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# The Development of a Performance Measurement Framework to Support the Office of Emergency Services Commissioner's Fire Safety Strategy



An Interactive Qualifying Project Report
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Degree of Bachelor of Science
by

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## Abstract

The purpose of this Interactive Qualifying Project was to develop a framework to identify measurable ways to assess the performance of fire prevention programs in Victoria. This report was presented to the Office of Emergency Services Commissioner with a methodology to develop a hierarchy of performance measures that can be applied to specific community education programs, as well as survey techniques to collect the necessary data.

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## Executive Summary

The objective of this project was to develop a performance measurement framework to support the Office of Emergency Services Commissioner's (OESC) fire safety strategy. The OESC is currently developing a program entitled "Fire Safety Victoria" in an attempt to coordinate the fire safety efforts of the Country Fire Authority (CFA), the Metropolitan Fire Brigade (MFB), and Department of Sustainability and Environment (DSE). According to Fire Safety Victoria, areas with similar risk should receive similar treatment. This treatment should be an effective mix of fire prevention and suppression techniques. The OESC has representatives from both the CFA and MFB working on the Fire Safety Victoria report in order to aid its implementation amongst the three fire agencies. The DSE is not under the jurisdiction of the Office of Emergency Services Commissioner and therefore does not need to comply with the standards that they set. However, the OESC is hoping that the DSE will comply with the model of fire cover in order to establish the same evaluation system for all three agencies.

Victoria's three fire agencies have different responsibilities and as a result have different fire protection methods. Each agency is in charge of different geographical areas in Victoria. These different areas also incorporate different populations, structures, ecosystems, etc. This leads to different fire risks throughout the State.

It is currently difficult to compare the performance of these agencies due to the discrepancies in evaluation techniques. Each agency has different methods of dealing with their respective risks. The MFB is responsible for all

of the metropolitan areas of Melbourne while the DSE is responsible for all of the state, national, and wilderness parks. The CFA is responsible for the remaining areas and often needs to work with the other brigades when they meet at their physical boundaries.

Part of the Fire Safety Victoria strategy concentrates on the need for a common evaluation technique for the public education programs delivered by Victoria's fire agencies. In the past, the focus was on evaluating the suppression efforts of the agencies. Although this was seen as the principle responsibility of the brigades, the focus is now shifting towards the evaluation of all provided services. However, unlike evaluating suppression, it is much more difficult to evaluate the qualitative results of a public education program. The CFA, MFB and DSE realise the importance of community education and are currently running programs and campaigns throughout the state. Each program has different goals and is targeted at different groups Personnel working in the community education departments of all three agencies were interviewed to determine how each agency evaluates their prevention programs. The project group researched methods of evaluating such programs with the aim of creating an extensive framework that could be used uniformly by all three fire agencies for a thorough evaluation of their community education programs.

A hierarchy was identified by fire officials in the CFA, MFB, and DSE, as well as the OESC, as an effective way of evaluating the success of prevention programs. A hierarchy is a series of ordered groupings of things within a system (Dictionary.com). The initial hierarchy that the group researched from Proving Public Fire Education Works had six levels: The data

with the most weight placed on it was anecdotal, followed by evidence of change in behaviour, then change in awareness, extent of program outreach, satisfaction and usage of program, and finally institutional change. However, after consulting with fire officials regarding the hierarchy and conducting further research into each level, a new four level hierarchy was created. The lowest two levels of the original hierarchy were too subjective to use in an evaluation seeking quantifiable output and were consequently removed. At the top of the final hierarchy were end results. This includes two forms of performance measurement that combine qualitative and quantitative data. The qualitative data, anecdotal information, gives first hand accounts from individuals involved in fire incidents that a community education program had an effect on their behaviour. The top level also includes quantitative fire incident data, such as injuries, deaths, damages due to fire, and number of fires per capita. This data helps establish trends that illustrate the ultimate goal of all fire protection efforts, which is to reduce the impact of fire on a community. The next level on the hierarchy is behavioural change. Changing behaviour is the main challenge that a fire education program faces. This is a measure of how the community has reacted to reduce its fire risk. An example of behavioural change is when a person receives a message concerning battery replacement in smoke alarms and then actually changes the batteries as instructed.

The level below behaviour is awareness. This aims at measuring if the community is aware of its fire risk and what can be done to reduce this risk. Although this does not necessarily measure if people follow through on these actions, awareness must be established before behaviour can be changed.

The lowest level of the hierarchy is extent of program outreach. This is a quantifiable measure such as the number of people attending a community fire education course or the number of fire safety brochures distributed. The combination of qualitative and quantitative data leads to a well-rounded measurement of the performance of fire agencies in delivering public education practices to the community.

After establishing a framework, the next step was to identify ways of collecting data for the hierarchy. The project group decided that a mix of three different types of surveys (post-incident interviews, ad-hoc surveys, and pre- and post-tests) would give the best evaluation for the given hierarchy. Post-incident interviews, which are collected directly after a fire incident, give anecdotal responses as well as insight into the behaviour that lead to the event. These surveys should be in the form of one-on-one interviews and must use open-ended questions. This is done to reduce the bias in the data by allowing the person involved in the incident to give details about how the incident occurred. This method is only effective if post-incident interviews are conducted after every fire event. All behaviours, whether correct or incorrect, must be recorded in order to establish trends over time.

Pre- and post-test are conducted before and after delivering public education programs. This method gains information on short-term changes in the awareness of the program participants. To measure behavioural changes, the post-tests should be conducted after a certain amount of time has passed. For example, in the case of a program aimed at changing one's battery semi-annually, it may take up to 6 months before proper behavioural analysis can be conducted. These types of surveys can only be used on people who have

either attended a community education program or have been involved in a fire incident.

To gain information about the rest of the population, ad hoc surveys can be used. Ad hoc surveys are delivered to the general public and should contain questions that target general fire safety knowledge to determine trends in overall community awareness as well as behaviour. The surveys should be administered regularly over specified intervals of time. They need to collect the same data using the same techniques each time in order to use the information to develop trends.

It was concluded from interviews with fire officials from the DSE, CFA, and MFB that our hierarchy could be an effective form of evaluation for their agencies because it combines qualitative and quantifiable data. In order for this evaluation technique to work correctly every element of the hierarchy must be implemented. Once implemented, the intended outcome of this project is a system of consistent standards and indicators in order to coordinate the efforts of the three agencies to provide the best possible fire prevention programs.

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# 1 Introduction

The Office of the Emergency Services Commissioner (OESC), a sub-department of Victoria's Department of Justice, is responsible for managing all of Victoria's emergency services. The OESC's responsibilities range from road accident rescue to hazardous waste management. However, one of the main risks that Victoria and the OESC face is fire damage and loss. "Australia is a dry and fire prone continent. The geographical location of Victoria, its vegetation, and a climate of mild winters followed by warm summers combine to produce one of the most severe fire environments in the world ("Using Fire to Manage Our Parks and Forests" 1)". Previously, the focus of fire fighting techniques has been on suppression. However, fire prevention services have seen an increase over the past decade (Rhodes Personal Interview). After years of allocating resources into fire education programs, it is now important to determine if these programs are effective. To alleviate these concerns, the Victorian Government created the "Fire Safety Victoria" program. The goal of this project is to create a standardized framework to eliminate the discrepancies between agencies in order to provide everyone in Victoria with similar fire protection treatments for areas of comparable risk.

Fire brigades throughout the state of Victoria are using various local protocols to defend their communities against fires. While each respective fire brigade is familiar with their own methods of fire prevention, mitigation, and suppression, a problem arises when multiple brigades attempt to combine their efforts. Without a universal framework to govern all of their actions, it is difficult to work as a team. Additionally, the current performance

measurements of the fire brigades do not accurately evaluate the quality and efficiency of their activities. It is difficult to determine which fire prevention programs and suppression activities have been effective and which need improvement.

Currently, the Country Fire Authority (CFA), the Department of Sustainability and Environment (DSE), and the Metropolitan Fire Brigade (MFB) have implemented their own standards of evaluation. The OESC believes that under one risk-profiling framework the agencies would work in harmony to provide the following:

- Measures to prevent fire from happening in the first place
- Sophisticated risk assessment processes to better link the fire agency programs and services to the nature of identified fire risk
- Robust measuring systems to determine how effective fire agency services are in achieving the desired outcomes such as prevention of fire, and in the event of fire, minimizing death, injury and property loss
- A consistent fire risk profile across Victoria
- Common and agreed standards across Victoria's three fire agencies
- A framework that values prevention and mitigation, in addition to suppression activities
- Economically defensible and responsible recommendations and decisions
- Equitable fire safety outcomes for like risk environments
- Enhanced fire safety for all Victorians

("Fire Safety Victoria" 8-14)

There are several key principles that are important to the success of the "Fire Safety Victoria" project. First, the framework must encompass the standards of protection set by the CFA, MFB, and DSE. Additionally, the project must provide a cost-effective method of implementing the framework. The general framework must also be able to change and expand to meet possible future needs.

The purpose of this project is to develop a general framework to identify measurable ways to assess the performance of various fire prevention programs delivered to the Victorian community by Victoria's fire agencies. There are presently many quantifiable ways of measuring the effectiveness of a fire suppression program. However, it is more complicated to evaluate the success of fire prevention programs, specifically community education. Previously, these programs have been evaluated based primarily on the number of people that received the information rather than on how the information was processed. In order to effectively evaluate these programs, changes in awareness and behaviour need to be systematically monitored. The information collected then needs to be analysed and compared to other organisations as well as historical data to determine effectiveness. The OESC will provide a means to accomplish this task through their model of fire cover.

# 2 Background/Literature Review

Evaluating the effectiveness of fire prevention or suppression methods is a difficult process. How does one measure the number of fires that never started as the result of fire prevention? How does one know how a fire would have spread if it were not for suppression methods? For example, in the medical world this becomes and issue when vaccinations are administered. It is easy to count the number of people who received the vaccination or the number of needles that were used. However, it is more difficult to determine the number of people not infected by the disease because of the vaccination (Schaenman 3).

With the recent Australian bush fires and the World Trade Center attacks, fire fighters have come under increased public scrutiny. The publicity has raised questions regarding the responsibilities of fire agencies throughout the world. Many want to know where their tax dollars are going and what good these dollars are doing (Schaenman 2).

Proving that a single factor is the source of reduced fire risk is virtually impossible because there are numerous causal factors that contribute to one outcome. However, combining performance measurements can reveal how a factor contributes to a fire program.

## *2.1 Fire Safety Victoria*

Over the last nine years, both the Government and citizens of Victoria have expressed concern over the responsibilities of fire safety agencies (A Model of Fire Cover 9). The Country Fire Authority (CFA), Metropolitan Fire Brigade (MFB), and the Department of Sustainability and Environment (DSE) have each developed their own system of evaluation and therefore have a different set of standards. This has made performance comparison between the agencies extremely difficult. As an example, there are areas on the outskirts of Melbourne where one side of the street is under the responsibility of the CFA and the other by the MFB. The residents on the MFB side receive a response time less than 7.7 minutes 90% of the time. However, the CFA's response time could be between 8 – 20 minutes depending on location and staffing. Another concern is that some of the actions taken by the agencies are antiquated and do not take into consideration that the understanding of fire behaviour has increased dramatically in recent years. The solution to the public concern is "Fire Safety Victoria," a new unilateral system to evaluate the performance of the three agencies. (A Model of Fire Cover 14-19)

While some elements of the Fire Safety Victoria program are loosely based on other fire agencies' models such as those from the United States, United Kingdom, CFA, MFB, and other Australian States, this project remains an innovative idea. The objective of the "Fire Safety Victoria" project is the harmonization of the three fire agencies to ensure that areas of similar risk receive equitable treatment. This safety outcome is achieved through a mix between fire prevention and suppression methods. As an example, for rural

residencies where response times can be as high as 20 minutes, the damage resulting from the fire is reduced if a greater amount of the mix is dedicated to prevention techniques such as teaching citizens proper evacuation methods. However, in dense, urban areas where response times are lower, less emphasis is needed on prevention and more on stopping fires from spreading to other buildings. One of the main goals of "Fire Safety Victoria" is establishing a methodology to determine what mix is appropriate for specific areas (A Model of Fire Cover 8-10).

### 2.1.1 Department of Sustainability and Environment

The Department of Sustainability and Environment (DSE) is responsible for the fire safety of the national parks in Victoria. As of June 2002, the DSE's area of responsibility comprised 14% of Victoria, broken down into 36 national parks, 3 wilderness parks, and 31 state parks. Since approximately 90% of the DSE's fire fighters are part-time or seasonal, they work in conjunction with the CFA with both fire prevention and suppression programs (Overton personal interview). In the event of a large-scale emergency the CFA and DSE work in conjunction to resolve the crisis (Annual Report 2001/02 – Protecting our Community 1-4).

### 2.1.2 The Country Fire Authority

The Country Fire Authority (CFA), which was created under the Country Fire Authority Act 1958, is currently one of the worlds largest volunteer based emergency service providers. As of June of 2002, the CFA

consisted of approximately 58,000 volunteer fire fighters, 400 career fire fighters, and 700 other personnel. The CFA's area of responsibility covers the entire state of Victoria with the exception of metropolitan Melbourne and the Crown (public) land. The CFA provides many different emergency services including wildfire suppression, road accident rescue, hazardous material transportation, and fire education programs. The goal of the Country Fire Authority is to create a safe community through cost effective fire and emergency services and to continually improve these practices. (CFA Annual Report 2-4)

### 2.1.3 Metropolitan Fire Brigade

The Metropolitan Fire Brigade (MFB), the fire fighting division of the Metropolitan Fire and Emergency Services Board (MFESB), was created under the Metropolitan Fire Brigades Act 1958. The MFB's 1,500 career fire fighters are responsible for the safety of metropolitan Melbourne and the CFA/MFESB mutual aid areas on the outskirts of metropolitan Melbourne. Similar to the CFA, the MFB is responsible for a variety of emergency and non-emergency services ranging from fire suppression to community awareness programs (Annual Report 2001/02 – Protecting our Community 4-19).

## *2.2 Performance Measurements*

The Department of Treasury and Finance of Victoria defines performance measurements as "measures of quantity, quality, timeliness, and

cost used to assess the production and delivery of outputs" (Victoria Department of Treasury and Finance 17). Outputs are services or products that a department (in this case, the fire agencies of Victoria) provides to customers. For example, an output of fire prevention is community development, which are services delivered to the community to increase awareness concerning fire (Victoria Department of Treasury and Finance 11). There are many possible measures of community development, such as how many homes have working smoke detectors or how many children recognise the phrase "stop, drop, and roll." These measurements are important in order to identify the effectiveness of a brigade's output.

Performance measures help organisations identify the resources needed to provide an output, as well as contrast the performance of one brigade against another. This then enables the organisation to select an appropriate level and mix of outputs to achieve a desired result (Department of Treasury and Finance 17).

Performance measurements must be broken down into quantity, quality, timeliness, or cost. These measures describe the effectiveness of the distribution of a product. Quantity describes a specific amount, based on units of measurement. Quality measures are less scientific and describe the satisfaction of how the product is delivered, centred on the needs of the customer. Timeliness tells how frequently a product is being delivered, or a time frame in which the product will be delivered. Finally, cost measurements are defined by a unit of the financial resources used to fund an output. These four instruments combine to yield a set of measurements that can identify what has been accomplished, what needs to be accomplished, and the

appropriate mix of outputs that should be used (Victoria Department of Treasury and Finance 20).

Performance measurements must also meet a set of requirements to ensure that they are appropriate and feasible. For this reason, the following checklist (Table 1) is provided by the Department of Treasury and Finance:

**Table 1: Performance Measure Checklist**

| Criterion | Test | Check |
|---|---|---|
| Relevance | The measure described quantity, quality, timeliness, or cost for a specific output. | ☐ |
| | The measure assists the Government in deciding how to fund and allocate resources. | ☐ |
| Robustness | The measure will facilitate comparisons with:<br>• similar outputs delivered by other providers; and/or<br>• the department's own performance over time. | ☐ |
| Manageability | Data can be collected and reported against the measure at the end of each reporting period. | ☐ |
| | The department will have the capacity to collect the data and report the performance information within agreed time-frames | ☐ |
| Success indicator | The measure provides information to allow assessment of whether the output has been successfully delivered. | ☐ |
| Auditability | Data to support the reported performance will be available at the end of the reporting period. | ☐ |
| Accountability | It is clear who is accountable for delivery of the output. | ☐ |
| | Is it clear who is accountable for reporting against the measures/targets? | ☐ |
| | The information is useful for external reporting purposes. | ☐ |
| Consultation | Major stakeholders, including Government, regard the measure as useful. | ☐ |

(Victoria Department of Treasury and Finance 25)

If the defined performance measurements meet all of the above criteria, then it is an indication that they will not only be an effective assessment of the outputs, but also the overall success of the program.

## *2.3 Data Collection: Surveys*

"A survey is a system for collecting information to describe, compare, or explain knowledge, attitudes, and behaviour" ("The Survey Handbook" 1). There are four types of surveys that can be used to determine this: self-administered questionnaires, interviews (face-to-face/guided surveys), structured record reviews, and structured observations ("The Survey Handbook" 42).

The main objective of a self-administered questionnaire is to have the participant fill in the information without any assistance. These surveys can be distributed by standard or electronic mail, over the Internet, or can be delivered directly to the participant. One of the major advantages of self-administered surveys is that it is a relatively inexpensive way to reach a large audience. However, a disadvantage is the dependence on the reader to comprehend the material without guidance from those administering the survey.

Interviews are an interactive surveying technique where questions are read aloud to the participant. These questions can be predetermined, created at the interview, or a mixture of both. The advantage of this method is the high response rate. There is also an advantage of conducting face-to-face surveys because the interviewer can "read" subtleties such as body language or tone of voice. However, a major concern with this type of survey method is

that the questions and even tone must be carefully monitored for biases. An interviewer may consciously or unconsciously word a question inaccurately or misread the response of an individual.

Structured records are a review of information attained from other data sources or previous surveys. Finally, collecting data visually is referred to as structured observations. In this method no questions are asked but instead the interviewer watches and records the actions of the participant. An example is how many people visit a specific exhibit at a museum ("The Survey Handbook" 46).

### 2.3.1 Possible Types of Questions

Once the type of survey is determined, the type of questions used in the survey must be decided. There are three types of questions to choose from: Closed questions, which are also referred to as multiple choice, give the participant a set of responses from which they choose the answer that they agree with the most. Partially closed questions are the same as closed questions, except for the fact that "other" is given as one of the possible responses. This option may be followed by a blank space where the participant can expand on the "other" answer. Open-end questions allow the participant to write down any answer that he or she desires. This option allows a more honest answer from the participant because he or she is not forced to conform to a predetermined set of answers. However, it is much tougher to categorize these answers. This must be considered when developing the survey (Survey Techniques 10-13).

Another consideration is the environment in which the surveys are administered. The questions must be well thought out and tested to make sure they are not offensive or discriminatory. Some surveys may be appropriate for a certain setting or population, but may be disrespectful to a different group of people. Along the same lines, the phrasing of the questions must also be considered. The questions must be presented with the exactly same wording to everyone partaking in order to be able to compare the answers to each other. They cannot be leading or biased. The participant must also feel comfortable to answer honestly. If not all of these factors are considered in the development of the survey, the data can be distorted or inconsistent and thus loses validity (Survey Techniques 8).

### 2.3.2 Answer Types

For a closed or partially closed survey, the answers provided are just as important as the questions. If asking the participant to assign rate or rank, ordered responses should be used. Answers are put in an order such as high to low or one to ten. If the response does not ask for any sort of rating, unordered responses are used. Finally, numerical answers are suitable when the partaker is asked for a figure, such as weight or age ("The Survey Handbook" 16-17).

### 2.3.3 Sampling

When the population is so large that surveying everyone is impractical, sampling must be used. Sampling involves breaking the population into

smaller sections in order to represent the group as a whole. The two methods of determining a sample group are probability and non-probability.

Probability sampling is based on the assumption that there is an equivalent possibility of choosing each person in the population. This type of sampling is divided into four groups: simple random sampling, stratified random sampling, systematic sampling, and cluster sampling. In simple random sampling, each individual of a certain population that is targeted has an equivalent chance of being selected once. When the targeted groups of this method are broken up into different divisions based on particular characteristics, it is called stratified random sampling ("How to Sample in Surveys" 10-13). Another method is systematic sampling. Every $n^{th}$ person in a line or to go through an area is surveyed. This value depends on the size of the total population, as well as the size of the sample that is needed. The final method of probability sampling is cluster sampling, where naturally-occurring small groups are selected to represent a larger group ("How to Sample in Surveys" 14-16).

Non-probability sampling is when samples are selected because a group represents the larger population. Different methods of non-probability sampling are convenience sampling, snowball sampling, and quota sampling. Convenience sampling is administering surveys to the participants that are most convenient or available ("How to Sample in Surveys" 17-18). Snowball sampling is when participants of a survey recognise other individuals in the same group who are potential participants for the survey. Finally, quota sampling involved proportioning the sample groups to reflect the actual percentages of the total population ("How to Sample in Surveys" 19-21).

### 2.3.4 Survey Incentives

One of the most difficult elements of administering a survey is persuading the participants to complete it. An incentive may be considered to entice the participant to complete and return the survey. A representative amount of a population must respond in order to gain any data about the survey.

## *2.4 Fire Protection*

Fire is one of nature's most uncontrollable forces. However, with the advance of science and technology, society has learned more about how fire behaves and the factors that contribute to its destructive forces. A greater understanding of how fire acts leads to more successful methods of control (Bugbee 44).

Fire protection procedures decrease the risk of fire, slow the progress of fire, and suppress the fire once it has ignited. These three phases are referred to, respectively, as prevention, mitigation, and suppression techniques. Fire protection, as a general term, refers to all the practices that attempt to reduce the loss of life and property as a result of fire incidents.

### 2.4.1 Prevention

Fire prevention is the practice of inhibiting the ignition of fires. It is also a successful way of minimising damages as the result of fire (Cote 3-1). It includes all the methods used by fire agencies to reduce the number and intensity of fire incidents. These methods include education, engineering, and

enforcement. Education involves alerting the community of fire risks: both how to prevent the risks, as well as how to handle a fire incident. Engineering, with regards to fire prevention, is a way to reduce the risk of the ignition of fire, as well as slow its progress. Examples of engineering practices include installing sprinkler systems into buildings and using flame retardant materials. Enforcement allows officials to implement codes and standards to ensure that there is not an increased amount of risk in an area (Bugbee 314). Successful prevention practices accomplish the goal of separating heat from a fuel source. Without fuel and the heat source to ignite it, combustion cannot occur (Cote 1-9).

#### 2.4.1.1 Public Fire Education

The majority of fire incidents that occur take place in the home; however, most of these fires are avoidable (Bugbee 39). One effective method of preventing these fires is through public fire education. Fire education programs attempt to increase awareness and reduce human carelessness. Nonetheless, these fire education programs are only successful if they achieve their goal of reducing the number of deaths and damages due to fires. There are two key factors to ensuring the success of a program. First, the curriculum must reduce the risk of fire for the participants. Second, the program must reach a majority of the population that is affected by a particular fire risk. Without reaching these two goals, even the most successful programs will make a minimal difference (Cote 2-16).

Overall, fire education programs seek to improve the safety of the entire community. The programs that have the most success adhere to the following guidelines:

1) The fire education program must distribute the education relevant to the specific community, as well as reach as many members of that community as possible.
2) The curriculum must not only teach the people the fire safety facts that they do not know, but also refresh the fire safety information that people already know.
3) The community must act on the information that it has learned from the program.
4) Action must be taken to improve the safety of the surroundings of the community.
5) All these changes must lead to a reduced number of deaths and damages from fire

(Cote 2-67).

Although one program may have many objectives, judgments concerning the success of a program can only be made by examining one clearly defined purpose at a time. Before assessing the influence that a program has had on a community, one must decide the goal of the curriculum. If the program is designed for a one-hour classroom session, pre- and post-tests can determine how much each student has learned in that period. However, if the goal is to teach the students proper life-long habits concerning

fire and fire risks, evaluations must be conducted years after the program's completion to determine if behaviour has changed. Another possible goal is to teach families about appropriate behaviour through their children. In this case, it would be fitting to conduct pre- and post-tests of both the student and their family (Cote 2-16).

To evaluate the degree of a program's success, one must look at the results: are the numbers of deaths and the amount of damages due to fire decreasing? However, evaluating the program based solely on the fact that the number of fires increased or decreased is rudimentary. A decrease in the amount of fires and loss due to fires can be the result of many factors other than a community education program (Cote 2-68). One way to illustrate the effect a fire education program has had on a community is to project what the occurrence of fire incidents would have been without the program. When this is compared to the actual number of fires that occurred after the fire education program was completed, the results can validate the impact of the program. Following the trends further into the future will also show how long the effects of the fire prevention program last. This can show not only how successful the course has been, but also, how frequently it should be repeated (Jennings 6).

Although measuring the change in fire incidents over time is a direct way of determining the effectiveness of a program, the fire education participants and the time it takes to implement the effects of the program must be considered. If the goal of the program is to educate students about having functional smoke alarms in their home, time must be allowed for these students to take the information back to their families, check the smoke

alarms, and possibly install new ones or replace the batteries. Therefore, the results of this program will not be immediately evident (Jennings 7).

If the end result cannot be evaluated, the second most effective method of evaluation is to determine whether the behaviour of the community affected by the program has changed. For example, are more people changing the batteries in their smoke detectors? Have an increased number of families discussed an escape route from their house in the event of a fire? These questions, in addition to other inquiries about human behaviour during a fire, can show the effectiveness of an education program.

Another method of evaluating a program's effectiveness, although less accurate than assessing human behaviour, is determining if the program resulted in a change in community awareness. Even though the participants in the fire education program may not have changed their routine when it comes to fire risks, they may now recognize these risks. If awareness cannot be evaluated then the number of people reached can be a measure of evaluation. The more people that are reached as a result of the program, the more likely it is that the habits of the community have changed, thereby reducing the number of fires and fire loss (Cote 2-68).

Often younger children are the target audience of public fire education programs. An effective way of determining the success of these programs is through interviews and tests. However, one must remember the audience; written tests may not be the best measure because many times a child's reading and writing abilities may inhibit them from correctly completing the test, thereby skewing the results A more effective method would be to

conduct one-on-one interviews or use illustrations depicting right and wrong behaviours, asking the child to show which one is correct (Cote 2-44).

Table 2: Hierarchy of Community Education Performance Measurement explains the hierarchy for evaluation of life safety and public fire education programs:

Table 2: Hierarchy of Community Education Performance Measurement

| | |
|---|---|
| 1. End results | • Number of deaths, injuries, dollar loss, or fires per capita<br>• Anecdotes of saves linked to programs |
| 2. Behaviour of the environment | • Percent of households with a working smoke detector<br>• Percent of households sprinklered<br>• Percent of chimneys cleaned at least annually |
| 3. Awareness, knowledge | • Percent of public who know how to extinguish a grease fire<br>• Percent of public who know how to use extinguishers<br>• Percent of public aware of need to crawl low under smoke |
| 4. Extent of program outreach | • Percent of population (or a subgroup) receiving public education materials<br>• Percent of elderly receiving safety lecture<br>• Percent of schoolchildren with *x* hours of safety instruction each year |
| 5. Likeableness and usage of programs | • Percent of teachers who think program materials are good and use them |
| 6. Institutional change | • Introduction of safety curriculum in schools<br>• Addition of service organization to aid dissemination |

**(Cote 2-68)**

Regardless of the targeted audience, the evaluation must always focus on the goal of the curriculum. If the course is intended to teach safety regarding grease fires, then the evaluation should focus on the change in grease fire incidents. If it is not possible to measure the specific fire incidents,

then a larger measurement can be substituted. In the case of grease fires, an easier quantity to measure would be cooking fires (Jennings 11). Table 3: Relating Evaluations to Specific Prevention Themes, gives examples of sample measurements used to focus on specific themes of a fire prevention program.

Table 3: Relating Evaluations to Specific Prevention Themes

| *Prevention Theme* | *Examples of Measures to Use* |
|---|---|
| Use of smoke detectors | # households with detectors |
| | # reported fires (early detection leads to occupant extinguishment and fewer reports) |
| | # fire deaths |
| Getting out quickly from residential fires | # injuries while attempting fire control in residential fires |
| | # fire deaths |
| | # severe injuries |
| Need to clean chimneys | # chimney fires |
| Careless smoking | # fire or deaths involving careless smoking |
| Safe storage of flammable liquids at home | # non-arson fires where flammable liquid was material first ignited |
| Children playing with lighters or matches | # residential fires where heat of ignition was a match (or lighter) and ignition factor was "children playing" |
| | # children injured in above type of fire |

(Jennings 12)

Collecting data to determine how many people a program reaches is relatively straightforward. One can determine the attendance of a fire prevention class, how many watched a television program related to fire prevention, or the number of people who read a magazine that includes fire prevention information. Surveys can also be conducted to understand how many citizens have learned about fire safety. Conducting tests both before

and after the program has been carried out can determine what citizens learn from a particular fire prevention program (Cote 2-68).

Although pre- and post-multiple choice tests are the most common way to evaluate how valuable a program has been, there are other ways to test the target audience. A common method is to break a class into two groups. One group is tested on knowledge before the class, and then using the same test the other group is tested on knowledge after the class. A problem with using the same test with the same group before and after the program is that some of the answers may have been discussed amongst the audience between the tests and the audience may have paid more attention to the information that they knew was on the test. Another method is to conduct the testing weeks or even months after the course has been completed. This tests how much information the audience retained.

Although these tests show what was learned from the fire education program, it does little to show exactly how the audience would react in an emergency. What a person knows and what a person does may be very different. A practical test where the audience would have to actually show, in a hands-on manner, how they would react during a fire more accurately depicts how the program has influenced a person's behaviour (Jennings 12). However, this method can be very expensive and difficult to simulate.

While all these assessments can make links between the implementation of a fire prevention program and its effects on the community's fire risk, there are many uncontrollable factors that can have an effect on the occurrence of fire. Some of these factors are listed below in Table 4 from Proving Public Fire Education Works:

Table 4: Examples of Factors That Affect Evaluation Results

| | |
|---|---|
| *Uncontrollable Factors* | Age profile of population<br>Income distribution of population<br>Education level of population<br>Geographical scatter of population<br>Ethnic groups in population<br>Weather or climate change<br>Economic changes<br>Migration of people in or out of community<br>Nature of local business and industry |
| *Semi-Controllable Factors* | Condition of housing<br>Architecture of the home<br>Hazards of new technology<br>Changes in percentage of unreported fires |
| *Starting Conditions* | Severity of fire problem (fire and death rates)<br>Previous exposures of population to fire safety information<br>Current level of detector usage and condition |

(Jennings 9)

One difficulty in proving the success of a curriculum is confirming that these uncontrollable factors were not an influence on the effectiveness of the program. For example, a community may introduce an education program that focuses on reducing chimney fires. Following the conclusion of the program, there is a noted decrease in chimney fires. However, if that winter happened to be unseasonably warm and there were fewer fires in fireplaces, there would naturally be a decline in chimney fires (Jennings 9). Other specific examples are noted in Table 5.

Table 5: Examples of Uncontrolled Variables to Consider for Particular Types of Fires

| ***Type of Fire*** | ***Variables to Consider*** |
|---|---|
| Arson | Economy |
| | Change in number of 18- to 26-year-old men |
| | Change in number of teenagers |

| | |
|---|---|
| | Instances of civil rioting |
| Children playing | Change in number of single-headed households with children |
| | Number of youths |
| | Economic levels |
| | Ethnic makeup of the community |
| Heating | Climate (average degree-days; abrupt changes in weather) |
| Careless smoking | Upholstered furniture and mattress regulations |
| | Level of alcoholism |
| | Usage and maintenance of detectors |
| | Cigarette consumption |

(Jennings 11)

To successfully indicate the effectiveness of a particular program, all of these uncontrollable factors must be accounted for (Jennings 11).

A strong method to evaluate the effectiveness of a program is to compile anecdotes. Anecdotes are accounts explaining people's reactions during a fire incident and if those actions were attributed to a public education program. One recorded anecdote is insignificant and can be considered inconsequential. However, when many anecdotes are collected over time they can be used in conjunction with statistics create a robust measure of the effectiveness and value of a program (Jennings 14).

Despite the fact that public fire prevention programs are generally considered an effective form of minimizing the effects of fire, prevention programs can also produce some negative results. Some of these consequences may be:

- A larger number of reported small fires
    - When fire prevention officers teach participants about fire safety and the correct behaviour in the event of fire, it is possible that

fire incidents that may have gone unreported in the past will now be reported, seeing as calling it in to the local fire brigade is the appropriate action.

  - If the number of smaller reported fires increases, it may not necessarily be a negative. The same number of fires may be occurring, but now more of the community is taking the appropriate action.

- An intensified number of incendiary fires set by children
  - Teaching children about fire safety not only increases their knowledge about correct behaviours, but also increases their curiosity about fire. This curiosity can often get out of hand and lead to arson.
- Imposing upon parents' lives
  - Once children learn about fire prevention, they are often encouraged to take this information back to their families. This information may include buying batteries for smoke detectors, installing fire extinguishers, or putting locks on cabinets to keep flammable liquids away from children or ignition sources. Parents may not have the resources to complete these tasks, and may be frustrated with the harassment from their children (Jennings 15).

Regardless of the unintentional effects or uncontrollable factors that a community education program faces, it is still the most effective form of fire prevention today. Teaching fire education allows a community to become

more self-reliant, and in turn, will reduce the need for extensive suppression techniques.

### 2.4.2 Suppression

Although there are many successful forms of fire prevention, the risk of fire will always be present (Cote 1-11). Fire agencies have limited capabilities to prevent fires, but they have much more control over how effectively they mitigate and extinguish these fires. An evaluation of the suppression methods of a community not only show how well the fire services of that area respond to fires, but also what the community is lacking (Cote 10-29). The key to an effective evaluation of a fire brigade is to include all the factors that affect the response and capabilities of the brigade.

A few of important factors to assess are:

1) How quickly the brigade can respond to a call.
2) How adequate the staff and apparatus are in responding to the call.
3) How able the brigade is to handle more than one call, or calls that require multiple alarms. (Cote 10-30).

The first step to evaluating the effectiveness of a brigade's suppression methods is to determine what the fire brigade has for staffing and apparatus. For instance, how many pumpers and ladders does the brigade have? What other types of equipment does it have? For areas with significant amounts of wild land, does the responsible brigade have apparatus that can access bush fires? How many career fire fighters does the brigade have? How many for

each shift? How many of these are able to respond to a call? The answers to these questions determine what the actual capabilities of the brigade are, regardless of how effective it is. Other areas to evaluate are response times to fires, abilities of other fire brigades to respond to calls, and ability to handle the extreme weather of the area (Cote 10-30).

This data can then be compared to areas of similar population and topography to establish how adequate the fire brigade's capabilities are compared to that of a similar community. In addition, data from fire reports of previous years can also help determine how effective a fire brigade's suppression program is. When the brigade increased staffing, what happened to the response times? How did the number of fires change? When the brigade received a new piece of apparatus, did the amount of fire loss increase or decrease? This information leads to an effective means of evaluating suppression measures of a community.

## *2.5 Current Prevention Programs in Australia*

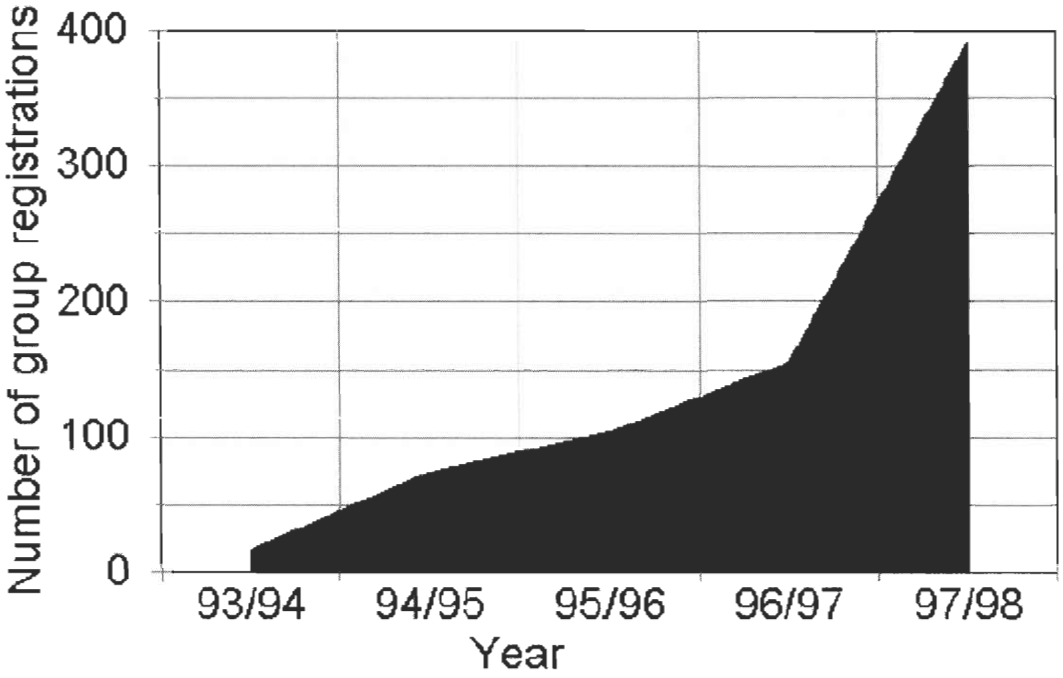
Over the past ten years, the Victorian Fire Brigades have been increasingly concentrating their efforts on fire prevention. In Victoria, the Country Fire Authority (CFA) and the Metropolitan Fire Brigade (MFB) successfully run many community education programs.

### 2.5.1 Community Fireguard

Community Fireguard is one of the most successful community education programs run by the CFA (Rhodes). During the course of a

community Fireguard Program, a CFA facilitator helps a small group of residents learn how to deal with the threat of bushfires. The program strives to help people become more self-reliant by assisting them to develop strategies that will be helpful in case of a fire emergency. This has proved to be a very popular program among the Victorian communities because it is interactive and encourages involvement. Its growth is shown in Figure 1:

**Figure 1: Growth of the Community Fireguard Program**



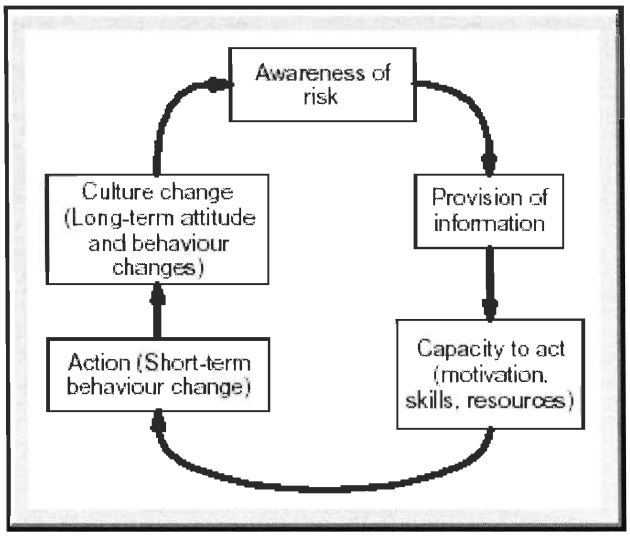

(Boura 7)

Community Fireguard depends on the active participation and interest of community members. Most of the Community Fireguard groups are self-initiated (Boura 6). In such cases, concerned residents contact the CFA and a Community Fireguard facilitator is sent to help initiate and advise the prevention program. Community Fireguard creates an informal atmosphere

by organising the meetings in a group member's home. A trained facilitator provides the group with information concentrating on their local needs.

The program attempts to make people realise that they are responsible for their own safety and they can take many important steps to manage a fire threat before the fire brigade actually reaches the scene. The Community Fireguard process does not stop after providing the people with information in one meeting but continues over a long period to change people's behaviour. The structure of the program is a cycle, which begins by elevating the general awareness of the community and goes through several steps (illustrated in Figure 2) to reach the long-term goal of behavioural change.

**Figure 2: The Community Education Cycle**




(Boura 8)

A few of the major goals achieved by this program are:

- Understanding what a major fire looks like

- How to react to major fire and knowing what to expect from the fire services
- Understanding how houses are ignited.
- Making decisions whether to evacuate or stay in the home
- Identifying what escape route is best
- Identification of more vulnerable members of the community

(Boura 10)

Community Fireguard goes beyond an education program and provides a framework for the community and the fire services to interact during an emergency management process.

### 2.5.2 Fire Ed

The Metropolitan Fire Brigade (MFB) conducts a Fire Safety Education Program called Fire Ed that reaches over 600 primary schools and over 35,000 children each year. This program is aimed at children, which are a high-risk group due to their inexperience and fascination with fire. Fire Ed tried to change the behaviour of the children by educating them about the dangers of fire and how to react to a fire emergency (MFB sec. 1).

In the Fire Ed program fire fighters, teachers, children, and parents are actively engaged to form a partnership. The fire fighters involved in these programs are trained by the MFB in fire education skills and are provided with resources such as lesson plans and follow-up activities, not only for the students, but for parents and teachers as well (MFB sec. 1).

The Fire Ed program is divided into two parts, Fire Ed Grade Prep and Fire Ed Grade 6. Fire Ed Grade Prep, also known as Fire Ed level 1, aims to

reach every Grade Prep child in all government, Catholic, and private schools in the Metropolitan Fire and Emergency Services Board area. Fire Ed began with the Grade Prep program in 1993 (MFB sec. 1), which delivers the following messages:

- Information on Safe and Unsafe Fires
- Fire fighters are friendly
- Stop, drop and roll in case of clothing fires
- Crawl low in smoke

(MFB sec. 1)

The Fire Ed Grade 6 program was developed in 1998 to reinforce the information delivered in the Prep Grade program. As it was dealing with older children, the program is slightly more complex (MFB sec. 2). Fire Ed Grade 6 focuses on the more technical components of fire including:

- Fire is a part of everyday life and has benefits and harmful effects.
- The three components required for a fire to burn are fuel, heat, and oxygen.
- Identifying potential fire hazards at home
- Responding to a fire emergency and survival strategies

(MFB sec. 2)

## 2.6 *Measuring Fire Protection Effectiveness: Creating the Framework*

In order to create a framework to assess the effectiveness of a community's fire protection capabilities, all factors that affect the prevention and suppression methods must be considered. These factors can be separated into four groups:

1) Output
    a. Fire incidents during a given period of time
    b. Damage caused by these fire incidents
    c. Population and area covered by a given fire agency
2) Input
    a. Dollars spent by fire agency
    b. Volunteer capabilities
3) Habituation factors
    a. Environment (temperature, weather, etc.)
    b. Area
    c. Population
    d. What land is used for
    e. Type of buildings in area
    f. Roads and traffic
    g. Topography
    h. Social uproars
    i. Private fire protection
4) Features of the fire brigade
    a. Apparatus
    b. Personnel
    c. Response to calls and multiple alarms
    d. Dispatch
    e. Water supply

(Schaenman 13)

When these factors are presented together in a framework, the productivity of the prevention and suppression measures of an area can be determined (Schaenman 14). Productivity is the measure of how much is put

in (input) compared to the quantity and quality of the result (output) (Schaenman 1). A basic way to identify this is through the rate at which fires occur in relation to the loss of property and human life as the result of these fires. Unfortunately, this only gives an evaluation of the productivity of a brigade's fire protection measures. To determine how effective a specific sector of fire protection techniques is, indicators that are more specific must be formulated that relate to that specific segment (Schaenman 22).

In the case of fire prevention, it is impossible to directly measure the number of fires prevented. However, it is possible to measure the number of fires that do occur, and monitor that number over time to establish trends. In the case of fire suppression, it is possible to assign a dollar amount to the damages caused by fire incidents per year. In both cases of measuring the effectiveness of fire prevention and suppression, these total measures can be broken down into smaller sections. For instance, the number of fires per year can be broken down into different types of fires, such as residential and commercial (Schaenman 22). . The majority of this data should be obtained at the local fire brigade level. The brigade that is responsible for a particular fire incident should have a record that includes information such as why the fire occurred, where it occurred, and the amount of damage as a result of the fire (Schaenman 27).

# 3 Methodology

One of the most effective and efficient ways to create a robust and useful evaluation framework is by collecting information through published documents, fire agency reports, and interviews with fire protection personnel. The next step is the processing of data and records, which includes interviewing fire prevention and performance measurement officials to learn from their expertise about how to develop accurate measures. This step also includes the development of not only the performance measures but also the methodology outlining how to develop these measures. The final step is to submit the conclusions to the OESC for approval and then further verification and application can be carried out as appropriate.

## *3.1 Needed Background Information*

The initial step was to acquire a background in fire prevention and suppression techniques. This information included the structure of a fire brigade, the basics of fire science, and fire risk management principles. It was also crucial to understand what work the Office of Emergency Services Commissioner had done previously on the "Fire Safety Victoria" project. The research then focused on the evaluation of public education programs. This provided a general understanding of the goals of fire prevention programs so the project group could conduct efficient and successful interviews and

establish the performance measures and methodology that the OESC needed.

The Country Fire Authority (CFA), Department of Sustainability and Environment (DSE), and Metropolitan Fire Brigade (MFB) have different prevention and suppression procedures in place for their individual areas. Since these areas are considerably diverse, it was important to understand the responsibilities and performances of the agencies. Information that was researched included community fire education programs, fire service personnel and apparatus availability, response times, and other variables that affect the ignition and spread of fire.

The next stage was to obtain the annual reports of the CFA, DSE, and MFB to determine the history of the brigades, how each brigade collects and processes information, and what fire prevention and suppression programs are currently in place. This data helped link key factors such as how standard response times are developed, how prevention groups are targeted, and what contributes to the frequency of fires and fire loss.

While collecting this information, records of what the OESC has already completed regarding Fire Safety Victoria were gathered. Since October of 2000, the OESC has actively involved the MFB and CFA, while also attempting to include the DSE. They have also collected historical data and trends, established preliminary performance measures for suppression, and created a general methodology to achieve the ultimate goal of a safer Victoria.

## *3.2 Preliminary Action*

The project group conducted interviews with performance measurement and fire prevention officials. The key to making these interviews as beneficial as possible was to interview a wide variety of fire officials. This allowed for an assortment of perspectives to be expressed. In the first round of interviews, the goal was to uncover how each agency evaluates their community education programs, and from that determine the strengths and weaknesses of each evaluation method. After the initial interviews to determine need were completed, a second, more in-depth series of interviews were conducted. A working performance measurement hierarchy was developed before these interviews. The focus of these interviews was to acquire support that the hierarchy was an effective way to determine the success of a community education program

The preference for interviewing was using the face-to-face method. This was the easiest way to convey the need for precise information and to be able to interpret what the interviewee was thinking, based on body language and facial expressions. Before the interviews, the project group divided into groups of two in order to be as efficient as possible and discussed the questions to be asked to ensure that the same, necessary information is retrieved from each resource.

## *3.3 Development*

Based on the background information collected and interviews conducted with performance measurement and fire prevention officials, a new, four-level hierarchy was established. The four remaining indicators were end results, behavioural change, awareness, and extent of a program's outreach. The lowest two levels of the original hierarchy were removed in order to create a concise mix of qualitative and quantitative measures.

The hierarchy of evaluation places the most weight on end results. This includes both anecdotal information and fire incident data. Statistics for fire incident data can be collected using post-incident reports from the fire brigades. An effective method used to collect anecdotal information about a fire incident is through post-event surveys. The project group decided, with the support of fire officials from each agency, that the development of a methodology outlining how to create a survey would be an effective method for the OESC to measure the performance of prevention programs in the future. The subsequent surveys developed could be used to assess the quality of fire education programs. They will not be specific to any one program, but the governing methodology will be applicable to every program offered by the DSE, CFA, and MFB. Surveys are an effective form of evaluation because they focus on change in awareness and behaviour, as opposed to purely quantitative data. However, due to possible inconsistencies in anecdotal records, statistical data is needed to support qualitative information.

Finally, fire officials at the OESC were consulted to ensure that the performance measures complied with the standards of the Office of Emergency Services Commissioner, as well as the Department of Treasury and Finance. These interviews were crucial because the OESC is the department in charge of implementing and running Fire Safety Victoria and their support is therefore vital to the success of this project.

# 4 Data and Analysis

The project group interviewed officials from the DSE, CFA, and MFB to gain more background data about their agencies. These interviews were effective at establishing the characteristics and needs of each agency. The project group also gained the support of all three agencies that the hierarchy is an effective method to create the needed mix between qualitative and quantitative data to create a robust evaluation. From the collected information several conclusions and recommendations were drawn.

## *4.1 Fire agencies*

Initially, the project group believed that the agencies did not share responsibilities and operated as separate entities. However, through the interviews it became evident that the DSE, MFB, and the CFA overlap in several areas. The DSE and MFB are on opposite extremes, controlling rural and urban areas respectively. The CFA falls somewhere in-between the two agencies, sharing responsibilities with both the DSE and MFB. The CFA has developed many of their fire prevention programs with the other agencies. Wayne Bradborn of the OESC (A former MFB fire prevention manager) explained that the MFB and CFA would often coordinate efforts to develop programs and share in the managerial responsibilities. Kathy Overton of the DSE agreed that her agency often works in conjunction with the CFA on suppression and prevention programs due to the DSE's limited staffing (Overton Personal Interview 1, Bradborn Personal Interview).

### 4.1.1 CFA

Three sets of interviews were conducted with fire officials at the Country Fire Authority to gain more information about the suppression and prevention programs. Alan Rhodes, Jon Boura, Greg Esnouf, Dr. Jon Morris, Vince Bosua, Michelle Wintle, and Penny Wolf were all exceptionally helpful by providing the OESC with information concerning the CFA's prevention, suppression, and evaluation programs.

#### 4.1.1.1 Prevention programs

Data was collected from the annual reports of the CFA, MFB, and DSE. These reports contain information about the different areas that the respective agencies cover, the fire incidents in the area, and the causes of these fire incidents. This information was then used to create examples of indicators for the hierarchy.

**Figure 3**and **Figure 4** are examples of the data provided for the Westernport and North West areas of Victoria from an annual report by the CFA. This information shows not only the fluctuation of fire incidents throughout the past three years, but also the cause of these fires. Westernport's risk lies more in building fires. Therefore, the area's prevention programs should focus on this problem. Comparatively, the North West region is more prone to vegetation fires compared to the risk of building fires.

Figure 3: Fire Incidents in Westernport, Victoria

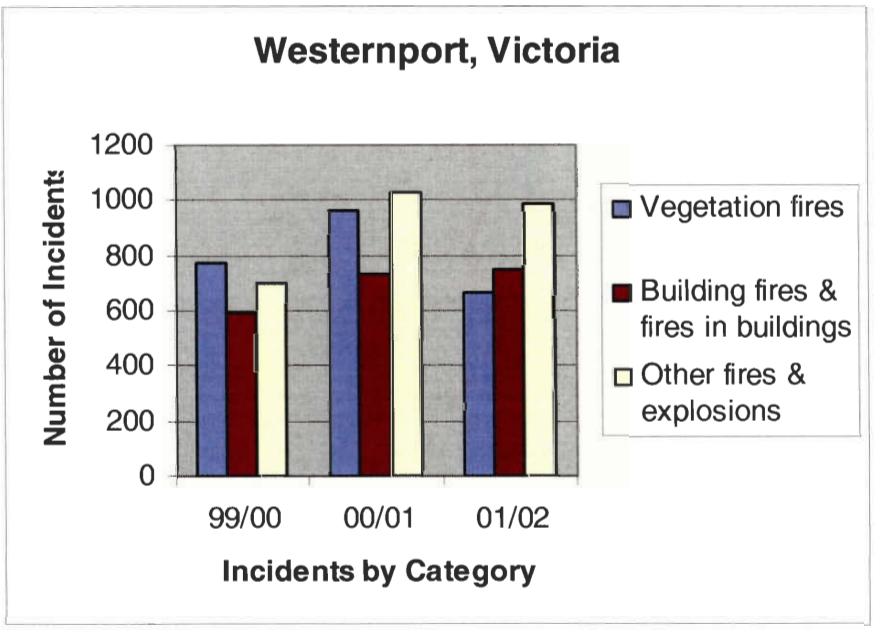
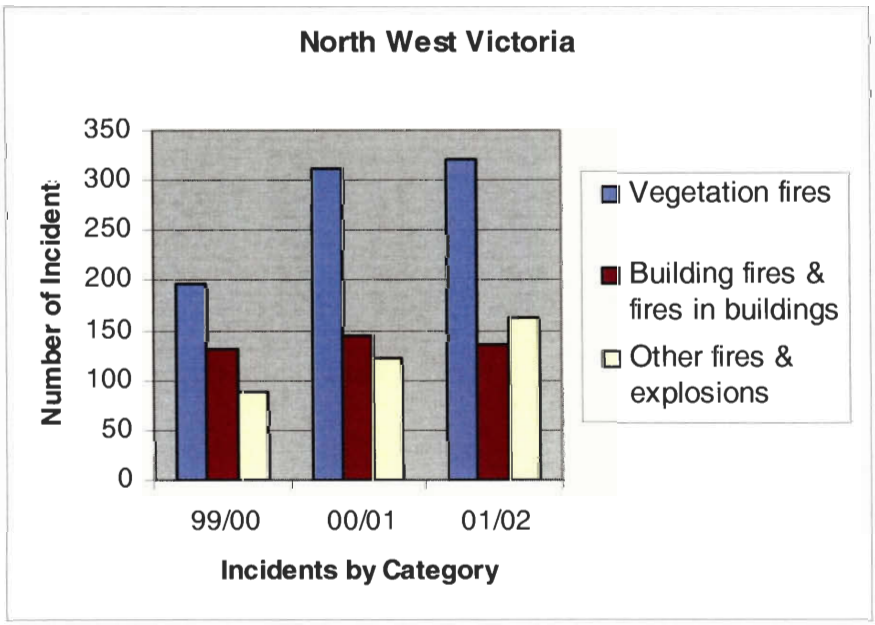



Figure 4: Fire Incidents in North West Victoria




This data shows trends in the types and frequency of fire incidents. This information can be used to support fire education programs in the area. For instance, if a fire prevention program geared towards bush fires was

implemented in Westernport in the 2000/2001 season because of the increase in vegetation fires, the decrease in vegetation fire incidents in the 2001/2002 season could be partially attributed to the program. However, it is important to note that this data only partially shows the effectiveness of a program. There are numerous other factors that could contribute to a decrease in vegetation fires. This data is only effective to develop trends. If vegetation fires continued to decrease, a strong case can be made using this information in support of the program's effectiveness.

Trends are an indicator of behavioural change. Before behaviour can be altered a change in awareness is needed. Creating fire safety awareness is a relatively easy task compared to altering someone's behaviour. Approximately 80 - 85% of people know that they are in a bush fire area but not all of these people know how to react to it (Rhodes Personal Interview). Relative information needs to be distributed to groups based on their specific interests. It is also important to have the right people deliver the message to the community. People do not simply learn by receiving information, but through discussion, getting the relevant information, and by being more interactive. The person delivering the information needs to use an effective teaching technique based on the targeted audience.

#### 4.1.1.2 Suppression programs

The CFA has suppression program for suburban and rural areas throughout the state. Resource management is an important factor in providing adequate suppression services. The CFA currently track all of their equipment and personnel through handwritten reports, but are currently updating that to a completely digitised process. Vince Bosua (Operation

Manager) is currently overseeing this project and hopes to see it reach full functionality over the next one to two years. This new technology will allow the CFA's Emergency Response Team to receive real-time information and make a more accurate assessment of emergency situations throughout Victoria. This, in turn, will help to further improve the efficiency of the CFA's suppression team.

Equally important to the resource management of the CFA is its ability to work with other brigades. The CFA contracts aircraft from the DSE and as recently as two years ago, they were operating separate air decks for the same fleet of planes. Their efforts have since been consolidated and the two now have a joint aircraft unit located at the DSE (Bosua Personal Interview). The CFA also has adapters that allow them to use MFB hydrants. This promotes its ability to better serve the community in emergency situations.

The CFA also assists the DSE and MFB, along with brigades in New South Wales, when fire incidents cannot be easily contained. During the summer of 2002-2003, the CFA sent sixty fully manned trucks to New South Wales to help them with their extensive brush fires. As a result of this open relationship with brigades in other states, the CFA is able to successfully control fires that run along, and even past, the borders of Victoria.

#### 4.1.1.3 Evaluation methods

Alan Rhodes of the CFA explained that there must be some type of hierarchy of outcomes to effectively evaluate a program. After speaking with Jon Boura, it was revealed that the CFA does not focus on evaluating specific programs, but rather on the appropriateness of the mix of all existing programs. There are statistical evaluations performed on individual programs

in order to obtain specific data. However, once that information is collected it is not used to determine changes that need to be made within a prevention program, but instead on how to appropriately use that specific program in conjunction with other existing prevention programs.

### 4.1.2 MFB

In the last ten years, the Metropolitan Fire Brigade has seen an organisational change. In the past, the MFB focused mainly on suppression techniques and providing protection to the community when a fire broke out in the metropolitan area. According to Frank Stockton, a public education manager at the MFB, this shift to be more proactive has become more common in the last decade throughout the emergency services industry. Brigades are learning that dedicating more funding to prevention programs is effective at reducing the need for suppression.

#### 4.1.2.1 Prevention programs

The MFB have a range of programs that target the needs of the urban atmosphere. As of April of 2003 there were nine major programs running: three targeted towards young children, three for the elderly, and one towards the middle-aged public. The other two programs are specific to non-English speaking groups and juveniles prone to lighting fires. According to Frank Stockton, the groups are targeted based on statistical data and information collected from fire investigations.

The MFB's prevention programs focus on changing behaviour, but have developed an additional role of changing the attitudes of the community

towards fire risk. Graeme Murphy, a fourteen-year career fire fighter who now develops and maintains community education programs for the MFB, described that the attitude of most is apathetic towards fire. There are typically between 1700 and 1800 fires a year in metropolitan Melbourne, which has a population of around two million. In general, Murphy said most people believe that a fire could not happen to them. In fact, only about one-third of the metropolitan Melbourne community has fire insurance (Hooper Personal Interview). The programs now not only try to teach people how to react if a fire occurs, but also stress the fact that it is impossible to predict if a fire will occur, so preparation is key to safety.

#### 4.1.2.2 Suppression programs

Low diameter, high pressure hoses are used by the MFB, as well as the CFA in the areas with a population of over 30,000. These hoses allow easier advancement into a structure. They also reduce the amount of structure damage because of the lesser amounts of water used. Finally, the lesser amounts of water allow a quicker conversion to steam, which absorbs heat and ultimately extinguishes the fire. (Scoble 2)

#### 4.1.2.3 Evaluation methods

The current method that the MFB uses to evaluate the effectiveness of a program is through anecdotes. Although anecdotes are the highest form of evaluation on the hierarchy, they by no means prove that a program is a complete success. A major problem is that anecdotes do not solely describe

how well a program works. Luke Hooper, a project and research coordinator at the MFB explained that his organisation recognises that anecdotes alone are not a robust way to determine the performance of a program and that they are currently developing a more diverse evaluation system. Another problem that the MFB faces is the classification of fires. Many citizens would never report if they extinguished a wastebasket fire themselves although this might be an indication that a prevention program influenced the correct actions. A new method that has recently been employed to create a stronger evaluation system is the use of ad-hoc surveys. These surveys are administered to a large-scale audience, such as a recent survey that was given to 10,000 Victorian citizens at the Melbourne Royal Show. The goal of this type of survey is to get an idea of the overall fire safety knowledge to determine what the community already knows, and what new programs should be created to increase fire safety awareness.

Hooper stated that one of the obstacles with their attempts to create a new evaluation method is time; as an example, it may take 10 years to discover if the 12 year olds that are currently being taught the correct methods of fire safety actually act in the correct manner once they are homeowners. For this reason, data must be continually collected and stored to develop trends.

### 4.1.3 DSE

The DSE, along with the Department of Primary Industries, has replaced the former Department of Natural Resources and Environment. The DSE is under the jurisdiction of the Office of the Premier, as opposed to the

Department of Justice ("About DPI and DSE"). Fire Management for Public Land is one section of this department. According to the DSE, "fire management comprises all activities associated with the management of fire-prone public land, including the use of fire to meet land management goals and objects. This involves the management of both wildfire and the use of planned fire on public land" ("Fire Management on Public Land").

#### 4.1.3.1 Prevention programs

There is currently only one employee in the DSE that is dedicated to fire prevention efforts. Kathy Overton is the public education coordinator for the organisation. She has been at the DSE for just over a year and is working to expand the department. According to the DSE, fire prevention includes "all activities concerned with minimising the incidence of wildfire, particularly those of human origin" (Code of Practice for Fire Mgt. on Public Land 30). Approximately six hundred unplanned bushfires are ignited each year in the National Parks and State Forests of Victoria. About one quarter of these fires are started by lightning strikes. The remaining fires are the result of human activity. The DSE is aiming to reduce the number of fires that are the result of human activity.

The focus of the DSE's public education programs is currently on information distribution. Fire safety information is posted on the DSE's website. The agency also has published brochures on wildfires and wildfire prevention. However, Overton recognises the fact that information distribution is not education. Currently, the organisation is focused on a change in awareness, but Overton would like to see a shift to focusing on changing

behaviour. The DSE simply does not have the resources readily available to educate the public to the extent that Overton would prefer. Despite this, the DSE coordinates many public education efforts with the CFA. Since both agencies work with wildfires, they share each other's resources to educate the public about the dangers of wildfires (Overton Personal Interview).

The DSE differs from the CFA in that a majority their public education information focuses on prescribed burns and the positive outcomes of wildfires, as opposed to human behaviour to prevent damage during a wildfire. Prescribed fires are the "use of fire to achieve planned land and resource management objectives." ("Using Fire to Manage Our Parks and Forests" 1). There are three main reasons for using prescribed burns: the first is for commercial forest management. By using prescribed burns, areas can be cleared or forests can regenerate. The second is for flora and fauna management. Many species of plants and animals rely on wildfires to survive. The final reason is to reduce the fuel load in forests. Prescribed burns consume the twigs, leaves, grass, and other vegetation that would encourage the spread of a wildfire ("Using Fire to Manage Our Parks and Forests" 2).

These prescribed burns usually occur in the autumn and the spring. During this time of the year, the weather is milder and the fires are easier to predict and control. However, since weather is a variable, the number of planned prescribed burns in a year often exceeds the number of actual burns that occur (Billings Personal Interview). When the organisation decides to a prescribed burn, it notifies the surrounding community of the upcoming fire. It also ensures that there are proper control lines. These are areas such as a

stream or a road where fuel is reduced or absent in order to stop the spread of fire. The fire is then ignited either on the ground or by aircraft.

Prescribed burns are not the only form of fire prevention used by the DSE; it also uses investigations and records as forms of fire prevention. Fire investigations determine the cause of fires as well as the reason for the extent of the damage occurred. This leads to the development of relevant public education programs.

### 4.1.3.2 Suppression programs

The DSE's suppression techniques were tested with the summer of 2002-2003 wildfire outbreaks. Over a million hectares of land in the state burned over this past summer, and much of that land was under the jurisdiction of the DSE. Fire suppression, according to the DSE, is all actions taken to extinguish a fire once it has been detected. The most common type of fire fighting that this department uses is "dry fire fighting." While the CFA also uses this technique in their remote regions, the suburban and urban areas use wet tactics similar to the MFB. The dry method uses minimal amounts of water to extinguish a fire. It also involves the use of control lines to prevent the spread of fire. Another method of suppression that the DSE uses is back burning, or fighting fire with fire. Back burning uses the same principles as prescribed burns in that it reduces the fuel load for a wildfire. Fire fighters will set fire to an area that is in the path of a wildfire in an effort to eliminate its fuel, and therefore stop the fire from spreading any further (NRE Fire and Other Emergencies).

A typical sequence of events for the suppression of a wildfire on land under the jurisdiction of the DSE is as follows:

- Upon detection, the fire is reported to a 24-hour duty DSE officer. This officer then reports the fire to the first response crews whose response to the scene. The response is often by vehicle, but can also be by air if necessary
- Typically, this first line of responders would consist of an officer as well as five or six persons who would respond in a small fire-fighting vehicle or tanker, as well as a bulldozer. Hopefully this effort will create a control line that will contain the fire.
- The burning vegetation surrounding the area of the fire will also be extinguished to minimise the risk of the fire jumping the control line. Once this is achieved, the fire is then said to be controlled.
- If this effort is not successful, additional units are dispatched to the fire. Indirect attack, a fire fighting method that creates control lines and back burns metres to kilometres away from the fire to attempt to stop the spread of fire, is most often used at this point.
- This endeavour continues until the fire is controlled and eventually extinguished (NRE Fire and Other Emergencies).

### 4.1.3.3 Evaluation methods

Out of the three major fire bureaus in Victoria, the DSE has the least means of evaluation. Since public education is an undeveloped field at the DSE, there has not been a need for an evaluation. Overton explained how the DSE was still working on developing their programs and there was not much of a focus on evaluation. She also explained that there had been a limited use of anecdotes and surveys to support their education programs. The DSE had also used the number of hits on their website as a measure of their information distribution. However, Overton has experience with performance measures from when she worked at various botanical gardens throughout Victoria. She verified that anecdotes are an effective form of performance measures because they provide first hand accounts of behaviour in fire incidents.

The DSE's focus on evaluation placed more weight on what people know about fire as opposed to how they react to it. Overton expressed her desire for the community to accept the fact that fire is a part of their environment. She believes an understanding of how fire works is a vital component to community education. The success of this viewpoint would most accurately be evaluated using anecdotal information.

## *4.2 Hierarchy for prevention programs*

The purpose of this hierarchy is to create a robust framework of performance measurements that can be used by professionals to analyse the effectiveness of a public education program. The research performed

throughout the course of this project supported the need for a hierarchy of evaluation. Based on existing examples and original research, a new hierarchy was created to comply with the needs of the fire prevention programs in Victoria.

### 4.2.1 General framework

Proving Public Fire Education Works provided the basic framework used for this project. The basic levels of this hierarchy are:

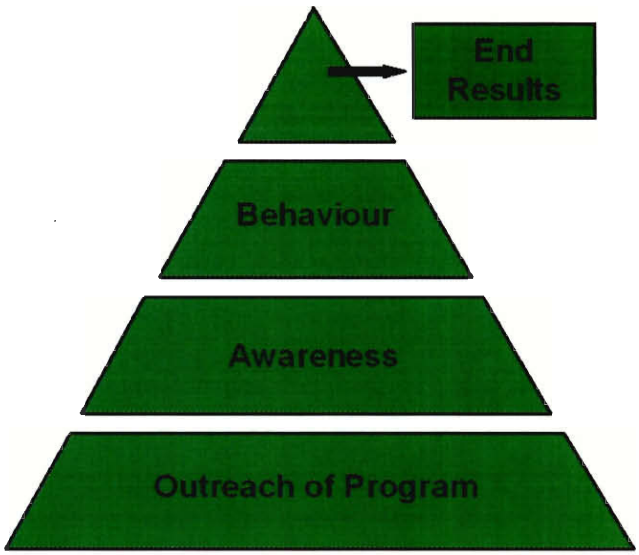
1. End results
2. Behaviour or the environment
3. Awareness, knowledge
4. Extent of program outreach
5. Likeableness (Satisfaction) and usage of programs
6. Institutional change

(Jennings)

However, the project group determined that satisfaction of a program was far too subjective of a measure to use in an evaluation seeking quantifiable output (Leach Personal Interview). Since institutional change is considered a weaker measure than likeableness, it was also eliminated. End results, change in behaviour, change in awareness, and reaching the community created a mix of measures that covered all goals of a public education program in a concise form. All three agencies supported this mix of measures as well as the respective weight given to each measure (Kavanagh

Personal Interview 1, Overton Personal Interview 1, Rhodes Personal Interview). Figure 5 is the resulting general hierarchy.

Figure 5: General Hierarchy




### 4.2.2 End Results

End results incorporate both anecdotal information and fire incident data. This creates a mix of qualitative and quantitative data in the highest level of the hierarchy. Given that reducing the effect of fire on a community is the main goal of any fire protection technique, fire incident data was one of the performance measures given the most weight. In order for the statistics to be effective, the same data must be collected from the incidents. Also, calculating this data must be determined using equal criteria. For example, deciding the amount of damage to a structure must be determined using the same standards.

This measurement can be used to develop overall trends. However, it can also be used to assess the specific targets of programs. The change in the amount of damage as the result of children setting fires from year to year can be an indicator of how well a juvenile fire setting intervention program is working. Deaths and injuries can also be broken down into the targeted groups of a program.

Strong evidence that a program is effective is also gained through the use of anecdotal information. This is the one method that all three fire agencies interviewed used (Kavanagh Personal Interview 1, Overton Personal Interview 1, Rhodes Personal Interview). They not only illustrate that a person acted correctly during a fire incident, but also that this behaviour was learned as the result of a public education program. However, anecdotal information is only effective if it is collected after every fire incident; 100% participation is crucial. Currently, only positive anecdotes (stories saying that the correct behaviour was performed) are recorded, and these are generally received on a volunteer basis (Kavanagh Personal Interview 1, Overton Personal Interview 1, Rhodes Personal Interview). However, all accounts of how a person reacted to an emergency must be documented so that all behaviours can be assessed in an unbiased manner.

Anecdotal information is currently collected by all three fire agencies, but not necessarily recorded. At this time, these anecdotes are used more for the publicity of public education programs than as an evaluation technique (Kavanagh Personal Interview 1, Overton Personal Interview 1, Rhodes Personal Interview). In order for them to be used for an effective evaluation, a record needs to be kept of when the correct behaviour was used, where it was

used, and where it was learned. When this information is compiled over time, they create a strong case for or against the effectiveness of a program.

### 4.2.3 Change in behaviour

Changing behaviour is the main challenge that a fire education program faces. It takes minimal effort for a person to take home pamphlets and listen to fire officials speak about fire safety, but it is much more difficult to act on this awareness (Rhodes Personal Interview). The goal of behavioural change is to affect the manner in which people reduce the fire risk of their environment. Anecdotal evaluations differ because they measure the reactions in an emergency situation while behavioural change measures the proactive steps taken by the individual. For example, an anecdote could be a story about how a person acted correctly in response to a smoke detector going off. A measure of change in behaviour, in this same scenario, would be if the person had changed the batteries in their smoke detector as instructed. Changing behaviour is one of the ultimate goals of any public education program and is therefore extremely important to measure.

### 4.2.4 Change in awareness

A change in behaviour can only be achieved if a change in awareness occurs first. People must know about fire safety and know how to prevent and properly react to a fire in order to change their behaviour. An example of change in awareness is whether a person knows that the batteries in their smoke detector should be changed twice a year. Awareness is easier to

measure than change in behaviour; a person is either aware of something or they are not, there is commonly no middle ground. Awareness alone, however, does not tell how a person received the information or if they are actively applying it in their lives. It does, however, show if the program is achieving its goal and getting the message of fire safety across to its participants.

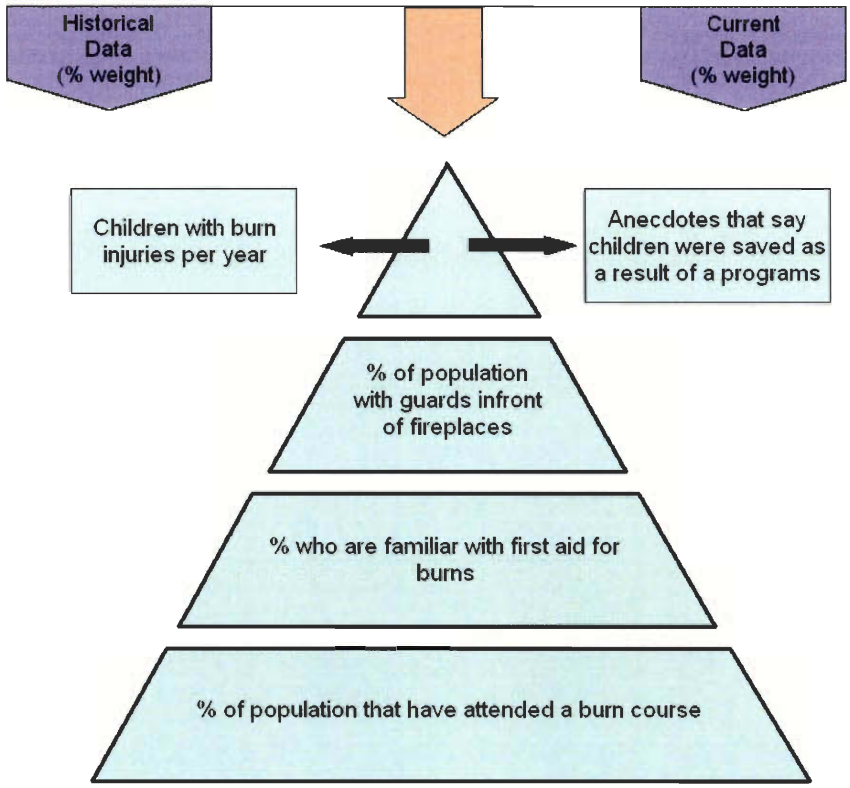
### 4.2.5 Extent of program outreach

Information distribution is the first step to the success of any fire education program. This is the quantifiable form of data in the hierarchy. Extent of program outreach involves information such as what percent of the community attended a fire education program and how many brochures a fire brigade handed out in a specific time period. This quantifiable evidence supports the conclusions drawn from the change in awareness, change in behaviour, and anecdotal information, which are all qualitative forms of data.

### 4.2.6 Specific example of hierarchy for an education program

A program that the CFA and MFB conduct together is "Early Fire Safe" It is aimed at fire safety for children under the age of five. One aspect is preventing burns and scalds. Figure 6 is an example of sample measures that could be used for this program:

Figure 6: Sample Hierarchy for Early Fire Safe




This is an example, developed by the project group, of the types of questions that represent the different levels of the hierarchy. The information at the top of the hierarchy has the most weight placed on it. The measures in each section are samples to indicate the type of data that would be collected to support that section of the hierarchy. These measures are specific to the goals of a particular fire prevention program.

### 4.2.7 How to collect data for hierarchy

It is necessary to use several methods of data collection to determine the effectiveness of a program. The main technique is using surveys. By using various types of surveys, data about anecdotes, behaviour, and awareness can all be accurately collected. Extent of program outreach data

can be collected through reports regarding the delivery of a program. This covers all four levels of the hierarchy.

#### 4.2.7.1 Post Incident Interview

Post incident interviews collect the information needed for anecdotal and behavioural data. Interviews need to be conducted on a one-on-one basis and must use open-ended questions. This reduces the bias of the persons involved in the fire incident and allows the individual to answer the questions in a manner that reflects how the incident actually occurred.

The most important part of a post incident interview is that it is conducted for all fire incidents. Interviewing a person who has recently been through a trauma such as fire damage to a house or even the death of a family member can be a daunting task. However, it is equally, if not more important to retrieve information from these types of large loss fires. It must be understood why the larger degree of damage occurred. More time should be allocated between the fire incident and the interview for persons who have been exposed to a greater trauma, but the interview must still be conducted.

To collect the anecdotal information, questions regarding how the person reacted to the actual fire must be asked. This behaviour ranges from reaction to discovery or ignition of the fire, notification of the fire department, any behaviour to extinguish or mitigate the spread of the fire, and evacuation procedures. Whether correct or incorrect, those involved in the fire incident must also be asked where they learned this behaviour.

In addition, questions regarding preventative behaviour should also be asked. This information would include what measures had been taken before

the fire that contributed to the reduction of risk. Examples would be whether the property's owner had changed the smoke detector batteries in the last six months, if a fire extinguisher had been purchased for the premises, and if the excess debris had been cleared from around the house. Obviously, these questions would be tailored to the type of fire that occurred.

These questions should not be asked in a leading manner. This would result in bias from the interviewee. Instead of asking, "Did you clear the excess brush from around your house in case of a wildfire," it can be asked, "How did you prepare your home in case of a wildfire?" The same principle applies to the anecdotal interview questions.

#### 4.2.7.2 Pre- and Post-Tests

Pre- and post-tests are to be conducted before and after public education programs are delivered. This method directly measures the short-term effectiveness of changing the awareness of the program's participants. The easiest and most efficient way to conduct this survey is to create a list of questions that outline the major goals of the program, followed by multiple-choice responses. This allows the data to be quantified to some extent.

The behaviour change as the result of a program can also be measured, but the test must be conducted after an ample amount of time has passed. This amount of time will vary depending on the expected outcomes. The participants must be given time to absorb the knowledge that has been gained from the program and then act on it.

The genuine results of a program will not be truly understood for many years. Since public education programs have only been in existence for approximately ten years, much of the population is still unaware of fire safety. The ultimate results of a program will be when the children who are currently participating in public education programs grow up and raise children of their own. This is why general population surveys, or ad hoc surveys, will become important.

#### 4.2.7.3 Ad Hoc Surveys

The fundamental goal of all public fire education is to change the behaviour and increase the awareness of the general public. The previous two types of surveys have assessed individuals who have either been exposed to a fire incident or have gone through a program. The rest of the population must also be surveyed in order for general trends to be formed.

Ad hoc surveys need to be completed after a specific time interval, such as every eight months. The surveys should cover different seasons because people's awareness levels can be skewed due to the time of the year. As an example, a community might pay more attention to wildfire safety during the summer months when wildfires are more prevalent. An appropriate target audience must also be identified based on what is being evaluated. From this proposed demographic, a venue can then be targeted to conduct the survey.

The key to having an effective ad hoc survey is to ensure that the sampling is random within the targeted population and that those chosen to participate in the survey complete all the questions and return it. General information such as age, sex, and address (general area will suffice) must be collected. The answers should be in multiple-choice form, but with the option

to check "other" and space to elaborate on this answer. This is so that the responses can be compared and quantified, but it does not force the participant to conform to one of the given answers. Whoever delivers the survey should personally hand it to the participants and ensure that it is then returned. This minimises the risk of bias in the results. If the survey is distributed to a large group of people and they are then asked to turn it in themselves, it is more likely that the people who know the answers or are already intrigued by fire safety will return it.

This type of survey is targeted at determining change in behaviour as well as awareness. An example of a general awareness question would be "How often should you change your smoke alarm battery?" A follow-up question that analyses change in behaviour could be, "When was the last time you changed the battery in your smoke alarm?" The questions for an ad hoc survey can either be specific to a program, such as smoke alarm maintenance, or can test general fire safety by asking questions that address a number of fire safety concerns.

# 5 Conclusions

In order to achieve the highest amount of fire safety there must be a mix that appropriately values both fire suppression and prevention. This can only be achieved by having a universal system of evaluation that spans the three fire agencies. The MFB, CFA, and DSE each have their own cultures and responsibilities. These differences cannot be overlooked and must be recognised when using performance measurements.

## *5.1 Testimonials of support for hierarchy system*

Alan Rhodes, Kathy Overton, and Luke Hooper (fire officials from all three agencies, have all agreed that a hierarchy is one of the most effective ways to evaluate the performance of a fire prevention program. Rhodes discussed the need to establish trends in order to determine if programs are causing changes in behaviour. Changing the actions of the public cannot be attributed to one factor; it is not possible to prove that one factor leads to one outcome. However, if many factors are combined to support each other, strong suggestions can be made about the effects of a program. This is why the hierarchy is the ideal combination (Rhodes Personal Interview).

Due to the lack of public education provided by the DSE, Overton had not worked with evaluations to the extent as Rhodes. She does, however, collect anecdotes to support the fire safety information that the fire management department distributes. This is the form of evaluation that she believes is the most robust (Overton Personal Interview).

The MFB also currently uses anecdotes as a form of evaluation. However, Hooper recognises that this method is preferred because anecdotes

produce instantaneous results. A more effective form of evaluation would be anecdotes in conjunction with trends developed over time (Hooper Personal Interview). The MFB also has experience using surveys for evaluation of awareness with the general public. However, the survey had several flaws and the information was not properly collected or recorded. The anecdotes were also not properly recorded. They did not collect the information needed to convey effectiveness (Hooper Personal Interview).

Overall, all three agencies realise what needs to be done to properly evaluate an education program. However, they need guidance as to how to collect this information, what information to collect, and how to record and analyse this information in order to work together. All were eager to establish a procedure and support the use of the hierarchy as well as the surveys.

## *5.2 Weaknesses of measures*

The weakness of any form of evaluation measure is that is it impossible to prove what the direct effect of a program has had on decreasing the fire risk of a community. It is impossible to show that one public education program was the sole result of any fire safety behaviour. There will always be other factors that will mitigate or enhance the spread of fire.

Although the hierarchy evaluation method creates a well-rounded measurement system because it combines a mixture of subjective qualitative data and objective quantitative data, there are conditions that must be met for the hierarchy to be an effective evaluation. In order for the hierarchy to remain unbiased and accurate, data must be collected from every fire incident. Each situation gives a different perspective of behaviour. If incidents go unreported, no true benchmarks or standards can be developed.

For the hierarchy to be effective, it must remain only as a general methodology so that it is applicable to the three agencies. Regardless of responsibility, the three agencies need to monitor how their prevention programs alter the behaviour or awareness of the targeted community. This methodology must be used by the three agencies so that a consistent standard can be developed.

There is, however, concern with the use of anecdotal information. Unfortunately, this measure relies on the accounts of people who have experienced the traumatic occurrence of a fire incident. A person's memory can be unclear after the incident; some may change their story because they do not want to admit how they behaved, while the physical conditions of others could prevent them providing an accurate account of the incident. The human error will always be a factor affecting the accuracy of the evaluations. With proper surveying techniques, this inaccuracy can be minimised. With the use of data from fire incidents, this inaccuracy is further minimised. The mix of qualitative and quantitative data creates a robust level of the hierarchy. This combination of first-hand accounts and facts should eliminate any discrepancies.

# 6 Recommendations

There are several key recommendations for the successful implementation of this project. The most important factor is increased communication. Although the major responsibilities of the DSE and MFB differ, there are areas that overlap. Therefore, there are areas where the two agencies could benefit from a communication of evaluation techniques. Although the three agencies deal with different types of risk, their prevention programs all attempt the same thing; increase the safety of the Victorian communities. With one system of evaluation and open communication, the agencies could share the strengths and weaknesses of each program.

This hierarchy of evaluation, as well as the entire Fire Safety Victoria project, is only effective if all three agencies adopt it. There needs to be a commitment from the senior management of the MFB, CFA, and DSE to implement the uniform performance measurements. The hierarchical evaluation technique, proposed by the project group, is intentionally general so that it can be applied to any prevention program.

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# 8 Appendices

## *Appendix A*

Who is our Sponsor?

**The role of the Office of the Emergency Services Commissioner**

- The Office of the Emergency Services Commissioner provides independent, objective and strategic policy advice on emergency services to the Minister for Police and Emergency Services and the Department of Justice Executive.
- The Emergency Services Commissioner is also responsible for supporting the Minister for Police and Emergency Services as Coordinator in Chief of Emergency Management, and chair of the Victoria Emergency Management Council.

**The role of the Commissioner**

- Establish and monitor performance standards for the emergency services, including implementation of a standard model of fire cover for Victoria so areas of similar risk and hazard profiles will receive the same standard of fire cover.
- Oversee more effective utilization of the common resources of the Metropolitan Fire and Emergency Services Board, the Country Fire Authority and the Victoria State Emergency Service.
- Provide emergency management leadership for Victoria as Executive Officer of the Victoria Emergency Management Council.

**The responsibilities of the Emergency Services Commissioner**

1. **Emergency services** (specifically the CFA, MFESB and State Emergency Service) are organizations whose primary role is to respond to urgent requests for assistance from the public. Equally important is their role in raising public awareness of safe behaviours in potentially hazardous situations and practices and in working closely with municipal councils and other bodies to prevent such situations.

2. **Emergency management** arrangements involve the emergency services and many other organizations, such as councils, government departments, and voluntary organizations. The Emergency Management arrangements are designed to co-ordinate the capacity to prevent (where possible), mitigate the impact of, respond to and help the community to recover from, a wide range of emergency events, including floods, bushfires, storms and man-made situations, such as essential service disruptions. The Victoria State Emergency Service (VicSES) assists local councils by providing advice and training in relation to emergency management. In addition, VicSES has a statutory duty to audit Municipal Emergency Management Plans.

3. **Asset Utilization:** The Commissioner is responsible for promoting effective asset utilization across the Metropolitan Fire and Emergency Services Board, the Country Fire Authority and the Victoria State Emergency Service. Where appropriate this might involve the co-location of services in particular areas and include other emergency services, such as ambulance.

Source: Office of the Emergency Services Commissioner. 11 November 2002. Department of Justice, Victoria. 20, Feb. 2003
http://www.justice.vic.gov.au/CA2569020010922A/page/Business+Units-Office+of+the+Emergency+Services+Commissioner?OpenDocument&1=0-Business+Units~&2=0-Office+of+the+Emergency+Services+Commissioner~&3=~