, non-government organisations (Baker, 2011).

The most commonly utilised form of community-based care is the HACC (Home and Community Care) program, accounting for 70% of community care funding in Victoria as of 2006 (Nous Group, 2006). Established by *Home and Community Care Act 1985*, HACC is funded both at the federal and state levels. The federal government and state/territory governments determine what each respective state receives in funding from the federal government, and then in turn fund organisations within their respective states to carry out services covered by HACC (Home and Community Care Act, 1985). Additionally, local governments add funding of their own for the program.

The most commonly accessed HACC services delivered in Victoria during 2008-09 were Assessment (33.1%), Domestic Assistance (32.6%), Allied Health Care (Centre) (26.8%), Nursing Care (Home) (22.4%), and Home Maintenance (17.5%) (DoHA – HACC, 2011). In Victoria, the Royal District Nursing Service (RDNS) and Bush Nursing Service deliver most of the nursing, local governments take care of home and personal care, and hospitals provide Allied care (Nous Group, 2006).

In 2009-10, about 275,000 Victorians made use of HACC services. Most (63%) were aged 70 and older, and over half (59%) of all clients used just one service, as HACC services are meant to be chosen individually rather than being packaged as they are with CACP, EACH and EACH-D (HACC website, 2010). In Victoria, 468 government-funded organisations responsible for distributing these services, with 37 located within Melbourne and its surrounding suburbs (Department of Health Victoria - HACC, 2010).

Additionally, the national government funds the Veterans' Home Care (VHC) program through its Department of Veterans' Affairs (DVA). The VHC website describes the program as being similar to HACC, but only for veterans of the Australian defence forces and their widows and widowers. It includes personal care, respite care, domestic assistance, and safety-related maintenance, which can include replacing batteries in smoke alarms (DVA website, 2011).

The DVA also makes available the HomeFront service, which is a free, annual assessment of the home for hazards that could cause falls. After the assessment, any necessary modifications to the home are made, such as the installation of handrails (DVA website, 2011). From the program description, it does not appear that this service is used to

evaluate fire safety hazards, but with this type of service in existence already, it could be extended to offer fire safety assessments.

Additionally, many other smaller programs for aged care exist in Victoria, and the private sector's involvement in community care is growing. The Nous Group, an independent research group that prepared the report *Moving to Centre Stage: Community care for the aged over the next ten years* for the Victorian Community Care Coalition in 2006, described the structure of the community care system as being overlapping and rigid in their report. The nature of the system has caused confusion in terms of what services are available to which clients and how different organisations are funded for their provision, as many organisations are funded under more than just one government program (Nous Group, 2006).

2.3.2 Community Care Programs for People with Disabilities

For people with disabilities, all community care funding comes from the state level. The Disability Services Division (DSD) of the Victorian government's Department of Human Services (DHS) provides two programs involving community care. The first is Individual Service Packages, through which the DSD funds people with disabilities so they can purchase services related to their disabilities. Anyone qualifying under *Disability Act 2006* can receive assistance by applying for a package, after which the DSD determines the range of funds appropriate for that person's needs. Once resources are available, the person with the next highest priority on the Disability Support Register whose funding range can be covered is contacted and given the opportunity to receive funds. These funds are paid directly to the person, managed by a financial intermediary, paid directly to a disability services organisation, or a combination of the three depending on the person's circumstances (Disability Services, 2010).

Disability Services recommends that recipients of their financial packages purchase services from registered disability services organisations, which are funded by the DHS. These organisations are required to comply with *Disability Act 2006* and are monitored by the DSD. As of September 2010, 305 such organisations were listed in Victoria (Disability Services, 2010).

Another division of the Victorian government, the Transport Accident Commission (TAC), funds all costs associated with victims of motor vehicle accidents in the state. This includes paying for in-home care and rehabilitation. Set up by *Transport Accident Act 1986*, the TAC supported over 42,900 clients with $909.3 million in 2010 (TAC website, 2011).

2.3.3 Community Care Assessment

The gateway to community care is through assessment, with most of the major programs (CACP, EACH and EACH-D) reachable only through an assessment by the Aged Care Assessment Program (ACAP), which employs assessment teams across the state. The HACC program has its own assessment process attached directly to service provision from the same agency.

According to a 2009 annual report by the ACAP, "[Aged Care Assessment Services] are required to conduct a holistic assessment of the client's care needs; taking into account the physical, medical, psychiatric and social needs of frail older people, including their rehabilitation potential, in order to help them choose the most appropriate services to meet

their needs" (DoHA - ACAP, 2009). In Victoria, eighteen such teams have the goal of assessing people aged 65 years and over (50 years and over if Indigenous). These teams must be comprised of or have access to health care professionals to make accurate assessments, but can range from a nurse and an assistant to a team of fifteen to twenty health professionals. In addition to being required for access to federally funded packaged services, ACASs can also refer people to HACC or other more appropriate programs (DoHA - ACAP, 2009).

Access to HACC services begins with an initial assessment by any organisation designated as a HACC Assessor and may continue with subsequent assessments by other organisations whose expertise and services better match the needs of the client. This may possibly even include a referral to ACAS instead (Department of Health Victoria – "Strengthening assessment", 2010).

The flow chart in Figure 1 shows how a potential community care client in Victoria might obtain various aged care services, but is not an exhaustive representation. Once the client's needs are assessed and matched with one or more specific organisations, the appropriate package or individual services are planned and delivered.

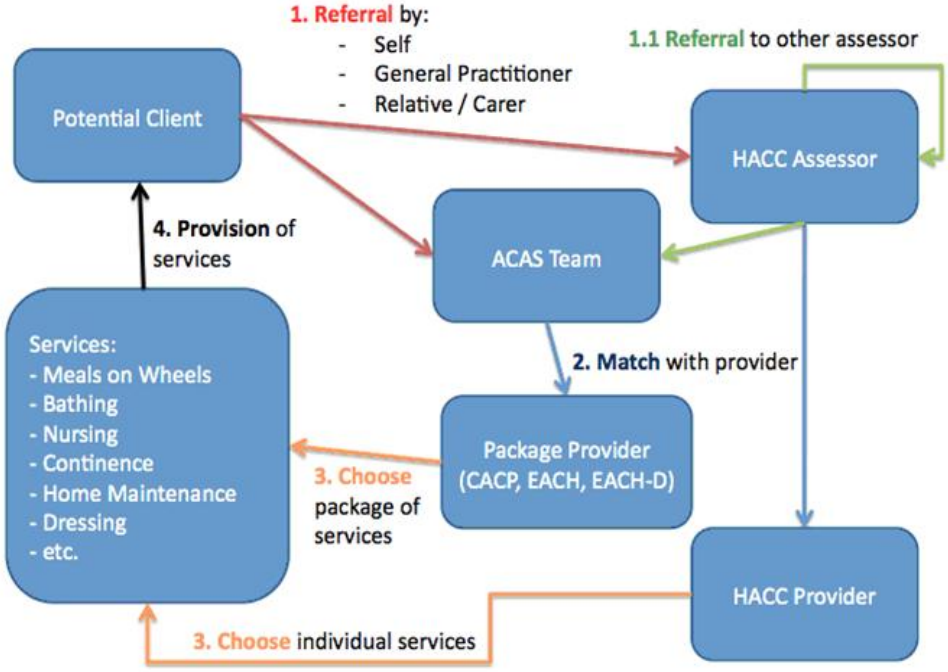

Figure 1: Aged Care Assessment in Victoria

2.3.4 Community Care Services as Agents of Fire Safety

Whether on the federal or state level or meant for use by older people or people with disabilities, government-funded community care programs require the organisations they fund to follow standards set out in legislation. However, there are no requirements with regards to the fire safety of their clients.

Accommodation services, which are group homes with 24-hour residential care worker support for people with disabilities provided by the Disability Services Division of Victoria's Department of Human Services, provide extensive support for the fire safety of workers and clients. Fire safety is taken into consideration from the beginning when the accommodations are built. Fire detection and suppression equipment is required in all DSD Shared Supported Accommodation dwellings, doors used in fire escape plans must be able to

be opened from the inside without a key and be fitted with door strikes, among other measures. Additionally, the fire-related behaviours of the clients who stay in the accommodations is taken into account when clothing, bedding and other furnishings are selected (Department of Human Services - DSD, 2004). The Disability Services workers that reside in the accommodations also must be trained in fire safety, and fill out fire safety checklists when they first arrive and on a weekly basis. They must also participate in evacuation drills and on-site bi-annual workshops (Young, 2007).

In contrast to the attention paid to fire safety by accommodation services, a form of residential care, there are few examples of fire safety included at the program level in community care, though two that make mention of it are HACC and VHC. One of the services funded under the HACC program is Home Modification, which among other things includes the installation of emergency alarms. While this is not available under HACC in Victoria, providers can help change smoke alarms under Property Maintenance (Department of Health Victoria - HACC brochure, 2010). Likewise, one of the services offered under VHC is replacing batteries in smoke alarms (DVA website, 2011).

Although these two programs offer smoke alarm maintenance, they are not required to. The overlapping, complicated nature of the system and the fact that a significant number of packaged care providers do not actually employ direct care workers, but broker their services instead, means that any attention paid to fire safety varies between organisations and regions, if present at all. Additionally, given the fact that many HACC providers, in particular, service thousands of clients, it is difficult for them to reach all their clients in terms of fire safety, even just to help with an annual smoke alarm battery changeover.

However, given the fact that the community care sector is looking to concentrate on prevention rather than just reaction, both to help their clients and to ease the burden on the sector in the future, the sector has a clear opportunity to play a larger role in the prevention of fire-related injury and death among their clients. The Nous Group, in their 2006 report for the Victorian Community Care Coalition, argued that the community care sector is in a good position to help with prevention and early intervention in general (Nous Group, 2006).

2.4 Future Demand on Community Care Services

This section will discuss many of the factors that will contribute to an increasing burden on the community care sector. An increasing number and proportion of older people in Victoria is one of the key driving forces that will result in a large increase in the number of community care clients. The prevalence of disability among this group and the increasing cases of dementia will also create more demand on the sector. Furthermore, more people are expected to choose to live in a community and receive care in their homes for a variety of reasons. The Victorian government is also encouraging people to stay in the community in an effort to reduce the burden on residential care.

2.4.1 Increasing Age Demographics

Australia's population is ageing, both in terms of the total number of older people and their overall proportion in the population. As in many industrialised countries, Australia is

experiencing an increase in age demographics brought about by low fertility rates and increasing life expectancy. The ageing of the baby boomer generation is also a large source of this shift in age demographics and will account for a large number of the increase in older people over the next 20 years (Department of Planning and Community Development [DPCD], 2008). It is also predicted that baby boomers will change the current needs-based provision of service to a rights-based focus and overwhelmingly choose community care. According to the DPCD the number of Australians aged 65 and older is projected to increase from 2.73 million (13.3% of the population) to 4.47 million (18.7%) by 2021 (DPCD, 2008). Population changes in Victoria also reflect this trend, with the same report estimating that by 2021, one in four Victorians will be 60 years of age or older (DPCD, 2008).

This increase in the proportion of older people in Victoria will create a wide range of economic and social challenges. One central concern is how the community care sector will adjust to meet the needs of a growing number of clients. It is well known that the likelihood of acquiring a disability increases with age. According to the Community Care Coalition, one in four Australians over the age of 65 has a severe or profound disability. This rate is much higher than in the general population, as the disability rate is only one in twenty-five for Australians under 65 (Community Care Coalition [CCC], 2005). A specific type of disability that is known to be more common among older people is dementia. In fact, largely due to the ageing demographics, the prevalence of dementia is expected to increase by 54% between 2005 and 2020, resulting in about 300,000 people with the disease in all of Australia (Access Economics PTY Limited, 2006). This increase combined with other factors suggests that there will be a large increase in potential community care clients in the next 10 years, which may put a greater demand on the sector.

Another challenge for community care services will be in caring for a growing number of older people who are culturally and linguistically diverse (CALD). Caring for CALD communities presents unique challenges for community care services. CALD clients generally take longer to assess, can require a translator, and sometimes require more complex planning to setup a service (DoHA, 2010). Furthermore, the number of older CALD residents is expected to increase in Victoria. In 2001, the older CALD population was estimated to be 130,000 in Victoria, and this number is expected to increase to 230,000 by 2026 (Howe, 2006). The percentage of CALD communities is also growing, reaching about 38% of all older people in 2011, giving Victoria the second highest proportion of CALD HACC clients in Australia (Nous Group, 2006; DoHA - HACC, 2011).

2.4.2 Trends Toward Community Care Services

Given the coming rapid growth in the ageing population of Australia described in the preceding section, the fact that the country's health and community care sector is the second fastest growing comes as no surprise (CS&HISC, 2011). Despite the rapid growth seen over the past decade in this sector, the ageing population and other drivers of change will push community care to its limits due to a future small workforce, diminishing informal care support and historically inadequate funding.

Representing 11.4% of the Australian workforce, the health and community care sector accounted for 20% of all new jobs from 1999 to 2009 and grew by 8.6% with the addition of 1.3 million new workers in 2010 (CS&HISC, 2011). The need for such growth

can be seen in Victoria, where usage of the HACC program has seen an unprecedented increase in demand, growing from 204,450 clients in 2003 (Department of Health Victoria – "Who Gets HACC", 2006) to almost 265,000 in 2009 (DoHA - HACC, 2011). Additionally, according to the *2009-10 Report on the Operation of the Aged Care Act 1997*, Australian Government funding of packaged services and their usage in Victoria has grown substantially over the past few years, as illustrated in Tables 1 and 2, which report expenditures on packaged services in terms of packages allocated to providers and millions of Australian dollars, respectively.

	2006	2007	2008	2009
CACP	9,113	9,562	10,135	10,582
EACH	718	882	1,106	1,356
EACH-D	166	331	497	569
Total	**9,997**	**10,775**	**11,738**	**12,507**

Table 1: Victorian Usage of Packaged Programs (in packages allocated to providers)

	2005-06	2006-07	2007-08	2008-09	2009-10
CACP	94.3	106.5	118.0	125.8	131.8
EACH	19.5	29.7	39.9	46.3	53.4
EACH-D	-	7.4	16.1	22.1	24.7
Total	**113.8**	**143.6**	**174.0**	**194.2**	**209.9**

Table 2: Australian Government Expenditure on Packaged Programs in Victoria (in millions of Australian dollars)

As described in the preceding section, a major driver of the increased use of community care is Australia's ageing population. Significant as that may be, other factors will also contribute to the growth and change of the industry.

One such factor is the shift of older patients from low-level residential care to the community. Government plans such as *A Fairer Victoria* and *Care in Your Community* encourage this shift to reduce the demand for residential facilities and ease the strain on residential care's unsustainable funding model. This shift is being done through reduced hospital admissions, fewer inappropriate admissions, shorter bed stays, and day procedures. Additionally, people generally prefer to remain in the community rather than being treated in a residential facility, and often place more importance on housing options than the actual care received (Nous Group, 2006).

This trend towards community care can be seen in a 2009 report by the Aged Care Assessment Program (ACAP), which reports annually on various performance indicators calculated using the National Data Repository (NDR), which is populated by Minimum Data Set (MDS) records filled out by aged care organisations throughout the country. According to the report, the percentage of people with dementia recommended to use community services climbed from 49% in 2003-04 to 59.4% in 2007-08. Overall, the percentage of those assessed by the program in the community that are recommended to stay in the community has increased from 73.9% to 84% over the same time span (DoHA - ACAP, 2009).

Another driver of change in the community care sector is the increasing complexity of care that workers will need to administer. Increasing numbers of CALD clients will require more interpreters and care that is culturally appropriate, both for them and Indigenous clients. Already, the ACAP reports that assessing CALD clients takes longer because of such needs (DoHA - ACAP, 2009).

Additionally, improved nutrition and health practises are resulting in higher life expectancies (Nous Group, 2006), reflected in the average age of clients at assessment time as reported by the ACAP, which has risen from 79.2 in 1995-96 to 81.9 in 2007-08. Those assessed at age 85 or older went from representing 29.8% of clients to 42.7% over the same time span (DoHA - ACAP, 2009). As people continue to live longer, their needs become increasingly complicated, including treatment for dementia. Combined with the push for lower-level residential clients to be treated in the community, the community care sector will be responsible for much more complicated care than it has been in the past (Nous Group, 2006).

These increases in the amount and complexity of needed services could not come at a worse time for the community care sector. Diminishing ratios of both formal workers and informal carers to clients and insufficient funding will only serve to compound the problem going forward.

According to the Community Services and Health Industry Skills Council's (CS&HISC) *Environmental Scan 2011,* community services will be doubly affected by Australia's ageing population. Besides the increase in demand for community care services, nearly half of those employed in the sector are 45 years and older, and most of the growth the sector has experienced over the past decade was through new workers in the 55-64 age bracket. This means a significant number of workers in the sector, some of whom undoubtedly will become clients themselves, are close to retiring age. In general, the ratio of people in the workforce to retirees is projected to decline from 5 to 2.7 by 2050 (CS&HISC, 2011).

Unfortunately, the age profile is not the only concern about the community care workforce. There is currently a high turnover rate in the sector due to several other factors, including a general lack of a career path, occupational health and safety issues that come along with working in clients' homes, working in relative isolation, and low pay. For example, a 2007 report by the Allen Consulting firm identified that the typical personal care worker in New South Wales earned less per hour than a checkout operator in a supermarket (Allen Consulting Group, 2007).

Given the above factors, the number of community care workers is currently not growing fast enough to keep pace with the ageing population. *The Hogan Report* (2004) estimated that the sector would need to grow by 35% to accommodate Australia's ageing population, but projected that the overall workforce will only grow by 8% over the same time period (Nous Group, 2006). Worse, it is already reported that the current older population is under-serviced, with nearly 400,000 older Australians claiming they have unmet needs. The sector already also suffers from a lack of nurses and skilled doctors, whose roles are important both for assessment and for complex needs that will increasingly fall on community care services to provide for (Allen Consulting Group, 2007).

In addition to formal care workers, informal carers such as family members, friends and neighbours are very important to the wellbeing of community care clients. It is estimated that informal carers provide for 74% of home care in Australia (Allen Consulting Group, 2007), and that 50% of all older community care clients have informal carers. However, there are several factors present that will suppress the growth of informal carers in the future, placing even more pressure on the formal community care sector (Nous Group, 2006).

CS&HISC reports that the main reasons for fewer informal carers in the coming years will be decreased family sizes; changing preferences of some clients; increased rates of older people living alone due to increased divorce rates and longer life expectancies; and increased workforce participation, especially by women (CS&HISC, 2011). The Nous Group adds four more concerns: increased dispersion of families; increased complexity of care becoming too complicated for carers to handle; decreased willingness of younger generations to serve as carers; and slowed growth of the primary carer demographic, which is women aged 50-64 (Nous Group, 2006). As can be seen in the 2008 distribution of carers in Table 3, as reported by the ACAP, the latter two concerns are highlighted by the fact that partners and children are the two most represented groups among carers.

	Partner	Parent	Child	In-Law	Other Rel	Friend	Total
Male	5,800	34	7,088	104	847	435	14,308
Female	9,194	158	15,186	1,013	2,594	1,163	29,308
Total	**14,994**	**192**	**22,274**	**1,117**	**3,441**	**1,598**	**43,616**

Table 3: Number of Carers in Victoria by Sex by Relationship to Client

While there is reason to believe that some of the above factors will be counteracted by an increased number of carers with the retirement of the baby boomers and the potential for other demographics to pick up the slack, the Nous Group predicts that the ratio of carers to clients will still fall rather quickly. By 2016, they project that 47% of community care clients will have an informal carer, which falls to 43% by 2021, 39% by 2026, and all the way down to 35% by 2031 (Nous Group, 2006).

In addition to a lack of both formal and informal carers, the community care sector has historically been underfunded, according to the Nous Group. Most aged care spending in the past has been on residential aged care and acute care, of which community care spending makes up just 31% and 24%, respectively. According to the Nous Group's calculations, the annual amount of growth in funding needed for the HACC program to keep up with the factors driving the growth and change of the community care sector is 6.5%, whereas as of the writing of the report, it had only grown by 4% in each of the past several years leading up to 2005 (Nous Group, 2006).

Given that the number of both formal and informal carers is not projected to keep pace with Australia's ageing population, it is probable that the community care sector will have a difficult time adequately responding to the projected future demand. Any recommendations for how the sector can support its clients to achieve a minimum level of home fire safety must acknowledge the current and future demands on an increasingly complex service delivery environment.

2.5 Current MFB Fire Safety Efforts

The MFB is an emergency service organisation located in Melbourne, Australia, funded by insurance providers as well as local and state government. It operates within the Metropolitan Fire District (MFD), which consists of Melbourne and some of its suburbs. The MFB was established by the Fire Brigades Act of 1890 due to an outbreak of serious fires during the previous year. The MFB disbanded the 56 separate fire brigades in Melbourne and absorbed their members, thus creating a united organisation. Since then, the MFB has expanded its responsibilities to include urban search and rescue, road accident rescue, hazardous material response, Emergency Medical Response (EMR), and a variety of other emergency response services.

In addition to emergency response, the MFB's other key mandated responsibility is community safety. The MFB fulfils this though its Community Education department (soon to be Community Resilience) which targets the general community through the use of programs. Traditionally, these have been delivered through media campaigns, such as Change Your Clock Change Your Smoke Alarm Battery and Winter Fire Safety. Media campaigns are designed to use media sources such as television, press, and radio to warn people of fire dangers, and provide practical advice on how to lower risks. These campaigns are mostly dedicated to helping all homeowners practise better fire safety, but sometimes have messages for high-risk groups. In addition, some programs specifically focus on high-risk groups such as older people and people with disabilities. There are two ways the MFB can conduct programs that focus on high-risk groups: target the members of the group or target the people who provide care for them. The programs the MFB uses to target high-risk groups are engagement activities such as presentations to members of a group. An example of programs that target older people is the Seniors Fire Safety program in which retired MFB fire fighters deliver a presentation on the necessity of good home fire safety practises to groups of active older people through clubs such as Probus, Elderly Citizens Clubs and other planned activity groups. While this method has helped to raise fire safety awareness for hundreds of thousands of people over the years, there are inherent limitations to this approach. One challenge associated with this type of community education is that it is very resource intensive for the MFB. More importantly, it does not reach older people who may be less active, isolated, or disconnected from the community in which they live.

In response to these limitations the MFB also targets the people who provide care for older people and people with disabilities. In the past, the MFB has provided home fire safety information to community care workers, but with over 1,000 separate providers of community support, this effort proved unsustainable. To address this issue, the MFB developed and led a national project to have Basic Home Fire Safety Training Materials included into the national curriculum for a range of community sector workers, including those providing services to older people and people with disabilities. As a result, the Basic Home Fire Safety Training Materials are now part of nine separate units of competency, which form part of 49 separate qualifications. To ensure consistency across all states and territories, the MFB then developed the Basic Home Fire Safety Training Materials specifically for sector workers. In order to encourage their use, the materials were made freely available on every fire services website in Australia. In addition to the materials' use as

part of the formal qualifications, fire services also promote using it as an in-house training tool by sector providers for new and existing workers. Using these materials allows the community care service to become agents of home fire safety for their clients, who are typically people in high-risk groups. These materials contain information on high-risk factors and behaviours, prevention techniques, and all aspects of smoke alarm installation, use, and maintenance. One advantage to this approach is its efficiency; given that community care workers already have regular visits with their clients they are in a unique position to assist with their fire safety needs. However, there are also several challenges associated with this educational method. The practical application of the information in an individual care recipient's home is only reflective of the current and existing policies and procedures of the agency providing the service.

3 METHODOLOGY

The goal of this study was to provide simple fire safety solutions for the community care sector to utilise and potentially incorporate into policy, to ultimately assist in increasing fire safety among their clients. In order to understand the problem of the overrepresentation of older people and people with disabilities among preventable residential fire fatalities and prioritise needs, we analysed the rate and underlying causes of such fatalities within these two groups. The following is a list of objectives to accomplish the main goal of this study.

1. Create a profile of preventable residential fire fatalities and develop a projection of future fire fatalities.
2. Examine the underlying factors that led to fire fatalities among community care clients.
3. Make recommendations for how community care organisations, in partnership with the MFB, can assist their clients in increasing fire safety.

This chapter describes the approaches and methods that were used to conduct this study and achieve these three objectives.

3.1 Analysis of Fire Fatality Data

This section explains the process that was used to collect fire fatality data, the reason certain data were of interest, and how those data were analysed. The purpose of the analysis was to identify the number of fire fatalities among older people and people with disabilities in Melbourne between the financial years 2000 and 2010, in addition to identifying high-risk factors that contributed to the causes of the fires or fatalities. This section also discusses the process used to form projections of future fire fatalities. Following is a list of research questions that this study aimed to answer, mainly through the quantitative analysis discussed in this section.

1. What is the relative risk of older people and people with disabilities becoming a preventable residential fire fatality?
2. What are the high-risk factors for older people and people with disabilities?
3. How many fire fatalities related to older people and people with disabilities can be expected in the next 20 years?

3.1.1 Data Collection and Creating a Database

To collect the data needed for the quantitative analysis, we reviewed information from the Fire Investigation and Analysis (FIA) database. The FIA database is created by the MFB and records every fire fatality within the Metropolitan Fire District (MFD). It contains demographic information about the victim(s), in addition to a detailed report about the circumstances of the fire. We used the FIA database to identify all preventable residential fire fatalities that occurred within the MFD between the financial years 2000 and 2010. A *preventable* fire fatality was defined as any fire that was started accidentally. This

classification was explicitly stated in the FIA reports for each fire. A fire was classified as *residential* if the location specified in the FIA database was a residential address. After reviewing the FIA database we identified 62 preventable residential fire fatalities. The corresponding detailed FIA reports from each incident provided information about fire and victim characteristics, and were also analysed in order to identify if age or disability was a factor in the fatality. We also examined the reports for evidence that might indicate if a victim was a community care client for use in the case study portion of this study. This involved examining the body of the report, fire-call history, related pictures, interviews, and appendices that might indicate some type of disability or age related illness. Following is a list of all information, factors, and variables of interest that we aimed to obtain for each fire fatality using the FIA reports. It was broken down into nine key sections.

1. ID numbers: The two ID numbers used to organise all fire fatality incidents were the call number assigned by the FIA database and a separate ID number assigned by this study.
2. Date: Information on the date included the day, month, and year, in addition to the day of the week and the time of day. This was of interest in looking for patterns in when fire fatalities occurred.
3. Demographics: This included basic demographic information such as age, gender, location, and Cultural and Linguistic Diversity (CALD) status. This information was important for developing a profile of all preventable residential fire victims, and was used to find relative risk for different groups.
4. Victim Characteristics: This included whether the fire fatality victim had some form of disability, chronic illness, or harmful behaviour. Our interest in this information was in identifying possible high-risk factors among these characteristics.
5. Accommodations: This included the type of housing, type of ownership, and whether or not the victim was living alone, which were all variables of interest in creating a profile of fire fatality victims and identifying high-risk factors.
6. Smoke Alarms: Information related to smoke alarms included if a smoke alarm was present, the number and location(s) of the alarm(s), and whether or not an alarm was known to be in working condition at the time of the fire. This type of information was of interest in exploring the possible importance of smoke alarm maintenance and smoke alarm location in preventing fire fatalities among this population. We were also interested in learning whether the location of working smoke alarms would have made a difference in preventing the fatality.
7. Fire Related Details: This section included information on the cause of the fire, room of origin, confinement of the fire, and whether or not egress points were locked or blocked. Our interest in this information was in identifying possible high-risk factors among these variables.
8. Details of the Fatality: This includes information on the cause of death, location of the body, and what the victim's behaviour was during the fire. This information was used to determine what key factors may have led to the fatality.
9. Community Care Information: Determining if fire fatality victims were community care clients was important in the selection of case studies that will be used to identify

common features or possible gaps in the service and provide advice on how to prevent a similar fatality from happening in the future.

To organise and store all the data that were collected, we created a collective database that contains records of all preventable residential fire fatalities that were found. Through collecting and analysing these data, we encountered many challenges that limited the usefulness of the data in some ways. The first limitation was incomplete information. While detailed information was desired, we did not find relevant information for each fire fatality incident. Specifically, determining which victims were community care clients proved to be challenging, as not all clients were identified. The relatively small number of fire fatalities compounded this problem. We found 62 preventable residential fire fatalities that occurred between financial years 2000 and 2010 within the Metropolitan Fire District (MFD). With such a small population size, it was difficult to draw statistically significant conclusions about the population, and even more difficult to draw conclusions about subsets of the population. To combat these problems, every effort was made to ensure completeness of our database.

3.1.2 Creating a Profile of Preventable Residential Fire Fatalities

Once we had a working version of our database, we began to build a profile of preventable residential fire fatalities. This profile contains four main parts: relative risk of the different demographics of the fatalities, a breakdown of characteristics of the fatalities, high-risk factors, and possible reasons that may have led to the findings.

The first step in building this profile was breaking down the fatalities by demographic information, such as age and gender, and calculating the relative risk of each group. Relative risk is the number of times as likely a person within a certain demographic is to experience a given event as the average person. For the purpose of this study, relative risk was calculated as the ratio of the percentage that a certain demographic represented in all fire fatalities to the percentage it represented in the population of Victoria, as given by the 2006 census data provided by the Australian Bureau of Statistics. This allowed us to identify the high-risk groups among the population. Two assumptions were made to perform this calculation. One of these is that the demographic percentages for the MFD are approximated by the demographic percentages of Victoria. The other assumption is that the 2006 census data are approximately the average for the ten-year period we examined.

The second step was to break down the different characteristics of the fire fatality such as the room of origin and the cause of the fire. By doing so we identified the most common features of these fatalities. The next step was to use the information gained by breaking down the demographics and characteristics to identify the high-risk factors that led to preventable residential fire fatalities. The final step was to identify likely reasons for each high-risk factor. We had two purposes in building this profile, the first of which was to identify fire fatalities which would make suitable case studies. We wanted cases that would allow us to examine the greatest number of high-risk factors. The second purpose of this profile was to help create recommendations; by examining the risk factors in the profile we could identify areas in need of attention.

3.1.3 Projections of Future Fire Fatalities among Older People

In order to predict the number of preventable residential fire fatalities among older people, we created 20-year projections of future fire fatalities for people aged 65 and over. To create these projections, we used population estimates from the ABS and our calculated relative risk to estimate the percentage of fire fatalities that people aged 65 and over will make up each year, for the next 20 years. This percentage of all fire fatalities is calculated by multiplying relative risk by the percentage of people aged 65 and older as estimated for each year by the ABS.

One limitation in this projection is the calculation of relative risk for people aged 65 and over. Limitations and assumptions regarding our calculation of relative risk are discussed in Section 3.1.2. Another assumption is that the relative risk for the 65-plus age bracket will remain equal over the next 20 years to the risk measured in our study. This is unlikely to be true, as there are a variety of factors that can affect relative risk. In general, increasing fire safety measures, better fire-safe technology, and the new mandate for fire-safe cigarettes may lower this relative risk. In contrast, an increasing number of older people and an increasing age in their homes and home appliances can increase the risk of fire. The number of older people is also predicted to increase, which may have implications on the capacity of community care organisations to deliver services and may also result in an increased risk of fire fatalities. Overall, the variability of relative risk is difficult to estimate and is one limitation of this projection.

Another limitation is in the accuracy of ABS demographic projections. It should be noted that estimates on the ageing demographics for Victoria vary by source. Population estimates used in this projection were from an ABS report entitled *Projected population, components of change and summary statistics - Australia, state/territory, capital city/balance of state, 2006–2101*. This report cites several assumptions and limitations and also produces three separate series of estimates with their own set of assumptions. Our projections used Series A population estimates, as these were the most conservative in predicting growth in the proportion of people aged 65 and older. Another limitation that is incurred by the use of ABS data is that the population projections are for Victoria, while the fire fatality data and relative risk are restricted to the MFD. The major assumption here is that the proportion of the population aged 65 and older is the same for Victoria compared to MFD, and that future estimates of the proportion of older people for Victoria are also the same for the MFD.

3.2 Detailed Examination of Specific Fire Fatality Incidents

In addition to analysing the fire fatality data quantitatively, we studied specific representative fire fatalities in order to further identify the reasons behind them and to determine opportunities for the community care sector to help prevent fires and fatalities involving similar factors in the future. We used our database and profile of fatalities involving older people and people with disabilities to find specific fire fatality events of interest. We looked for specific incidents illustrating significant risk factors to study in detail, attempting to find at least one that fell into each general category of the cause of fire or other

common features. In all cases, the case files studied were representative of the categories we selected them from to highlight specific fire risk issues.

When studying the cause of a fire, we looked deeper to see the underlying factors behind it. The advantage of this in-depth approach was that it did not categorise the causes of fire as in the statistical analyses, which suppressed many details of each incident that were important to understand when creating our recommendations. For example, the detail that the victim placed combustible items on or near heaters is lost when the fire is simply categorised as being caused by a heating appliance. Using this approach, we were able to view several incidents in detail, which was very beneficial in terms of fully understanding the cause of the fire and nature of the fatality. We then used our understanding of each case to construct stories that illustrate particular risk factors and significant behaviours, which also serve as examples of opportunities for life-saving interventions.

A qualitative approach such as this provides the advantage of telling a story that can reveal specific information on what could have been done to prevent such an incident. By looking at the underlying causes of fires and the fatalities they cause with respect to the disabilities of the community care clients we studied, we aimed to determine whether there were any opportunities to help prevent these fatalities. This information was combined with findings from the quantitative analysis and was then used to make general recommendations about how to prevent these types of fires and their resulting fatalities based on common warning signs uncovered in this phase.

Given the in-depth nature of such an approach, we could only perform a modest number of case studies. The case studies are not entirely representative of the larger group of all fire fatalities studied and may not illustrate every risk factor identified in the quantitative analysis. We did our best to address these concerns by selecting cases that represented the most common risk factors.

3.3 Creating Recommendations

When compiling our recommendations, which may be utilised by the community care sector, we sought to determine solutions that could assist the community care sector in reducing the risk of fire fatality for their clients. In order to create these recommendations, information was combined and synthesised from statistical analyses of fire fatality data and qualitative information gathered from case studies. The high-risk factors were mostly obtained through the statistical analyses and are used as the basis for the recommendations. We considered the following questions for each high-risk factor:

- Could this risk factor reasonably be alleviated or addressed by the community care sector? If so, how?
- What actions might ease the burden of community care workers in providing fire protection services?

Sources of information included previous studies and knowledge of the MFB's Community Ageing Strategist, Julie Harris. Drawing on the detailed case studies, we

identified ways in which the community care sector might assist its clients to reduce their fire risk. In developing our recommendations, we kept in mind the constraints and challenges faced by the community care sector.

4 RESULTS AND ANALYSIS

This chapter presents the major findings of this study based on data drawn from the 62 preventable residential fire fatalities that occurred within the MFD between the financial years 2000 and 2010. In an effort to create a profile of fire fatality victims, this study examined the relative risk and high-risk factors for specific demographic groups. Specific high-risk factors and fire safety challenges faced by older people and people with disabilities were also of key interest. The results from this analysis, along with the most probable reasons for the findings, are presented in this chapter. Finally, the potential growth of fire fatalities among older people over the next twenty years is projected.

4.1 Overrepresentation of Older People and People with Disabilities

Older people were overrepresented in preventable residential fire fatalities. Of the 62 fire fatalities studied, 50% (n=31) of the fatalities involved people aged 65 and older. Figure 2 shows the percentage of each age group in all fire fatalities. Based on these data and 2006 Australian Census information, people 65 and older were found to be almost four times as likely to perish in a fire as the general population. This is seen in Figure 3, where relative risk of fire fatality is shown for each age group.

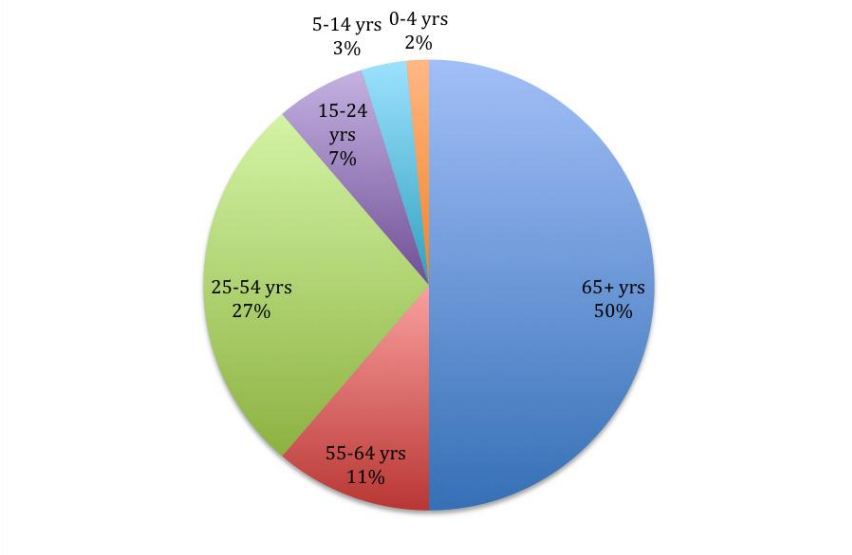

Figure 2: Fire Fatalities in the MFD, by Age Group, financial year 2000-2010

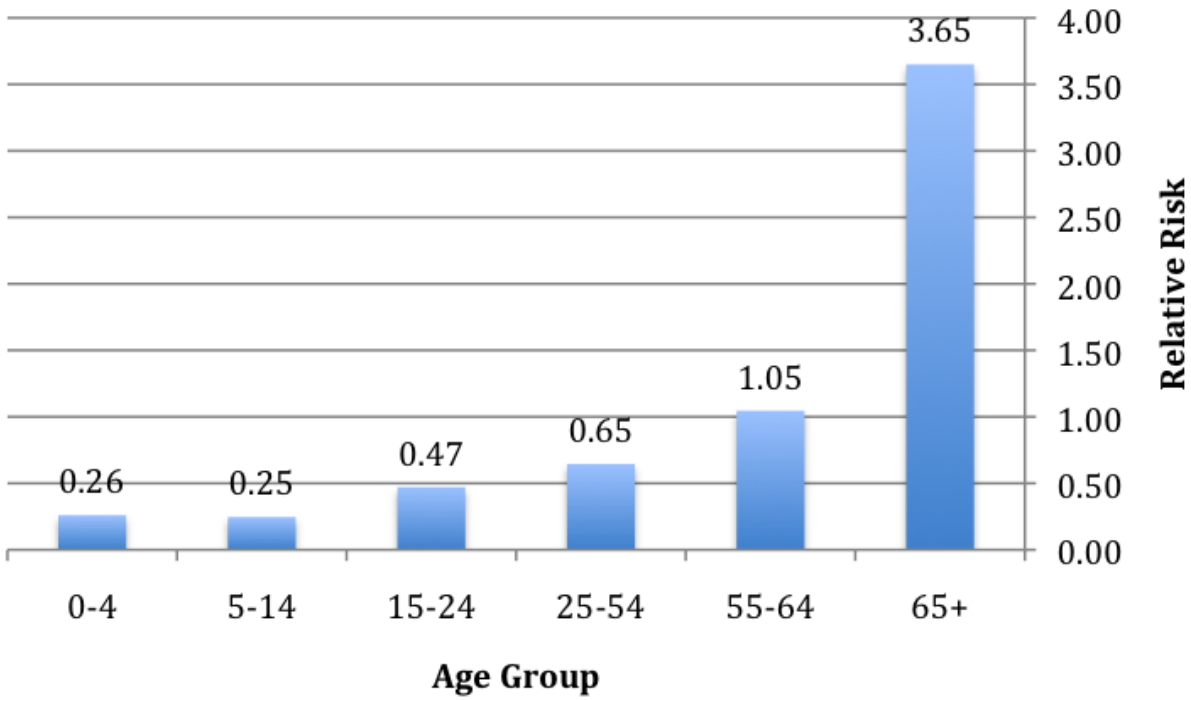

Figure 3: Relative Risk of Fire Fatality in the MFD, by Age Group, financial year 2000-2010

This level of overrepresentation among people aged 65 and older was higher than findings in other studies. Most relevant for comparison is the AFAC report that found the relative risk of people aged 65 and older to be about 2.0 for Victoria from 1997 to 2003, which is considerably less than the relative risk of 3.7 found in this study. This may have been the case for several reasons, including that the relative risk of older people may have increased over recent years or may have been higher in the MFD compared to all of Victoria.

Age related disabilities make it more difficult to escape a fire and decrease one's ability to be alerted to the emergency, which may have contributed to the overrepresentation of older people in fatalities. Of the 31 fatalities aged 65 and older, at least 32% (n=10) were affected by limited mobility.

Disabilities such as limited mobility or mental health contributed to the risk of fire fatality. Of all fatalities, 29% (n=18) were people with a known disability. Based on these data and 2005 Community Care Coalition information, people with a disability were found to be over four times as likely to perish in a fire as the general population. At least 22% (n=14) of fatalities studied were people with limited mobility, at least 8% (n=5) of the fatalities were people with a mental health disability, and one victim was Deaf and mute. In two cases, the victim had more than one of the listed disabilities.

These data have some limitations, primarily with the difficulty involved in identifying those with disabilities. The data were limited by the sources used, as there may have been cases in which a disability was not evident in the FIA report. Data from the Coronial reports for each case would have provided more comprehensive information, which may have aided the identification of people with a disability.

4.2 Risk Factors

Most fire fatalities occurred between 8:00 p.m. and 8:00 a.m. Of all fatalities, 69% (n=38) occurred between these hours, as shown in Figure 4. This means that people were over twice as likely to perish in a night-time fire as a daytime fire. This increased amount of fatal fires at night has been well documented by a number of international studies. Most relevant for comparison is the AFAC report that studied all preventable residential fires in Victoria from 1997 to 2003, and reported that 70% of fires occurred between 8:00 p.m. and 8:00 a.m., which is nearly identical to the findings of this study (AFAC, 2005).

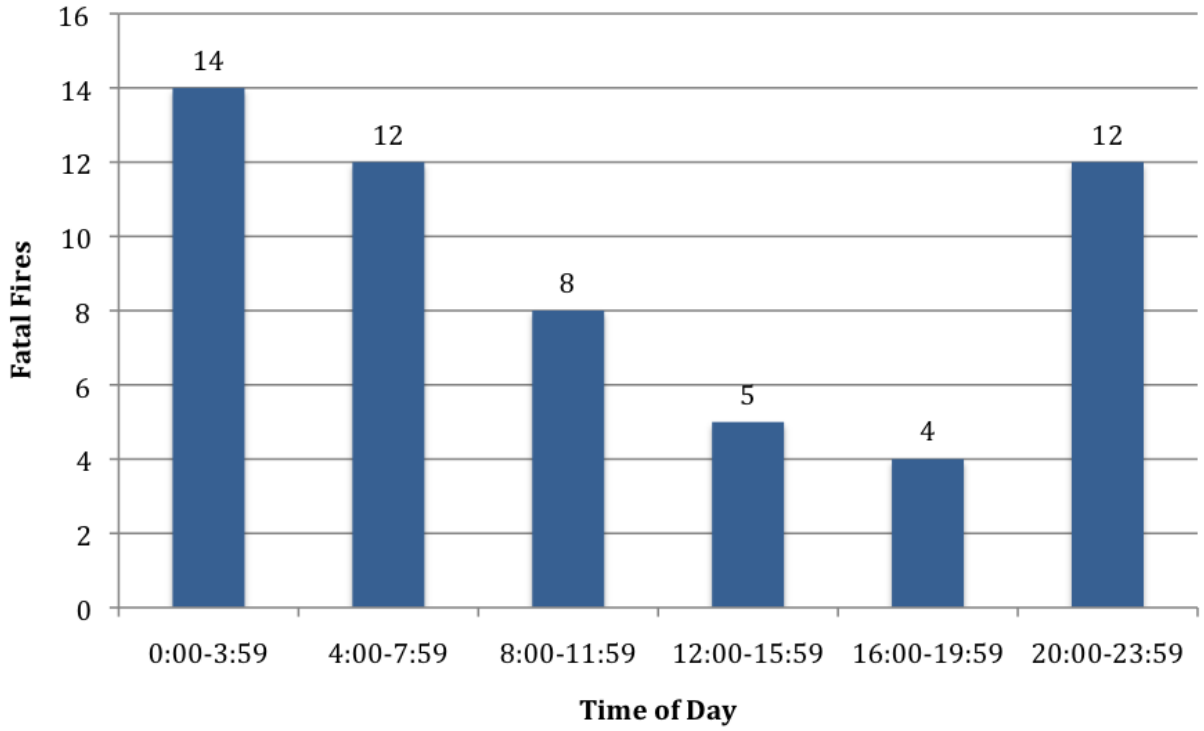

Figure 4: Number of Fatal Fires in the MFD, by Time of Day, financial year 2000-2010

The limitation to these data was that the time of day was not identified for 11% (n=7) of the fatalities. These unidentified cases could have a small effect on the results for this analysis. In addition, the FIA reports identify the time of the fire emergency call, and for the purposes of this analysis it was assumed to be the time of the fire.

Most fire fatality victims lived alone. Of the 57 cases for which occupancy information was available, 63% (n=36) of the victims had lived alone. Based on these data and 2006 Australian Census information, people who live alone were found to be approximately seven times as likely to perish in a fire as the general population. Additionally, the Australian Bureau of Statistics predicts that the percentage of people living alone in Australia will increase from 9% in 2001 to between 12% and 15% in 2026.

An individual who lived alone may have benefitted from another resident's aid during the fire, as evidenced in several cases where the individuals were unable to escape or were not awoken. In some cases where victims were living alone, emergency services were

contacted by neighbours, rather than the individual in the house. When emergency services arrived, the victim was usually either unconscious or already deceased.

High-risk behaviours such as hoarding, smoking, and drinking were exhibited by 32 fire fatality victims. In 19% (n=12) of the fatalities studied, the victims were known to be hoarders. Based on estimates of the prevalence of hoarding, it is predicted that hoarders are between 4.8 and 9.0 times as likely to be a fire fatality as the general population. At least 35% (n=22) of the victims were smokers, which suggests that smokers were about twice as likely to perish in a fire as the general population. At least 8% (n=5) of the fatalities in which alcohol may have been a contributing factor were found. There are several likely reasons why each of these behaviours was found to be a high-risk factor for the victims.

Hoarding was a contributing factor to the fatalities of 12 victims because it restricted egress from the home and created an excess of flammable materials. Of the fatal fires in hoarding households, at least 42% (n=5) of the victims tried to escape. Additionally, only 83% (n=10) of these fires were not contained to the room of origin. For all 62 fatalities, 53% (n=33) were not contained, suggesting that hoarding increases the risk of a larger fire, which may also increase the risk of fatality. In many of the other hoarding cases, the fire spread rapidly and consumed much, if not all, of the house. Hoarding may also pose a greater fire risk to older people, as 67% (n=8) of the hoarding fatalities were among people aged 65 years or older.

Smoking and alcohol use also were implicated in several fire fatalities. Smoking materials were high-risk when not properly extinguished or disposed of. This finding was limited by the ability to identify smokers through evidence in the FIA reports. Alcohol use can also be high-risk because it impairs judgment and mobility, which limits the victim's reaction in the case of a fire. Overall, 52% (n=32) of the victims were identified as hoarders, smokers, or drinkers, while 24 % (n=15) of the victims exhibited at least two of the high-risk behaviours listed, which may have been contributing factors to the fire fatality.

Smoking materials were the leading cause of preventable residential fire fatalities. The most common cause of fire fatalities was discarded smoking materials, which led to 34% (n=21) of the fatalities, as shown in Figure 5. For the purposes of this study, the fires were categorised into seven general causes, based on the cause given in the FIA report. There was one incident in which the cause was undeterminable. This percentage of fatalities caused by discarded smoking materials is notably higher than that found in an AFAC study, which reported 18% of fatalities as being caused by smoking materials (AFAC, 2005). Figure 5 shows the percentage of fatalities for each cause of fire.

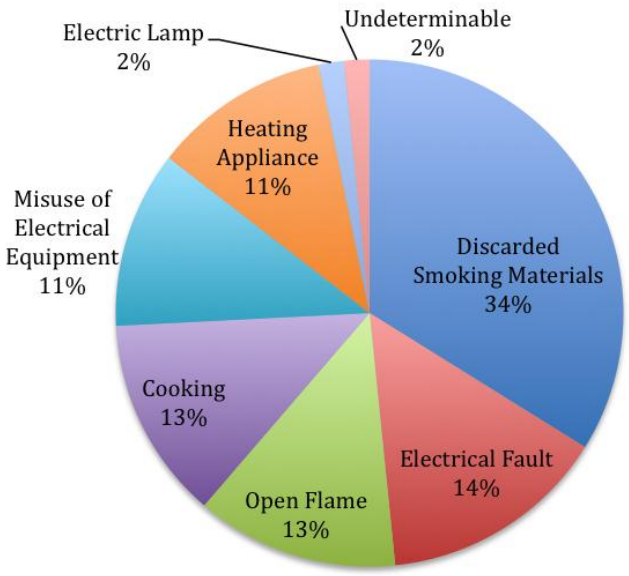

Figure 5: Percentages of All Fire Fatalities in the MFD, by Cause of Fire, financial year 2000-2010

The main limitation on these data was identifying the exact details of the cause of a fire. Fire causes were identified by the most probable cause in the FIA reports based on available evidence to the fire investigators.

Nearly half of fatal fires started in the bedroom. The FIA reports include a judgment on where the fire started which was categorised into a room of origin for this study. These data showed that 46% (n=28) of fatal fires started in a bedroom. Figure 6 shows the percentages of fatalities, broken down by room of origin.

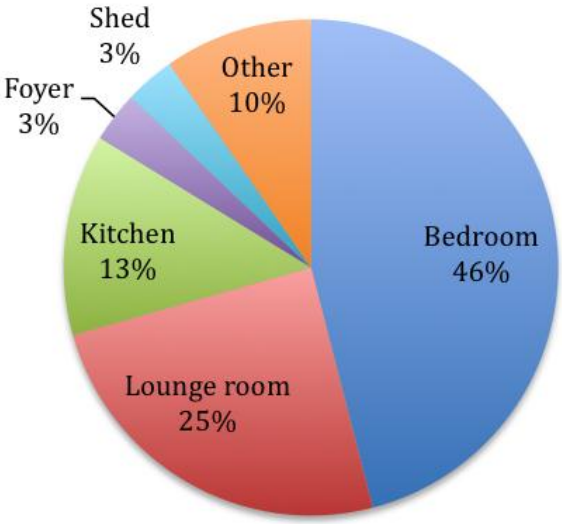

Figure 6: Percentages of All Fire Fatalities in the MFD, by Room of Origin, financial year 2000-2010

One limitation of these data was in the ability to determine the room of origin of the fire. While the FIA reports were able to obtain the room of origin for most cases, there was one incident that was undeterminable.

Most fire fatality incidents did not have a working smoke alarm. Of all fatality incidents, 28 of 62 did not have a smoke alarm present, and an additional eight had a smoke alarm that was not in working order. Thus, 58% (n=36) of fatalities occurred in homes with a non-existent or non-functioning smoke alarm. This finding is similar to results of other studies, previously discussed in Section 2.2.2. Figure 7 shows the percentages of fire fatalities broken down by the status of the smoke alarm in each incident.

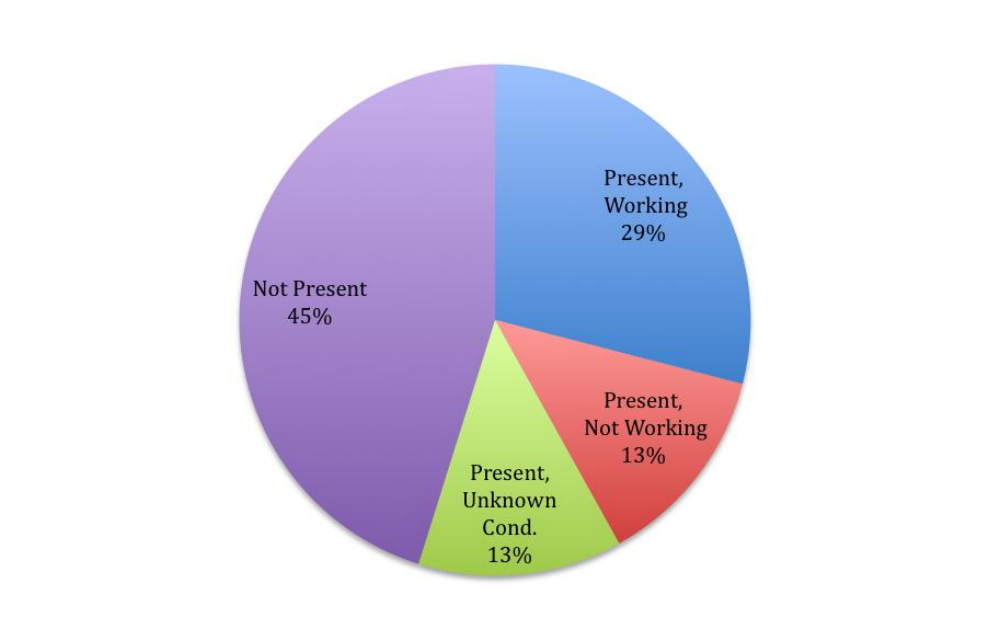

Figure 7: Percentages of All Fire Fatalities in the MFD, by Smoke Alarm Status, financial year 2000-2010

A limitation on these data is that in 13% (n=8) of the cases, the status of the smoke alarm was either unstated in the FIA report or undeterminable due to fire damage. It is also difficult to determine the exact reasons as to why many people did not have a working smoke alarm.

4.3 Projection of Fire Fatalities

Fire fatalities among older people are projected to increase over the next 20 years. People aged 65 and over made up about 50% of all preventable residential fire fatalities in the MFD between the financial years 2000 and 2010. As previously mentioned, the relative risk for people aged 65 and older was found to be 3.7 during this time frame. Assuming this relative risk stays constant over the next twenty years, the percentage of fire fatalities among older people is estimated to increase to 62% by 2021 and 73% by 2031. This is influenced by the increasing percentage that people aged 65 and over are predicted to make up in the population, as estimated by the ABS and other sources. Figure 8 shows the estimated

percentage that people aged 65 and over will make up of all preventable residential fire fatalities over the next twenty years, within the MFD.

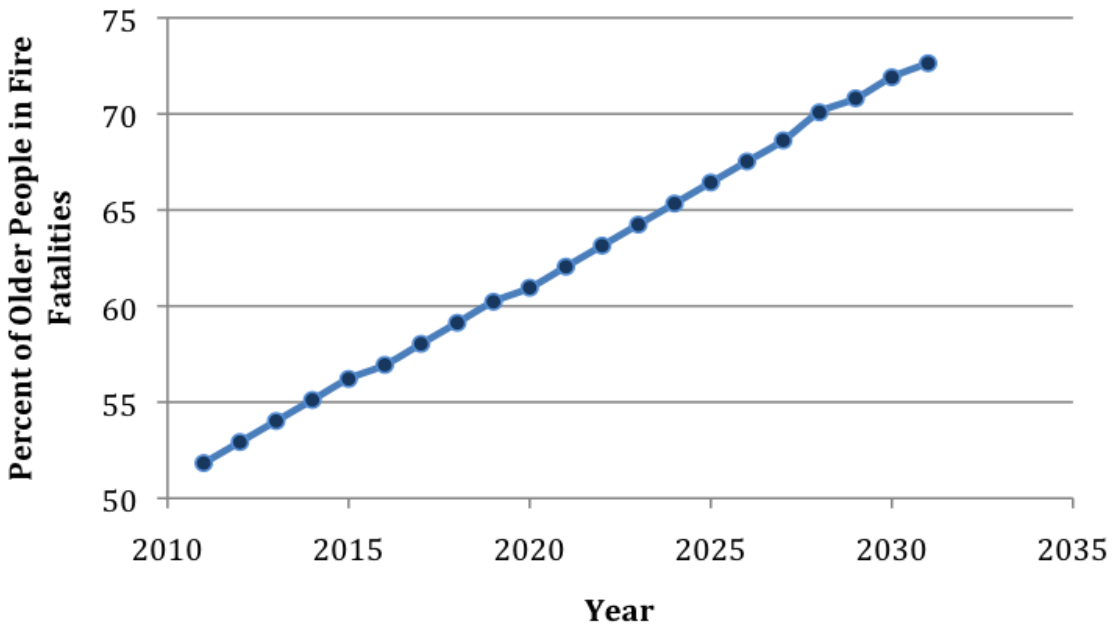

Figure 8: Twenty Year Projections of the Estimated Percentage of Fire Fatalities among People 65 and Older, based on data found within the MFD, financial year 2000-2010

The accuracy of this projection is limited by the population estimates from the ABS and several other factors previously discussed in Section 3.1.3. This projection uses the most conservative estimates by the ABS of the growth of the number of people aged 65 and older. The assumption that relative risk will remain constant for such a long period of time is unlikely, and presents a major limitation for this projection. There are several factors such as the introduction of fire-safe cigarettes, ageing homes and home appliances, the increasing number of older people, and better fire-safe technology that can have a positive or negative effect on relative risk.

5 PREVENTABLE FIRE FATALITY CASE STUDIES

This chapter will review in detail six fire fatality incidents that involved community care clients. Each case explores one or more high-risk factors identified by this study, and then considers how the risk of fire or fatality might have been reduced. By identifying actions that could be taken to potentially prevent the fatality in these cases, it may be possible to reduce the risk of fire fatality for future community care clients that are in similar situations as the six described in this chapter.

In an effort to ensure anonymity, several precautions were taken. The specific date of each incident is not revealed. All six of these incidents have occurred within the last 5 years: one event was in 2006, one was in 2008, two were in 2009, and two were in 2010. The exact age of each victim is also obscured by providing a five-year age range. The locations of the victims' homes and other identifying information of the victims were also suppressed. Additionally, any evidence appearing in quotations has been taken directly from the corresponding FIA report.

CASE 1: Risks of Smoking without Smoke Alarms

Summary

The victim was an elderly female who lived alone on the ground floor flat of a two-storey block. She "appeared to be a compulsive smoker" and had limited mobility, using handrails and various walking aids throughout the house and an extension arm grabber in her bedroom. Her home was well kept, as "most rooms within the unit were generally tidy, with normal quantities of personal effects, furniture, papers, books and clothing throughout." She was a long-standing HACC client through the local government, receiving regular help at home at least once per week.

The fire began late at night, with the Metropolitan Fire Brigade receiving the call at 11:06 p.m. The victim was smoking while watching TV from a chair in her bedroom when she presumably fell asleep and dropped her cigarette, which started the fire when it came into contact with either her nightwear or the chair she was sitting on. No smoke alarm sounded, as the only one in the unit was in a kitchen drawer with the battery removed. She was found deceased in her bedroom by fire fighters at 11:22 p.m.

Conclusions

Two major issues are highlighted in this fatality. The major concern is that no functioning smoke alarms were found in the residence. Smoke alarms have been mandated for all Victorian homes, units, flats, and townhouses since 1997 (MFB, 2009). The local government has responsibility for compliance in relation to this law. A working smoke alarm is vital in all homes for early warning of a fire, but critical in the homes of people who have reduced mobility. Information contained in the report, including photography, clearly identify that the fire was contained to the room of origin. Early notification of the fire in her bedroom by a working smoke alarm may have increased the potential of the victim escaping the fire.

A smoke alarm, which was found in the kitchen drawer, may have been removed due to false alarming. While the type of alarm was unknown in this case, photoelectric smoke alarms, which the AFAC now recommends, are less likely to false alarm as often as their ionisation counterparts. Additionally, they are more efficient at detecting slow, smouldering fires than ionisation smoke alarms. According to the fire investigators, "the fire scene indicated a long duration smouldering fire." Ionisation smoke alarms do not detect such fires very well due to the lack of smoke, whereas photoelectric alarms have proven much more effective at detecting such fires.

Additionally, the victim was a smoker. Fire investigators found "a small dish containing cigarette butts and used matches" on top of a "small round sided table" in the bedroom. The position of the MFB is that ashtrays should be large and high-sided and that they should be on sturdy non-combustible surfaces, which was not the case here. Additionally, cigarette butts should be extinguished with water to minimise risk of fire.

Demographics

Age:	70-74
Gender:	Female
CALD/Indigenous:	No
Disability:	Limited Mobility
Chronic Illnesses / Conditions:	None
High-Risk Traits:	Smoker

Environment

Residence:	Lower level flat of double storey block; 2 bedrooms; brick walls and concrete ceiling
Aids or Equipment:	Hand rails, walking aids, extension arm grabber, walking frame
Living Alone:	Yes
Smoke Alarm(s):	Found in kitchen drawer with battery removed
Fire Suppression Equipment:	None
Details of Care:	Long-time HACC client, received in-home care at least once per week

Fire Details

Time of Call:	11:57 p.m.
Cause of Fire:	Discarded smoking materials
Room of Origin:	Bedroom
Confinement of Fire:	Confined to room of origin
Status of Egress Points:	Doors were locked
Behaviour During Fire:	Limited reaction; probably asleep when fire started
Details of Fatality:	Died of smoke inhalation/burns in main bedroom

CASE 2: Risks of Social Isolation

Summary

This victim was a very elderly female with limited mobility and various medical complications. She used a walking frame to get around her house and had a Safety Link personal alarm. She was described as "fiercely independent," living by herself and having no close friends or family that could be contacted as she had lost her sister and husband several years before and had a limited knowledge of English. She was a client of Royal District Nursing Service (RDNS), though it is unknown whether she received in-home care.

Late in the afternoon, the victim was preparing the evening meal, which consisted of a stuffed chicken and vegetables. After positioning her walking frame near the open oven, presumably to place the chicken inside, the front of her clothing made contact with the oven, igniting her clothing. This would have happened very easily given the fact that the oven was on the maximum setting. She responded by making a distress call to Safety Link at 4:22 p.m., which contacted the RDNS "in accordance with their protocols." Four minutes later, the RDNS dispatched a nurse, though it took the nurse nearly half an hour to reach the residence due to traffic. Such calls to the RDNS are prescribed to take a half hour or less.

When the nurse arrived at the victim's residence, he could hear the smoke alarm sounding. He discovered the door was locked, and therefore had to force entry. When he found the victim, she was sitting in a chair in the kitchen with her clothes completely burned off and her legs on fire. After extinguishing her legs with some water, he alerted emergency services at 4:49 p.m. The MFB arrived three minutes later, and the victim was transported to the hospital. She passed away at 10:10 a.m. the next day from the burns she had sustained in the fire.

Conclusions

Due to this victim's isolation from others, the only contact she had to respond to her Safety Link alarm was the RDNS service, which can take up to half an hour to respond given the fact that they are not equipped to handle such situations. This fire fatality demonstrates the need to explore and identify other options than having service providers as emergency contacts for personal alarm services. Isolated older persons, such as the victim in this case, should have contacts who can reach them within a few minutes, rather than relying on a service whose responsibilities do not normally include responding to such calls.

Additionally, it must be stressed that '000' should be the first option if possible to be contacted in emergency situations, such as a fire, rather than personal alarms.

Demographics

Age:	85+
Gender:	Female
CALD/Indigenous:	Yes
Disability:	Limited Mobility
Chronic Illnesses / Conditions:	“Medical Complications”
High-Risk Traits:	“Fiercely Independent”

Environment

Residence:	Single-level unit
Aids or Equipment:	Walking frame, Safety Link personal alarm
Living Alone:	Yes
Smoke Alarm(s):	Yes, functional
Fire Suppression Equipment:	None
Details of Care:	RDNS client, possibly other in-home services

Fire Details

Time of Call:	4:52 p.m.
Cause of Fire:	Clothing coming into contact with electric oven while cooking dinner
Room of Origin:	Kitchen
Confinement of Fire:	Confined to room of origin
Status of Egress Points:	Doors were locked
Behaviour During Fire:	Activated personal alarm, sat in a chair in the kitchen awaiting assistance
Details of Fatality:	Died of burns the next day at the hospital

CASE 3: Risks to Smokers and Living Alone with Disability

Summary

The victim in this case was a middle-aged man who lived alone on the ground floor of a double storey residential unit. He used a walking frame due to his limited mobility, and was known to be a heavy drinker and smoker, evident from the ashtrays he used, one of them being a large seashell. He also used a dosette box in his bedroom, which suggests that he was on several medications and required the box to help him manage them. He was under case management and a client of Mental Health Services.

The victim's unit was clean and well kept, though there was evidence of previous fires. Decorative covers on the stovetops were severely burnt, suggesting he had left the stove burners on in the past. Ten months prior, the MFB was required to attend a fire in his home that started when discarded smoking materials came into contact with a cushion. Due to the previous fires and other risk factors, the victim had been identified as a fire risk; however, there was no evidence of any specific action to address this risk.

It appears the victim was smoking on his sofa when discarded smoking materials came into contact with a cushion, starting the fire. Since there was no evidence of an emergency response, it is likely the victim was asleep at the time. At 5:19 a.m., the MFB was called by one of the victim's neighbours when they heard his smoke alarm sounding. The victim was later found deceased, still in a sitting position on the burnt sofa.

Conclusions

This incident was classified as an accidental fire, and studying the event reveals several things that could be done to potentially reduce the risk of fire or risk of fatality of similar incidents in the future. On the basis of evidence of previous fires, including one attended by the MFB, there was an increased risk of fire in this home. While it is clear that the victim was previously identified as a fire risk, there is no evidence of any specific action that was taken to reduce the risk. Safer ashtrays, such as ones that are heavy and high sided or sealed containers, could have been promoted, purchased, and implemented in this case with regular reinforcement. This can potentially reduce the risk of fires caused by discarded smoking materials, which is the most common cause of fire found by this study and was also judged to be the cause of this fatal fire. Additionally, the service providers were in a position to emphasise and advocate in relation to this risk and monitor the use of appropriate receptacles for cigarette butts. Given the condition of the deceased and evidence of previous fires, it may have been beneficial to install a portable sprinkler system in places that were most commonly used for smoking.

Demographics

Age:	40-44
Gender:	Male
CALD/Indigenous:	No
Disability:	Limited mobility
Chronic Illnesses / Conditions:	Mental health issues
High-Risk Traits:	Smoker and drinker

Environment

Residence:	Unit on the ground floor of a double story residential unit
Aids or Equipment:	Walking frame, dosette box
Living Alone:	Yes
Smoke Alarm(s):	Yes, known to be working and found in the hallway
Fire Suppression Equipment:	None
Details of Care:	Mental Health Services

Fire Details

Time of Call:	5:19 a.m.
Cause of Fire:	Discarded smoking materials
Room of Origin:	Lounge
Confinement of Fire:	Confined to room or origin
Status of Egress Points:	Unknown
Behaviour During Fire:	Limited reaction, probably asleep
Details of Fatality:	Found in sitting position on burnt sofa

CASE 4: Risks of Living Alone Without a Smoke Alarm

Summary

This victim was an older woman who lived alone in a three-bedroom single-storey house, which she kept in a clean and manageable state. She received assistance in the form of Meals on Wheels from the local council.

Sometime while preparing breakfast, the victim inadvertently started the fire while lighting a match she intended to use to light her gas stove. It appears the match broke and came into contact with her clothing, causing her to get up from the stool she was sitting on to try to put it out at her kitchen sink. She then appeared to have got into bed in an effort to extinguish or smother the fire, as there were burnt remains of hair and material found on multiple beds in different bedrooms. She also appeared to have grabbed an artificial plant in the process, which had a key underneath it that was untouched. The MFB was notified of the incident at 11:58 a.m., when a Meals on Wheels Volunteer found her, conscious but burnt and having trouble breathing, in a closed veranda at the rear of the house. Besides some burnt material, no fire damage was found in the house. No smoke alarm was found in the home.

Conclusions

This incident highlights several issues that, if addressed, could help reduce the risk of similar fatal fires in the future. While there were no known disabilities, illnesses, or high-risk behaviours of the deceased, she did live alone, which has been found to make an individual 7.1 times as likely to be a fire fatality compared to the general population. In addition, there were no smoke alarms found on the premises. Smoke alarms are mandated in Victoria, with local government identified as the agency with responsibilities related to compliance. A working smoke alarm, which might have been activated as a result of burning clothing worn by the individual, could then have potentially alerted the neighbours. This scenario is a good example of how smoke alarms can be very beneficial outside of alerting the occupants of the home to the emergency. In this specific case, emergency services were not notified until the victim was found by a Meals on Wheels Volunteer. It appeared as though the shock and/or panic of the victim inhibited her from calling emergency services, and shows how a smoke alarm could have helped if there was a neighbour nearby. In addition, this case suggests the importance of dialling ‘000’. If emergency services were notified early, it may have increased the victim’s chances of surviving this fire.

Demographics

Age:	85-89
Gender:	Female
CALD/Indigenous:	No
Disability:	None found
Chronic Illnesses / Conditions:	None known
High-Risk Traits:	None

Environment

Residence:	Single storey brick residence
Aids or Equipment:	None
Living Alone:	Yes
Smoke Alarm(s):	None
Fire Suppression Equipment:	None
Details of Care:	Meals on Wheels Client

Fire Details

Time of Call:	11:58 a.m.
Cause of Fire:	Open Flame
Room of Origin:	Kitchen
Confinement of Fire:	Confined to deceased
Status of Egress Points:	Front door secure, rear door open
Behaviour During Fire:	Appeared to have panicked, went around the home and in beds
Details of Fatality:	Died later of burns and smoke inhalation

CASE 5: Risks of Smoking in Bed

Summary

The victim in this case was a middle-aged Indigenous woman who sustained significant injuries affecting her mobility from a car accident long before the fire. As a result of these disabilities, she lived in purpose-built housing, which had been designed and constructed to provide residential conditions to cater to her needs. She had in-home care for seven hours each day, which was funded by the Transport Accident Commission (TAC). The victim used several wheelchairs to get around, including several manual and one purpose designed motorised wheelchair, which was non-operational at the time of the fire. The house was a single level, four-bedroom, brick residence. It did not have a residential sprinkler system, but did have at least one operational smoke alarm. The victim was a heavy smoker who rolled her own cigarettes. Cigarette burns on the carpets and furniture throughout the house not related to the fire clearly identify there was a history of previous smoking-related incidents.

Around 5:00 a.m., the victim was smoking in bed when a cigarette or other smoking material landed on her mattress and ignited it. She managed to escape from her bedroom, though the nearest wheelchair was four meters away in the adjoining bathroom. She managed to evacuate to the front door without the use of a wheelchair, only to find it locked, and was then overcome by smoke. When the MFB arrived on scene, they provided CPR until the ambulance crew arrived and deemed her deceased.

Conclusions

This case has several features that could be examined in order to find ways to lower the risk of similar incidents occurring in the future. There had been burn marks from improperly discarded smoking materials found throughout the house prior to the fire. Promoting, purchasing, and advocating the use of safer receptacles for cigarettes would have reinforced the need for safer smoking practises and practical solutions.

The victim was also known to smoke in her bedroom while in bed, which, in terms of her mobility, placed her in a high-risk scenario. A photoelectric smoke alarm in the bedroom of this home may have alerted the victim to the emergency and maximised her opportunity to escape or call for assistance. Additionally, fire retardant bedding and a mattress could have limited the potential of discarded smoking materials igniting a fire.

The deceased attempted to self-evacuate, however was overcome by smoke at the locked front door. A key message of the MFB and fire services nationally is the issue of fire safety versus security. Locked doors account for a significant proportion of fire fatalities where the occupant has been unable to safely escape the home in a fire. If the front door had a single action handle, which unlocks and opens by just turning the inside handle, then the deceased may have been able evacuate the house. A mobility aid kept close to her bed in case of emergencies may have given her the means to evacuate the room to a safe exit and safely escape.

Demographics

Age:	35-39
Gender:	Female
CALD/Indigenous:	Yes
Disability:	Limited Mobility
Chronic Illnesses / Conditions:	None
High-Risk Traits:	Smoker

Environment

Residence:	Single level, four-bedroom, brick residence
Aids or Equipment:	Motorised purpose designed wheel chair, manual type chairs, other motion movement aids, bed controlled by motor, and vital call pager
Living Alone:	Yes
Smoke Alarm(s):	2 smoke alarms outside bedrooms, one confirmed functional, the other too damaged to determine
Fire Suppression Equipment:	None
Details of Care:	Received 7-hour of care each day funded by TAC

Fire Details

Time of Call:	5:30 a.m.
Cause of Fire:	Discarded smoking materials
Room of Origin:	Bedroom
Confinement of Fire:	Confined to room of origin
Status of Egress Points:	Doors were locked
Behaviour During Fire:	Attempted to self-evacuate
Details of Fatality:	Died of smoke inhalation by the front door

CASE 6: Risks of Refusing Fire Safety Advice and the Installation of a Working Smoke Alarm

Summary

This victim was an older woman who was confined to her bed by her inability to self-ambulate, and was also Deaf and mute. She was a long-standing community care client who received daily care. Her service provider conducted two external evaluations related to her capacity to understand risk, which identified no cognitive impairment. As a result, she was deemed capable of making her own decisions, so when she refused to install a smoke alarm, which was suggested due to her heavy smoking habits, the care service had no choice but to accede to her decision. She lived in the first floor bedroom of her double-storey residence and refused to move to the ground floor, despite her restricted mobility.

At approximately 9:00 p.m. the deceased was smoking in her bed when smoking materials came into contact with and ignited her mattress. Unable to evacuate or call for help, she perished in the violent fire, which went unnoticed by neighbours for several minutes. Eventually, a neighbour called ‘000’ when the windows in the victim's room were blown out. The MFB responded, and when the fire was doused, they found that her first floor bedroom had collapsed into the kitchen, where she was found.

Conclusions

In this case, what could have been done was limited by the unwillingness of the deceased to address her own fire safety, but it raises concerns on the installation of smoke alarms in general. In addition to increased risk of the care recipient, it also brings up the issue of occupational health and safety standards for care workers, and exposure for the service provider agencies involved. While smoke alarms are already mandated in Victoria, cases like this highlight the need for the community care sector to ensure this standard is met. In this instance, a smoke alarm linked to a personal alarm and/or a smoke alarm for people who are Deaf may have provided the opportunity for the occupant to escape the room of the fire or alerted the neighbours to the presence of a fire in the home. People who are Deaf may be eligible for a government subsidy for specific smoke alarms (see Appendix B for details).

This fire was started by smoking materials igniting a bed; fire retardant bedding and mattress could have prevented this ignition. In addition, placing high-sided ashtrays or sealed containers, as recommended by the MFB, would have provided places to properly discard smoking materials.

Demographics

Age:	70-74
Gender:	Female
CALD/Indigenous:	No
Disability:	Bedridden, Deaf, mute
Chronic Illnesses / Conditions:	None
High-Risk Traits:	Smoker

Environment

Residence:	Two storey brick veneer dwelling
Aids or Equipment:	None evident
Living Alone:	Yes
Smoke Alarm(s):	Deceased refused to have them installed
Fire Suppression Equipment:	None
Details of Care:	Received daily care funded by CACPs

Fire Details

Time of Call:	5:30 a.m.
Cause of Fire:	Discarded smoking materials
Room of Origin:	Bedroom
Confinement of Fire:	Not confined to room of origin
Status of Egress Points:	Doors were locked
Behaviour During Fire:	Attempted to self-evacuate
Details of Fatality:	Died of smoke inhalation by the front door

6 CONCLUSIONS AND RECOMMENDATIONS

This study found that certain groups such as older people and people with disabilities were at an increased risk of fire fatality. Several common features and high-risk factors were also identified through quantitative analysis and a detailed study of specific fire incidents. We found that most fatal fires started at night and were in households where the occupant lived alone. A large portion of fatal fires were found to have started in the bedroom. Discarded smoking materials were the most common cause of all the fatal fires examined. Two behaviours that led to a greater risk of fatality were smoking and hoarding. If future risks remain consistent with this study fatalities are expected to increase, with older people making up an increasing proportion of fire fatalities. This chapter discusses our recommendations for several ways in which to reduce the risk for the vulnerable groups identified in this study.

Summary of Key Findings

Key findings from data in the 62 preventable residential fire fatalities found within the Metropolitan Fire District from financial years 2000 and 2010:

- Older people (65+) and people with disabilities had an increased risk of fire fatality, making up 66% (n=41) of all fatalities.
- People aged 65 and older were found to be 3.7 times as likely to be a fire fatality as the general population.
- Smoking materials were the leading cause of preventable residential fires, accounting for 34% (n=21) of fatalities.
- The most common room of origin in fatal fires was the bedroom, accounting for 46% (n=28) of fatalities.
- Most homes did not have working smoke alarms, with 58% (n=36) of fatalities occurring in homes with a non-existent or non-functioning smoke alarm.
- Most fire fatalities occurred at night, with 69% (n=38) of fatalities occurring between 8:00 p.m. and 8:00 a.m.
- 63% (n=36) of all fire fatality victims lived alone.
- In 19% (n=12) of fatalities studied, the victims were known to be hoarders.
- At least 35% (n=22) of the victims were smokers.
- The proportion of people aged 65 and older in fire fatalities is estimated to increase dramatically over the next 20 years.

6.1 Smoke Alarms

As most fatal fires occur at night, smoke alarms may aid in alerting the occupant to a fire emergency. While it is mandated by the state of Victoria to have a smoke alarm in every residential building, only 29% of fatal fires examined had a smoke alarm known to be in working condition. This finding stresses the need for the community care sector to help ensure its clients meet this state-wide fire safety standard. The following recommendations

on smoke alarms take into account certain high-risk groups but also apply to the general population.

Recommendation 1: We recommend that every home be fitted with a standalone photoelectric smoke alarm, with a 10-year long life battery.

Discarded smoking materials were the leading cause of fire fatalities. It was also noted that these types of fires commonly started as smouldering fires. Photoelectric smoke alarms have been found to activate significantly earlier for smouldering fires compared to ionisation smoke alarms. Furthermore, photoelectric smoke alarms are less likely to false alarm than the ionisation type. Reducing false alarms may be a key factor in ensuring each home has a working smoke alarm. Frustration with false alarming has led to occupants dismantling their alarms or removing the battery, which was seen in several cases examined in this study. It should be noted that the AFAC recommends photoelectric smoke alarms as the standard for similar reasons found by this study.

Using a 10-year long life standalone smoke alarm provides a less expensive alternative to hardwired alarms. Standalone smoke alarms do not require installation by an electrician which greatly reduces costs. They also reduce costs compared to conventional standalone smoke alarms as the cost of replacement batteries over ten years would exceed the cost of a 10-year long life alarm. In addition to reducing costs, they also reduce the amount of ongoing maintenance. Conventional alarms require a new battery every year, while 10-year alarms never need a replacement battery since the one battery lasts for the entire life of the smoke alarm. For these reasons 10-year long life standalone smoke alarms offer an affordable solution and also reduce the amount of future maintenance. For a list of possible photoelectric standalone 10-year long life smoke alarms and details about each, see Appendix B.

Recommendation 2: We recommend that every household have a smoke alarm in every bedroom that is used.

Of all fire fatalities, 46% occurred when the fire originated in a bedroom. Most fatal fires happened at night, which makes having a smoke alarm even more important as it may be the only means of awakening the occupant. It should be noted that in the United States, the National Fire Protection Association (NFPA) has required smoke alarms in bedrooms in new construction since 1993, and many states have mandated this code (NFPA, 2002).

Recommendation 3: We recommend the use of interconnected smoke alarms for some specific high-risk scenarios.

Smoke alarms can be interconnected through wires or wirelessly and can increase the odds of early fire detection. As this feature does increase the costs, we only recommend its use for clients identified as a higher fire risk. Interconnected smoke alarms can be especially useful for people who are living alone, as they increase the chances that the occupant will be alerted to the fire even if the fire is in a different location in the house.

Recommendation 4: We recommend that smoke alarm options, such as smoke alarms that can be controlled remotely and smoke alarms that are linked to personal medical alarms, be considered for clients on an individual basis.

People who lived alone were found to be over seven times as likely to be a fire fatality as the general population, which may be due to the increased difficulty in contacting emergency services. As evidenced by several cases, a person's inability to contact emergency services was a large factor in the resulting fatality. To combat this problem, we recommend the use of personal alarms and/or personal alarms linked to smoke alarms for people identified as in need of this extra assistance. Having a personal alarm means that the occupant can request assistance without finding a phone. The organisation that is notified can then contact the occupant, assess the situation, and call emergency services if warranted.

Recommendation 5: We recommend that, if it is possible for family, friends, and neighbours to install and maintain smoke alarms, they do so in order to lower the burden on the community care sector. In cases that this occurs, we also recommend that the community care provider work in conjunction with the MFB to provide knowledge on the proper installation and maintenance of smoke alarms.

We formed this recommendation to acknowledge the burdens of the community care sector and seek ways to install and maintain smoke alarms without increasing those burdens. At the same time we also wanted to ensure that whoever takes on this responsibility has the proper knowledge to do so. This could be accomplished by the MFB creating a brochure that details the recommended types, locations, and maintenance procedures for smoke alarms. This brochure can then be distributed by the community care sector when they assess a home.

6.2 Recommendations for Community Care Sector Workers

Installing smoke alarms in homes and individually assessing clients for high-risk behaviours that could lead to fire fatalities is beneficial, but taking these actions only go so far. Community care sector workers go into the homes of their clients and care for them on a regular basis, and therefore are in the best position to ensure that fire hazards in the home are properly addressed as recommended above. Care workers and their involvement in the homes of their clients are the point at which the community care sector has its opportunity to improve and preserve the fire safety of older people and people with disabilities.

Recommendation 6: We recommend that all community care workers receive the Basic Home Fire Safety Training Materials developed specifically for the community care sector and freely available via download from every fire services website, in order to better assist their clients' safety needs and properly address fire safety issues.

By utilising the Basic Home Fire Safety Training Materials, community care workers will be better able to promote fire safety as an integral part of their care. The Basic Home Fire Safety Training Materials are available to the sector with self-assessment or trainer assessment materials at no cost, and are based on advice developed specifically for the community care sector.

Additionally, for organisations that serve as case managers and broker the actual rendering of services to other providers, we recommend that service agreements with providers stipulate that their workers be required to go through the Basic Home Fire Safety

Training Materials. This way, all services indirectly provided by organisations through brokerage can be delivered by workers who have an increased awareness and understanding of basic home fire safety.

6.3 Individualised Risk Assessment

A key component in reducing fatal fires will be in identifying high-risk behaviours or factors that are known to increase the risk of fire fatalities. Given that all care clients receive an assessment prior to receiving services, we recommend that such assessments take notice of fire safety concerns. If one or more fire safety concerns are found during assessment, specific action should be taken to reduce the risk, or the MFB should be consulted. Specific things to look for include:

- Is the client a smoker?
- Is the client a hoarder?
- Is the client living alone?
- Is the client's mobility limited?
- Is there evidence of previous fires or burn marks?

In this section, we provide recommendations that respond to each of these risks.

6.3.1 Clients Who Are Smokers

Since smoking materials were the leading cause of fatal fires, clients who are smokers are at great risk and warrant special attention. Important things to note in a client's home are the disposal methods, such as ashtrays, and the room in which the client most commonly smokes.

Recommendation 7: We recommend that all rooms in which the client smokes contain a heavy, high-sided ashtray or closed container for disposal of smoking materials, placed on a stable, non-combustible surface.

Proper ashtrays are important in the homes of smokers due to the fact that improperly disposed smoking materials were the leading cause of preventable residential fatal fires between the financial years 2000 and 2010. Several cases involved smokers who would extinguish cigarettes using inadequate ashtrays. Such practises are dangerous and directly led to fatal fires. We support the AFAC's position that heavy, high-sided ashtrays or sealed containers be used to extinguish cigarettes.

Such ashtrays are more difficult to accidentally knock over and start a fire. These ashtrays should be placed on a sturdy, non-combustible surface so that the surface they are on cannot easily be knocked over or catch fire if the ashtray is knocked over.

Recommendation 8: We recommend that all rooms in which the client smokes be fitted with a photoelectric smoke alarm, which is more easily able to detect low-burning, smouldering fires, such as those started by smoking materials.

Smoke alarms are important to have in the home, but are most effective in the rooms in which people smoke. Smouldering fires caused by improperly discarded smoking materials are not easy to detect, and if they go unnoticed, can easily be fatal since in many cases they started on or near the victim while they were sleeping. Photoelectric alarms have been shown to detect these types of fires more effectively, and should be placed in the same room so that the person has the earliest warning possible that a fire has started.

Recommendation 9: If the client smokes in bed, we recommend the use of flame retardant bed sheets and/or a flame retardant mattress.

There were several cases in which the fire started in the victim's bed from discarded smoking materials, usually because the victim fell asleep. Therefore, flame retardant bed sheets and/or a flame retardant mattress would help to reduce the risk of fire fatality in such situations.

6.3.2 Clients Who Are Hoarders

Hoarding can greatly increase the spread of fire and limit egress. As such, clients who are hoarders warrant special attention.

Recommendation 10: In hoarding households, we recommend that the care provider follow the recommendations given by the MFB which are listed below (see Appendix D for details):

- Install smoke alarms and test them
- Unblock exits
- Widen internal pathways
- Check that utilities are connected
- Prioritise removing clutter from around cooking area and stove tops
- Ensure clutter is removed from around heaters and electrical items and discourage the use of open flame

The materials collected by hoarders typically cause a home to have a substantial fire load, which may make hoarding fires more dangerous. In order to combat this risk, prevention and preparedness are essential. Removing clutter from ignition sources such cooking or heating appliances will help to prevent fire from occurring. To prepare the home for a fire, installing smoke alarms throughout the house can potentially increase the time the client has to respond to a fire. In addition, the narrow paths created when collectibles pile up throughout a hoarding household restrict egress, especially if the person is older or has any kind of mobility impairment. Therefore, having wide pathways and unblocked exits can assist in egress in the event of a fire in a hoarding household.

6.3.3 Clients Who Live Alone

As living alone can greatly increase the risk of fire fatality, there are several precautions that should be taken.

Recommendation 11: For older clients who live alone, we recommend the use of a personal medical alarm that allows the client to call an agency if help is needed.

These alarms are often linked to a two-way transponder that will allow the agency to communicate with the client. Through this communication the agency can ascertain the client's situation and attempt to calm and talk the client through the emergency. However, we recommend in cases where a personal medical alarm is given to the client, that community care services work in conjunction with the MFB to ensure the client understands the importance of dialling '000' rather than using the alarm in a life-threatening emergency. This is due to the fact that emergency services do not respond to these alarms and will only be notified when the monitoring agency has determined the situation requires the assistance of emergency service workers. This means that there might be a several minute delay in the notification of the emergency services, and these minutes are crucial to survival in many life-threatening emergencies.

Recommendation 12: If the client uses a personal medical alarm, we recommend that they not list a community care service as their emergency contact, but rather multiple neighbours or family members, who can attend to and assess the emergency much faster.

The response time for care services to a personal medical alarm ranges from five to thirty minutes. During this time, the care service attempts to contact the occupant by telephone in order to assess the situation. If contact with the occupant cannot be made, the agency must wait until a contact has arrived on site to confirm whether or not the situation requires assistance by emergency services. This time gap can be detrimental to the client's chance of survival. Given this limitation, we recommend that all contacts be within a five-minute travel time of the client's home.

6.3.4 Clients Who Have Limited Mobility

Limited mobility can greatly increase the risk of fire fatality as it limits the person's ability to escape the fire.

Recommendation 13: If the client has limited mobility, we recommend that walking aids or wheelchairs be left near their bed each night so that the client is able to escape in case of emergency.

In some cases, the client's mobility aid was a considerable distance from their bed, which may have hindered their escape. In addition, reducing the time it takes to escape can minimise the amount of injury from fire or smoke and improve the chances of survival.

Recommendation 14: If the client has limited mobility, we recommend that the client have a bedroom on the ground floor. The community care service should advocate for this switch, should it need to be made.

A bedroom on the ground floor will eliminate level changes from evacuation routes in the homes of people with limited mobility. Changing levels can be a difficult process for those who have limited mobility.

6.3.5 Clients in Households that Show Evidence of Previous Fires or Burns

When assessing a client's home, workers should look for evidence of previous fires or burns on furniture, bedding, appliances, or elsewhere. If any evidence is found, steps should be taken to ensure that these are avoided in the future.

Recommendation 15: We recommend that the community care sector work in conjunction with the MFB to educate clients who have started fires previously on the dangers related to their high-risk behaviour and proper safety methods to avoid the same happening again.

While clients have the right to choose their own lifestyle, community care service workers can lower their clients' risk by informing them of the dangers of their lifestyle. We recommend the community care service contacts the MFB, or similar fire services, and have them inform the client about the risks of their choices and potential ways to lower their risk without greatly interfering in their life.

Recommendation 16: In a household where burns from previous fires are detected in combination with other risk factors, we recommend the installation of a sprinkler system or a portable sprinkler in rooms where the fire risk is high for the client.

Having a sprinkler system installed greatly reduces the risk of a fire causing a fatality. Due to high costs, this recommendation is limited to cases where the client has exhibited several high-risk factors, and/or when evidence of burn marks or previous fires has been found.

6.4 Recommendations for FIA Reports

Through the course of this study we have used the MFB's FIA reports as the source of all fire fatality data. In these reports, we noticed some inconsistencies and a lack of certain information that could be very useful in gaining a better understanding of fire incidents. In an effort to help maintain consistency and ensure the inclusion of all relevant information, we made a checklist of items to potentially use during the fire investigation process. We hope that this checklist can be used to obtain a more comprehensive view of fire fatalities for the benefit of future researchers. This checklist can be found in Appendix C.

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APPENDIX A: DATABASE OF PREVENTABLE RESIDENTIAL FIRE FATALITIES

ID Numbers			Date & Time			Demographics		
ID#	Call No		Time	Year		Age	Gender	CALD
1	1525		22:06	1999		70-74	Male	
2	1974			1999		80-84	Male	
3	1499		1:15	1999		10-14	Female	
4	4391		13:33	2000		0-4	Female	
5	4958		20:10	2000		75-79	Female	
6	6060			2000		70-74	Male	
7	3734		20:52	2000		85+	Female	
8	5035			2000		85+	Male	
9	0065		14:26	2000		75-79	Male	
10	6154		6:08	2000		50-54	Male	
11	4305		8:25	2001		20-25	Male	
12	2026		4:24	2001		61-64	Female	
13	2202		12:11	2001		55-59	Male	
14	2168		2:09	2001		50-54	Male	
15	0109		11:43	2002		65-69	Female	Yes
16	1303		6:43	2002		70-74	Female	No
17	6387		23:57	2002		35-39	Male	No
18	5738		16:00	2002		40-44	Male	No
19	0833		22:02	2003		35-39	Male	No
20	0002		1:18	2003		61-64	Female	
21	4820		6:04	2004		70-74	Female	No
22	0237		11:20	2004		75-79	Female	No
23	3572		22:21	2004		55-59	Male	No
24	3572		22:21	2004		50-54	Male	No
25	1115		4:15	2004		85+	Male	No
26	0331		16:54	2004		80-84	Male	Yes
27	5944		5:42	2004		65-69	Male	No
28	4352		20:41	2005		70-74	Male	No
29	3179		8:12	2005		50-54	Female	

ID#	Call No		Time	Year		Age	Gender	CALD
30	0000		6:46	2005		80-84	Female	No
31	1441		6:31	2005		5-9	Male	No
32	4506		0:49	2005		80-84	Male	No
33	0386		14:52	2006		50-54	Male	No
34	0760		16:52	2006		85+	Female	No
35	0912		10:23	2006		45-49	Male	No
36	0028		5:22	2006		35-39	Female	No
37	0028		5:22	2006		15-19	Female	No
38	3573		1:09	2006		75-79	Male	No
39	3910		0:46	2007		30-34	Male	No
40	4784		15:06	2009		65-69	Male	No
41	5162		2:04	2008		80-84	Male	No
42	5085		2:10	2001		61-64	Male	No
43	8438		3:52	2008		50-54	Male	No
44	0117		2:37	2008		50-54	Male	No
45	0702		0:44	2004		20-25	Male	Yes
46	0702		0:44	2007		20-25	Male	Yes
47	0702		0:44	2004		30-34	Male	Yes
48	6661		21:37	2010		70-74	Female	No
49	4486		16:55	2005		80-84	Male	No
50	2492		11:40	2009		50-54	Female	Yes
51	0352		3:26	2002		55-59	Male	Yes
52	1816		23:06	2009		70-74	Female	No
53	8140		11:52	2009		70-74	Female	No
54	5158		20:31	2010		80-84	Male	No
55	3495			2002		75-79	Female	No

ID#	Call No		Time	Year		Age	Gender	CALD
56	3155		5:30	2000		35-39	Female	Yes
57	6768			2007		70-74	Male	No
58	3455		22:22	2009		85+	Female	No
59	8762			2009		70-74	Female	No
60	6330		11:58	2010		85+	Female	No
61	7059		5:37	2010		40-44	Male	No
62	5365			2010		55-59	Male	No

ID Numbers			Victim Characteristics		
ID#	Call No		Disability	Chronic Illness and/or Condition	High-Risk Behaviours
1	1525		Limited Mobility		"Smoker and Drinker"
2	1974				
3	1499				
4	4391				
5	4958				
6	6060		Mobility Issues	Poor Health	Drinker
7	3734			Hoarder	
8	5035				
9	0065		Limited Mobility		Smoker
10	6154				Smoker
11	4305				Smoker
12	2026				
13	2202				Drinker
14	2168			Hoarder	
15	0109				
16	1303			Hoarder	
17	6387				Smoker
18	5738		Limited Mobility	Alcoholic	Smoker and Drug Dependency
19	0833				
20	0002				
21	4820		Limited Mobility	Hoarder	
22	0237			Hoarder	
23	3572				Smoker and Drinker
24	3572				Smoker and Drinker
25	1115			Hoarder	
26	0331			History of Severe Heart, Renal, and Asthmatic Illnesses	
27	5944		Limited Mobility		Smoker and Drinker
28	4352		Mental Health		
29	3179			Respiratory Conditions	Smoker
30	0000		Limited Mobility		
31	1441		Intellectual Disability		Fascination with Fire

ID#	Call No		Disability	Chronic Illness and/or Condition	High-Risk Behaviours
32	4506		Limited Mobility	Respiratory Conditions	Smoker and Drinker
33	0386			Hoarder	Drinker
34	0760		Limited Mobility	"Medical Complications"	Fiercely Independent
35	0912				Smoker and Drinker
36	0028				
37	0028				
38	3573			Hoarder	Smoker
39	3910				
40	4784				
41	5162			Hoarder	
42	5085		Mental Health	Alcoholic, Hoarder	Heavy Smoker
43	8438			Hoarder	Smoker and Drinker
44	0117				Smoker and Drinker
45	0702				Misuse of Power Boards
46	0702				Misuse of Power Boards
47	0702				Misuse of Power Boards
48	6661		Bedridden, Deaf , and Mute		Smoker
49	4486		Limited Mobility	Medical Complications	Misuse of Power Boards
50	2492				
51	0352				
52	1816		Limited Mobility		Smoker
53	8140				Misuse of Power Boards
54	5158				
55	3495				Heavy Smoker

ID#	Call No		Disability	Chronic Illness and/or Condition	High-Risk Behaviours
56	3155		Limited Mobility		Smoker
57	6768			Alcoholic, Hoarder	Antisocial
58	3455				
59	8762		Dementia		
60	6330				
61	7059		Limited Mobility and Mental Health		Smoker and Drinker
62	5365			Chronic Injury, Alcoholic, Depressed	Smoker

ID Numbers			Accommodations		
ID#	Call No		Living Alone	Aids or Equipment	Home Suppression Equipment
1	1525		Yes		
2	1974				
3	1499		No		
4	4391		No		
5	4958		Yes		
6	6060				
7	3734				None
8	5035				
9	0065		No		
10	6154		Yes		
11	4305		Yes		
12	2026		Yes		
13	2202		Yes		Dry Powder Extinguisher
14	2168		Yes		
15	0109		Yes		
16	1303		Yes		
17	6387		Yes		
18	5738		No		None
19	0833		No		Fire Extinguisher
20	0002		No		None
21	4820		Yes		
22	0237		No		
23	3572		No		
24	3572		No		
25	1115		Yes		
26	0331		No		
27	5944		Yes	Crutch and walker	Sprinklers
28	4352		Yes		None
29	3179		Yes	Companion 492 Oxygen Concentrator	
30	0000		Yes	2 walking frames one with wheels	

ID#	Call No		Living Alone	Aids or Equipment	Home Suppression Equipment
31	1441		No		
32	4506		Yes	Handrail in bathroom, cane	None
33	0386		No		
34	0760		Yes	Walking frame and "safety link"	None
35	0912		Yes		
36	0028		No		
37	0028		No		
38	3573		Yes		
39	3910		Yes		None
40	4784		Yes		None
41	5162		Yes		
42	5085		Yes	Handrail by toilet	
43	8438		Yes		None
44	0117		Yes		
45	0702		No		
46	0702		No		
47	0702		No		
48	6661		Yes		None
49	4486			Wheel chair, walking frame, nebuliser, and seat over toilet	None
50	2492		Yes		None
51	0352		No		
52	1816		Yes	Handrails, walking aids, extension arm grabber, and walking frame	
53	8140		Yes		None
54	5158		No		None
55	3495		Yes		

ID#	Call No		Living Alone	Aids or Equipment	Home Suppression Equipment
56	3155		Yes	Motorised purpose designed wheel chair, manual type chairs, other motion movement aids, bed controlled by motor, and vital call pager	
57	6768		Yes		
58	3455		No		
59	8762		No	Stove knobs disarmed	
60	6330		Yes		
61	7059		Yes	Walking frame and medicine dispenser	None
62	5365		Yes		

ID Numbers			Smoke Alarms		
ID#	Call No		Present	Working?	Condition
1	1525		No	NA	NA
2	1974		No	NA	NA
3	1499		No	NA	NA
4	4391		Yes		
5	4958		Yes	Yes	
6	6060		Yes	Yes	
7	3734		No	NA	NA
8	5035		No	NA	NA
9	0065		Yes	No	Battery removed
10	6154		Yes	No	Found in packet
11	4305		Yes	Yes	Possibly attached via double-sided tape
12	2026		Yes	Yes	Working
13	2202		Yes	No	Battery removed
14	2168		No	NA	NA
15	0109		No	NA	NA
16	1303		No	NA	NA
17	6387		No	NA	NA
18	5738		Yes		
19	0833		No	NA	NA
20	0002		Yes	No	No, Dismantled on fridge
21	4820		Yes	No	Battery removed
22	0237		Yes		
23	3572		No	NA	NA
24	3572		No	NA	NA
25	1115		No	NA	NA
26	0331		Yes		
27	5944		Yes	Yes	Working
28	4352		Yes	Yes	Working
29	3179		Yes	Yes	Working
30	0000		Yes	No	Battery removed
31	1441		Yes	Yes	Working

ID#	Call No		Present	Working?	Condition
32	4506		Yes	Yes	Working
33	0386		Yes		
34	0760		Yes	Yes	Working
35	0912		No	NA	NA
36	0028		Yes	Yes	1 had no batteries
37	0028		Yes	Yes	1 had no batteries
38	3573		No	NA	NA
39	3910		No	NA	NA
40	4784		Yes	Yes	Working
41	5162		No	NA	NA
42	5085		Yes		
43	8438		No	NA	NA
44	0117		No	NA	NA
45	0702		No	NA	NA
46	0702		No	NA	NA
47	0702		No	NA	NA
48	6661		No	NA	NA
49	4486		Yes	No	Battery removed
50	2492		No	NA	Na
51	0352		No	NA	NA
52	1816		Yes	No	No, In a drawer with no battery
53	8140		Yes		
54	5158		No	NA	NA
55	3495		Yes	Yes	Working

ID#	Call No		Present	Working?	Condition
56	3155		Yes	Yes	Working
57	6768		No	NA	NA
58	3455		Yes	Yes	Working
59	8762		Yes		
60	6330		No	NA	NA
61	7059		Yes	Yes	Working
62	5365		Yes	Yes	Working

ID Numbers			Fire Related Details		
ID#	Call No		Cause of Fire	Room of Origin	Confined
1	1525		Heating Appliance	Lounge Room	Yes
2	1974		Discarded Smoking Materials	Lounge Room	
3	1499		Heating Appliance	Lounge Room	No
4	4391		Open Flame	Bedroom	No
5	4958		Open Flame	Bedroom	Yes
6	6060		Heating Appliance	Bedroom	
7	3734		Electrical Fault	Roof Space	No
8	5035		Discarded Smoking Materials		
9	0065		Discarded Smoking Materials	Bedroom	Yes
10	6154		Discarded Smoking Materials	Bedroom	No
11	4305		Discarded Smoking Materials	Bedroom	Yes
12	2026		Heating Appliance	Bedroom	No
13	2202		Electrical Fault	Laundry Room	Yes
14	2168		Misuse of Electrical Equipment	Lounge Room	No
15	0109		Cooking	Kitchen	No
16	1303		Heating Appliance	Lounge Room	Yes
17	6387		Cooking	Kitchen	No
18	5738		Discarded Smoking Materials	Bedroom	No
19	0833		Misuse of Electrical Equipment	Bedroom	No
20	0002		Misuse of Electrical Equipment	Foyer	No
21	4820		Electrical Fault	Bedroom	No
22	0237		Misuse of Electrical Equipment	Bedroom	No
23	3572		Discarded Smoking Materials	Lounge Room	No
24	3572		Discarded Smoking Materials	Lounge Room	No
25	1115		Cooking	Kitchen	No
26	0331		Cooking	Veranda	No
27	5944		Discarded Smoking Materials	Bedroom	Yes
28	4352		Cooking	Kitchen	Yes
29	3179		Discarded Smoking Materials	Lounge Room	Yes
30	0000		Open Flame	Bedroom	Yes

ID#	Call No		Cause of Fire	Room of Origin	Confined
31	1441		Open Flame	Lounge Room	No
32	4506		Electric Lamp	Bedroom	No
33	0386		Heating Appliance	Bedroom	No
34	0760		Cooking	Kitchen	Yes
35	0912		Discarded Smoking Materials	Lounge Room	Yes
36	0028		Electrical Fault	Ceiling below their room	No
37	0028		Electrical Fault	Ceiling below their room	No
38	3573		Discarded Smoking Materials	Lounge Room	No
39	3910		Open Flame	Kitchen	No
40	4784		Cooking	Kitchen	Yes
41	5162		Open Flame	Bedroom	No
42	5085		Discarded Smoking Materials	Sunroom	Yes
43	8438		Discarded Smoking Materials	Bedroom	No
44	0117		Discarded Smoking Materials	Lounge Room	Yes
45	0702		Misuse of Electrical Equipment	Bedroom	No
46	0702		Misuse of Electrical Equipment	Bedroom	No
47	0702		Misuse of Electrical Equipment	Bedroom	No
48	6661		Discarded Smoking Materials	Bedroom	No
49	4486		Electrical Fault	Lounge Room	No
50	2492		Cooking	Shed	Yes
51	0352		Electrical Fault	Bedroom	No
52	1816		Discarded Smoking Materials	Bedroom	Yes
53	8140		Electrical Fault	Bedroom	Yes

ID#	Call No		Cause of Fire	Room of Origin	Confined
54	5158		Open Flame	Shed	Yes
55	3495		Discarded Smoking Materials	Lounge Room	
56	3155		Discarded Smoking Materials	Bedroom	No
57	6768		Electrical Fault	Bedroom	
58	3455		Heating Appliance	Foyer	Yes
59	8762		Undeterminable	Bedroom	
60	6330		Open Flame	Kitchen	Yes
61	7059		Discarded Smoking Materials	Lounge Room	Yes
62	5365		Discarded Smoking Materials	Bedroom	

ID Numbers			Details of the Fatality		
ID#	**Call No**		**Died in Fire**	**Behaviour During Fire**	**Location of Body**
1	1525		Yes	Limited reaction	Lounge Room
2	1974				
3	1499		Yes	Asleep	Bedroom
4	4391		No	Rescued by Firefighters	NA
5	4958		Yes	Tried to escape	Bedroom
6	6060		No	Possibly tried to escape	NA
7	3734		Yes		
8	5035				
9	0065		Yes		Bedroom
10	6154		Yes		Bedroom
11	4305		Yes		Bedroom
12	2026		Yes	Asleep	Kitchen
13	2202		Yes	Tried to extinguish fire with the extinguisher	Closet
14	2168		Yes	Tried to escape	Kitchen
15	0109		No		NA
16	1303		Yes	Awake at the time, possibly tried to escape	Kitchen
17	6387		Yes		Bedroom
18	5738		Yes	Tried to escape	Bedroom
19	0833		Yes	Safely escaped then returned to fight fire	Front Door
20	0002		Yes	Tried to escape	Front Door
21	4820		Yes	Tried to escape	Laundry Room
22	0237		Yes	Tried to fight fire	Kitchen
23	3572		Yes		Kitchen
24	3572		Yes		Kitchen
25	1115		Yes	Tried to put fire out with a container of water	Kitchen
26	0331		No	Tried to escape	NA
27	5944		No	Asleep	NA
28	4352		No	Tried to extinguish fire	NA
29	3179		No	Limited reaction	NA
30	0000		No		NA
31	1441		Yes	Escaped to safety and re-entered to watch fire	Bedroom

ID#	Call No		Died in Fire	Behaviour During Fire	Location of Body
32	4506		No		NA
33	0386		Yes	Tried to hide under bed	Bedroom
34	0760		No	Was on fire, waited for assistance	NA
35	0912		Yes	Found near the front door, possibly tried to escape	Front Door
36	0028		Yes		Bedroom
37	0028		Yes		Bedroom
38	3573		Yes		Lounge Room
39	3910		Yes	Tried to escape	Back Door
40	4784		Yes		Kitchen
41	5162		Yes	Tried to escape, could not get through bric-a-brac	Kitchen
42	5085		No		NA
43	8438		Yes	Safely escaped then returned to fight fire	Bedroom
44	0117		Yes	Tried to escape	Back Door
45	0702		Yes		Bedroom
46	0702		Yes		Bedroom
47	0702		Yes		Bedroom
48	6661		Yes	Limited reaction	Kitchen
49	4486		No	Limited reaction	NA
50	2492		Yes	Limited reaction	Shed
51	0352		Yes	Escaped and went back into the fire to try to save belongings	Bedroom
52	1816		Yes	Limited reaction	Bedroom
53	8140		Yes	Limited reaction	Lounge Room
54	5158		No	Extinguished fire himself and wait for assistance	NA
55	3495			Asleep	

ID#	Call No		Died in Fire	Behaviour During Fire	Location of Body
56	3155		Yes	Tried to escape	Front Door
57	6768		Yes	Asleep	Bedroom
58	3455		No	Trapped at door	NA
59	8762				
60	6330		Yes	Ran around the house	Bedroom
61	7059		Yes	Asleep	Lounge Room
62	5365		No		NA

ID Numbers			
ID#	**Call No**		**Community Care**
1	1525		
2	1974		
3	1499		
4	4391		
5	4958		
6	6060		
7	3734		
8	5035		
9	0065		
10	6154		
11	4305		
12	2026		
13	2202		
14	2168		
15	0109		
16	1303		
17	6387		
18	5738		
19	0833		
20	0002		
21	4820		
22	0237		
23	3572		
24	3572		
25	1115		
26	0331		
27	5944		DHS
28	4352		
29	3179		
30	0000		
31	1441		

ID#	Call No		Community Care
32	4506		
33	0386		Mooney Valley City Council Aged and Disability Services, HACC
34	0760		Royal District Nursing Service
35	0912		
36	0028		
37	0028		
38	3573		
39	3910		
40	4784		
41	5162		
42	5085		
43	8438		
44	0117		
45	0702		
46	0702		
47	0702		
48	6661		AccessCare Southern Bayside Community Options, CACPS, Daily in-Home
49	4486		
50	2492		
51	0352		
52	1816		Stonington City Council, HACC
53	8140		
54	5158		
55	3495		Maroondah City Council

ID#	Call No		Community Care
56	3155		Transport Accident Commission, Care and Compassion, 7 Hours Daily in-Home Care
57	6768		
58	3455		HACC
59	8762		
60	6330		Local council, HACC Meals on Wheels
61	7059		Mental Health Services
62	5365		DHS

APPENDIX B: SMOKE ALARMS

BROOKS, 10-YEAR LIFE PHOTOELECTRIC SMOKE ALARM

Model Number	EIPFS3105TYCH
Sensor	Photoelectric
Battery	Non-Removable 10-Year lithium battery
Warranty	5 Year Limited
Standards	AS3786, BS5446-1:2000, CE Approved, ActivFire afp 1692
Interconnected	Yes, up to 12
Price	$82.08

GUARDIAN, PHOTOELECTRIC SMOKE ALARM WITH LITHIUM BATTERY

Model Number	SD2LITH
Sensor	Photoelectric
Battery	Comes with 10-year lithium battery
Warranty	5 Year
Standards	AS3786–1993
Interconnected	No
Price	$29.70

ORCA SAFETYACE, 10-YEAR PHOTELECTRIC SMOKE ALARM

Model Number	OM588H-LL
Sensor	Photoelectric
Battery	Built in 10-year 9V lithium battery
Warranty	10 Year Limited
Standards	AS3786 (pending review)
Interconnected	No
Price	$29.10

BELLMAN VISIT SOLUTION PACK 2(FLASH SMOKE ALARM)

Model Number	BE 8012
Sensor	Photoelectric
Battery	9V
Warranty	2.5 Year Limited
Standards	
Interconnected	Yes
Price	$400.00

The state of Victoria provides a subsidy for the profoundly Deaf to receive a smoke alarm at a cost of only $50.00. The link below provides more information on this subsidy.

http://www.vicdeaf.com.au/content.asp?cid=30&t=smoke-alarm-subsidy

APPENDIX C: FIA CHECKLIST

Smoke Alarms ☐Present ☐None Present (skip section)

	Condition	Type	Location
Alarm 1	☐Working ☐Not working ☐Undeterminable	☐Ionisation ☐Photoelectric ☐ Undeterminable	
Alarm 2	☐Working ☐Not working ☐Undeterminable	☐Ionisation ☐Photoelectric ☐ Undeterminable	
Alarm 3	☐Working ☐Not working ☐Undeterminable	☐Ionisation ☐Photoelectric ☐ Undeterminable	
Alarm 4	☐Working ☐Not working ☐Undeterminable	☐Ionisation ☐Photoelectric ☐ Undeterminable	
Alarm 5	☐Working ☐Not working ☐Undeterminable	☐Ionisation ☐Photoelectric ☐ Undeterminable	

If there are more than 5 smoke alarms, write details here:

If smoke alarms were not in working order, what were the reason(s):

Aids and Equipment ☐Present ☐None Present (skip section)

Type	Description	Location

Common aids and equipment:

☐Wheel Chair

☐Walking Frame

☐Canes

☐Motorised Wheel Chair

☐Hand Rails

☐Extension Arm Grabber

☐Dosette Box

☐Other:

Other Questions

Was the occupant living alone _____

Was the occupant receiving community care _____

Was there evidence of smoking _____

Tenure of home _____

APPENDIX D: MFB RISK MANAGEMENT FOR HOARDING

What is 'hoarding'?

- Hoarding is a large accumulation of possessions which appear to have no apparent use or value
- It results in rooms no longer being able to be used for the purpose they were intended
- Hoarding is a progressive and chronic condition

People affected by hoarding may also experience a high level of isolation and reject offers of assistance as they fear this will result in removal of their possessions.

People who hoard do so for a variety of different reasons. The effects of hoarding can be apparent inside, outside the house or a combination of both.

Commonly hoarded items include personal papers, newspapers, clothing, furniture, appliances, household rubbish, animals and hard rubbish.

The fire risks

Fires in hoarding homes increase risk for the occupant, their neighbours and firefighters. MFB research has identified that people who hoard aged 50+ are at particular risk and account for 24% of all preventable fire deaths between 1999 and 2009

Hoarding increases the risk of fire because:

- Accumulation of possessions results in an abnormally high fuel load and greater opportunity for ignition
- Blocked exits and narrow internal pathways impede escape for the occupant and access for firefighters
- Non functional gas or electricity may result in unsafe practices for cooking and heating

MFB recommends that in the first instance, individuals or agencies assisting those affected by hoarding should:

- Install smoke alarms and test them
- Unblock exits
- Widen internal pathways
- Check utilities are connected
- Prioritise removing clutter from around cooking area and stove tops as 39% of fires in hoarding homes result from cooking
- Ensure clutter is removed from around heaters and electrical items and discourage the use of open flame as combined these factors account for 44 % of fires in hoarding homes

For further information please contact the Community Education Department on (03) 9665 4464 or commed@mfb.vic.gov.au
Information on general fire safety can be found at www.mfb.vic.gov.au and more specifically home fire safety at www.homefiresafety.com.au