Literature Review:

Evaluation of the Effectiveness of the
Graphic Health Warnings on
Tobacco Product Packaging
2008

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1.   Executive Summary

Graphic health warnings that depict the possible consequences of smoking are an increasingly common feature of tobacco product packaging worldwide. Canada was the first country to introduce graphic health warnings, replacing text-only health warnings in 2000, with Brazil following in 2002. By February 2008, governments in Singapore, Jordan, Thailand, Venezuela, Panama, Australia, Uruguay, Chile, Belgium, Hong Kong, Korea and New Zealand had also introduced graphic health warnings, with many others considering or planning to do so in the future. A table listing these countries (as known at the time of writing), together with the number, size and position of the warnings, appears in the Appendix.

This global phenomenon has been driven, to a large extent, by research that demonstrates the effectiveness of graphic health warnings in increasing knowledge and awareness of the health risks of smoking and in encouraging smoking cessation.

Much of the research in the area is from Canada, where graphic health warnings appear to have played a significant role in enhancing both smokers' and non-smokers' understanding of the specific health consequences of smoking, motivating smokers to quit, discouraging relapse, and deterring potential smokers from starting to smoke (Hammond et al, 2003; Hammond et al, 2004b). The International Tobacco Control (ITC) Project examines and compares the effect of various forms of packaging on smoker behaviours and attitudes across a number of countries and demonstrates the greater effect of the graphic health warnings compared to text-only warnings (Hammond et al, 2007). Preliminary studies in Brazil, Singapore and Thailand indicate that graphic health warnings have also had a positive impact on knowledge of smoking risks, and motivation to quit (Datafolha Institute, 2002 cited in Agencia Saude, 2003; Channelnewsasia.com, 2006; Silpasuwan, 2006).

In essence, recent research continues to highlight the influence of a number of key factors on the overall effectiveness of graphic health warnings on tobacco product packaging. The importance of health warning noticeability, the presentation of motivating themes, message clarity, credibility and reinforcement are emphasised throughout the literature. Significantly, past research indicates that these factors must accommodate the varying ways in which specific consumer groups respond to health warnings. Health warning relevance and variety are therefore also notable. Finally, the introduction of plain packaging has also been raised in the literature as a future measure that is likely to lend significant support to the impact of health warnings.

The following is a summary of a review of existing research relating to graphic health warnings on tobacco product packaging. It was prepared by Elliott & Shanahan Research between November 2007 and February 2008 as the first stage of research, to inform the evaluation of Australian graphic health warnings on tobacco product packaging and was conducted for the Department of Health and Ageing (DoHA). The review focuses on the impact of graphic health warnings, and is based on data and information from both Australian and international studies.

1.1   Key Outcomes of the Literature Review

The literature review, although one part of an evaluation program designed to determine the effectiveness of the graphic health warnings on consumers, is in itself extensive. The key outcomes of the review are as follows:

- Recent studies provide considerable evidence of the effectiveness of graphic health warnings in raising awareness of the risks of smoking, increasing consumer knowledge of the health effects of smoking, encouraging the cessation of smoking, and discouraging smoking uptake or relapse;

  Much of the literature compares and contrasts graphic health warnings with text-only health warnings on a number of critical factors and clearly shows that graphic health warnings are less susceptible to wear out than text-only warnings, and out-perform text-only health warnings on a number of factors; for example:

  − on noticeability and overall impact of the warning,

  − on the impact of the message, in encouraging consumers to think about health consequences, and in encouraging cessation,

  − in bringing about positive attitudinal and behavioural changes associated with smoking cessation,

  − increasing knowledge of the health risks of smoking and in making consumers aware of the range of adverse health effects of smoking,

  − appear to have more impact than text-only health warnings in lower socio-economic groups and among those with limited literacy, and in influencing younger people, and

  − both graphic health warnings and text-only warnings appear to be more effective in influencing "lighter" smokers and those contemplating quitting than they are in influencing committed smokers;

- Design features play an important role in determining the potential effectiveness of graphic health warnings. To this end, specific features which have emerged from the literature review and are important to the effectiveness of the warning include:

  − the size of the warning (the larger the better, as this promotes visibility and enables warnings to compete with other pack elements),

  − the position on the pack (front panel in particular is most important),

  − the use of colours (particularly contrasting colours),

  − clarity of warning (easily understood imagery, simply and clearly defined),

  − typeface and font size (print type and style influence legibility), and

  − large, uncluttered text (simple, non-technical words);

- The choice of health warning itself is important. Allied to this is the notion of:

– firstly, getting the right message (message content) such as: personalising health risks, conveying the impact on others, social consequences, and reference to benefits of quitting, and

– secondly, getting the message right or message execution. Thus, credibility and relevance of the message conveyed in a clear, simple and direct format is important and so too is its ability to arouse an appropriate emotional response. The combining of both rational and emotional elements appears to be particularly important.

1.2   Effectiveness of Graphic Health Warnings

Recent research indicates that graphic health warnings have a stronger impact on smokers than text-only warnings. The International Tobacco Control (ITC) Project shows that Canadian smokers were more likely to cite graphic health warnings as a source of information, were more aware of a range of adverse health effects of smoking compared to that of their counterparts in countries where there are text-only health warnings (Hammond et al, 2007).

Moreover, the impact of graphic health warnings may be sustained more effectively in the longer term, with evidence to suggest that they are less susceptible to "wear-out" (Environics Research Group, 2005a; Hammond et al, 2007).

Graphic health warnings have varying levels of success in influencing particular smoker groups. For example:

- Overall, both text-only and graphic health warnings generally appear to have had greatest effect on middle-aged to older smokers (Willemsen, 2002; Omar et al, 2006). However, several studies indicate that graphic health warnings may be more successful than text-only warnings in influencing younger smokers (Datafolha Institute, 2002, cited in Agencia Saude, 2003; Environics Research Group, 2005a; Environics Research Group, 2005b; O'Hegarty et al, 2006; Golmier et al, 2007);

- The research suggests that those on more moderate incomes are generally most likely to be influenced by health warnings overall (Omar et al, 2006). Nonetheless, in countries such as Brazil and Thailand, lower socio-economic groups appear to have responded particularly well to graphic health warnings (Datafolha Institute, 2002, cited in Agencia Saude, 2003; Silpasuwan 2006). Other studies suggest that this may be dependant on the complexity of the warning and its clarity for those with low levels of literacy (Createc+, 2003);

- While the ITC Project indicates that both text-only and graphic health warnings are likely to have a greater impact on males than females (Omar et al, 2006), a number of other studies have found that females respond more strongly than males to health warnings, particularly those featuring graphics (Koval et al, 2005; O'Hegarty et al, 2006; Thrasher, Rousu et al, 2007); and

- The research appears to be more consistent in regard to the greater influence that both text-only and graphic health warnings have on "lighter" smokers and potential quitters compared with their effect on "heavy", or more committed smokers (Hammond et al, 2004a; Environics Research Group 2005a). Several studies have noted the contrasting ways in which these groups respond to graphic health warnings, with "lighter" smokers generally finding them motivating, and committed smokers tending to be more dismissive about their impact (European Health Research Partnership and Centre for Tobacco Control research 2002; Elliott & Shanahan Research 2003).

1.3 Factors that Influence the Effectiveness of Graphic Health Warnings

Getting the Warning Noticed

While the use of graphics clearly enhances the noticeability of a health warning, the size of the warning, position on the pack, choice of colours, typeface and layout also have a strong bearing on whether or not a warning is noticed. The research shows that, in order to maximise visual impact, a graphic warning should:

- Occupy as much of the surface area of the pack as possible (Borland, 1997; Informa Market Research, 1999; Environics Research Group, 1999; BRC Marketing & Social Research, 2004b; Hammond, Fong, McNeill et al, 2006);

- Be situated on the front of the pack. Research shows the front of the pack to be a significantly more prominent position for a health warning than either the side or the back of the pack (Elliott & Shanahan Research, 1996; Borland & Hill, 1997; Environics Research Group, 1999; Informa Market Research, 1999; Elliott & Shanahan Research, 2000; Environics Research Group, 2005a);

- Use contrasting colours, red, and avoid black and white (Gill et al, 1987 cited in Wogalter et al, 2002; Kline et al, 1993; Braun et al, 1994; Liefeld, 1999; Informa Market Research, 1999; BRC Marketing & Social Research, 2004a, 2004b); and

- Use borders around the warning text (Wogalter & Rashid, 1998, BRC Marketing & Social Research, 2004b).

The accompanying text on graphic health warnings has also been shown to have an impact on the noticeability of the warning. The research suggests that the text on health warnings should use:

- Large fonts (Viscusi & Magat, 1986 cited in Popper & Murray, 1989; Karnes & Leonard, 1986, cited in Popper & Murray, 1989; Engel et al, 1993; Young et al, 1995; Borland & Hill, 1997; Nilsson, 1999; Informa Market Research, 1999);

- Upper case lettering (UK Health Authority, 1990 cited in Centre for Behavioural Research in Cancer, 1992);

- Bold type (Sanders & McCormick, 1993, cited in Wogalter et al, 2002);

- Brief messages (Wogalter et al, 2002; BRC Marketing & Social Research, 2004b);

- Bullet points rather than continuous text (Hartley, 1994, cited in Wogalter et al, 2002; Wogalter & Shaver, 2001, cited in Wogalter et al, 2002); and

- Signal words, such as "Danger" and "Warning" (Wogalter et al, 1985, cited in Wogalter et al, 2002; Young et al, 1995).

Developing Meaningful Message Content

Message content has evolved over the years from general health warnings to more specific messages addressing a range of issues that tend to fall into one of four categories (outlined below). Recent research provides further evidence for the significance of these messages in encouraging smoking cessation, and provides greater insight into the most effective means of conveying these messages to smokers:

- **Health risks**: The literature shows that concern about the health risks of smoking is the most common motivation for quitting (Hammond et al, 2004b). Messages that relate to personal health risks, impact on others, social consequences, and benefits of quitting have been shown to be effective in promoting smoking cessation through encouraging motivation to quit, increasing smoker knowledge of health consequences, and raising their concerns. In this regard, much of the past research points to the greater effectiveness of messages that relate to specific health risks rather than to health more generally (Mahood, 1995; Hammond, Fong, McNeill et al, 2006; Ferrence et al, 2007). The relevance of specific health concerns tends to vary for different consumer groups (see *'Health Warning Relevance'* below);

- **Impact on others**: Concern about the impact of smoking on others has also been shown to influence motivation for quitting (Romer & Jamieson, 2001). Research indicates that health warnings that convey the risks of passive smoking for children and babies have a strong impact, particularly on those smokers who have children (European Health Research Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; Thrasher et al, 2006);

- **Encouraging positive attitudes about quitting**: The literature also points to the importance of including messages that focus exclusively on the benefits of quitting, or "gain framed" messages (appeal in a positive way, by presenting the avoidance of health risks as a benefit of quitting). These warnings have been found to encourage smokers to feel that quitting is desirable, worthwhile and achievable. Such an approach works well in tandem with "loss framed" warnings (i.e. describing the undesirable consequences of smoking that smokers are at risk of acquiring) (Strahan et al, 2002; European Health Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; BRC Marketing & Social Research, 2004a); and

- **Social consequences**: Recent research provides further support for the effectiveness of messages that appeal to social norms, by focussing on the undesirable social consequences of smoking such as bad breath, yellow teeth, effect on skin, and social disapproval. Several studies have shown this to be an effective approach for targeting young people, who appear to be particularly receptive to messages pertaining to potential negative social consequences, social threat and social disapproval (Strahan et al, 2002; European Health Research Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; BRC Marketing & Social Research, 2005; Department of Health (UK) 2007).

Getting the Tone Right

Much of the literature suggests that fear appeals can be effective in motivating behavioural change providing that they are sufficiently strong and credible, and are accompanied by efficacy messages that help smokers develop positive attitudes towards quitting, by demonstrating both how the health risk can be avoided (i.e. by quitting), and how this can be achieved (i.e. how to quit or where to get help) (Gill et al, 1987 cited in Wogalter et al, 2002; Liefeld, 1999; Strahan et al, 2002).

Fear based messages have a high level of "cut-through" and produce an emotional response from smokers, and, in so doing, help to establish unfavourable associations with smoking (Damasio, 1994, cited in Peters et al, 2007; Romer & Jamieson, 2001; Slovic, 2001).

Some researchers question the use of fear based appeals in health warnings on tobacco product packaging (Ruiter and Kok, 2005); however, several studies have demonstrated the strong impact that "shocking" graphics frequently have on viewers, with evidence to suggest that they may encourage smokers to consider cessation if coupled with appropriate pro-quit messages (Hammond et al, 2004a; Focus Canada, 2001; BRC Marketing & Social Research, 2005).

Fear arousing messages appear to have greatest impact on those who are highly involved in the issue and this is greatest if the message is personalised. Egger, Donovan and Spark (1993) suggest the need to emphasise the "me" in the message because people are motivated out of self interest. Messages need to convey the personal consequences and the high probability of negative consequences.

Clear, Simple and Direct Warnings

It is apparent from the literature that health warnings on tobacco product packaging must be clear, simple, and direct, in order to be understood (Elliott & Shanahan Research, 2003; Department of Health (UK), 2007). This applies to the image used in graphic warnings as much as to the text (Elliott & Shanahan Research, 2003; BRC Social & Marketing Research, 2004a; Thrasher et al, 2006). This has been shown to be particularly important for conveying the risks of smoking to those with low levels of literacy (Createc+, 2003). There is also evidence to suggest that narrative style pictures may enhance understanding of warning messages (BRC Marketing & Social Research, 2004a).

Health Warning Credibility

Recent research continues to demonstrate the significance of message credibility, in increasing knowledge and awareness of the effects of smoking and potentially leading to positive behavioural change. Smokers who believe the messages conveyed on health warnings on tobacco product packaging are far more likely to be influenced by them (BRC Marketing & Social Research, 2005; Hammond, Fong, McNeill et al, 2006; O'Hegarty et al, 2007). Message credibility may be affected by the extent of general awareness of specific consequences of smoking, with some claims likely to be rejected if they appear too extreme (O'Hegarty et al, 2007).

The literature indicates that credibility may be enhanced by:

- Using messages that are personalised, direct and unambiguous. Appealing to the individual, through the use of the second person in warning statements, has been shown to be effective (Mahmood, 1995; Environics Research Group,1999; Elliott & Shanahan Research, 2003);

- Avoiding probabilistic language (such as "can" and "may") and thereby leaving no room for doubt (Crawford et al 2002; European Health Research Partnership and Centre for Tobacco Control Research, 2002);

- Attributing the warning to a specific, reputable and expert source (Wogalter et al, 1997; European Health Research Partnership and Centre for Tobacco Control Research, 2002; Guttman & Peleg, 2003). There is inconsistency in the literature as to whether government or medical sources are considered credible;

- Using large sized warnings (Wolgater et al, 1997); and

- Using "signal" words (such as "Danger", "Warning" etc) (Etudes de March Createc, 1999).

Health Warning Relevance

The literature highlights the importance of targeting messages to specific audiences. Research shows that the impact of different messages varies for different audiences, reflecting the extent to which they are personally relevant (Strahan et al, 2002; Department of Health (UK), 2007; Createc+, 2003). Understanding target group knowledge, beliefs and attitudes is therefore considered critical to the development of effective warning messages (Egger et al, 1999; Strahan et al, 2002; Donovan & Henley, 2003).

Age, gender and cultural differences in response to specific health warnings have been observed:

- Older people tend to be more influenced by messages pertaining to existential/ terminal health risks of smoking, such as cancer, heart disease, stroke and diseased lungs (Environics Research Group, 1999; European Health Research Partnership and Centre for Tobacco Control Research, 2002; Environics Research Group, 2005a; O'Hegarty et al, 2006; Department of Health (UK), 2007);

- Younger people respond better to messages conveying more immediate health risks such as poor fitness and negative social consequences (Beede & Lawson, 1992; Elliott & Shanahan Research, 1996; Environics Research Group, 1999; BRC Marketing & Social Research, 2005). Studies have shown messages relating to the undesirable cosmetic effects of smoking to have a particularly strong impact on girls (Strahan et al, 2002; European Health Research Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; BRC Marketing & Social Research, 2005; Environics Research Group 2005a; Department of Health (UK) 2007);

- Females also seem to be more strongly influenced by messages relating to pregnancy and children (European Health Research Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; Environics Research Group, 2005a; BRC Marketing & Social Research, 2005; Department of Health UK, 2007);

- Males tend to respond more strongly to messages relating to impotence (European Health Research Partnership and Centre for Tobacco Control Research, 2002; Environics Research Group, 2005a; BRC Marketing & Social Research, 2005); and

- People of different cultures and nationalities have been found to respond in varying ways to different health warning messages and tonal qualities (European Health Research Partnership and Centre for Tobacco Control Research, 2002).

1.4 Health Warning Variety, Rotation and Review

The research suggests that using a variety of messages and targeting them appropriately is likely to strengthen overall impact (Nilsson, 1999; Hammond et al, 2003; Devlin et al, 2005). Systems of rotation and periodic revision help to maintain variety, and enhance both the salience and relevance of health warnings for different target groups (Krugman et al, 1994; Andrews, 1995; Greenfield, 1996; Strahan et al, 2002; Donovan & Henley, 2003; Hammond et al, 2007).

Systems of rotation and periodic review are commonly used to maintain health warning variety, keeping warnings "fresh", and allowing for coverage of a range of health risks. The periodic review and revising of health messages has been commonly advocated as a means of increasing variety (Hammond et al, 2007; Strahan et al, 2002; Donovan & Henley, 2003; Krugman et al, 1994). Periodically reviewing the messages is particularly important in that it enables updating of messages to prevent wear-out and in so doing, increases attention, readership, and knowledge, facilitating the overall impact of the health messages in general (Nilsson, 1999; Hammond et al, 2003; Devlin et al, 2005).

Introducing a variety of messages and rotating messages counters over-exposure, broadens targeting; and the presentation of new and specific information provides "novelty", reduces inattention and processing habituation (Strahan et al, 2002; Donovan & Henley, 2003; Andrews, 1995; Greenfield 1996).

1.5   Health Warning Reinforcement

The literature shows that other communications and media activity can be used to reinforce health warning messages, helping to strengthen both their reach and impact (Strahan et al, 2002; Elliott & Shanahan Research, 2003; Devlin et al, 2005).

These measures may be further supported by other forms of tobacco control, thereby contributing to the "denormalisation" of smoking. Many researchers assert that changing societal values in relation to smoking is particularly powerful in both encouraging cessation and deterring uptake (Costa e Silva, 2003; Hammond et al, 2004a; Silpasuwan, 2006).

1.6   Plain Packaging

The literature indicates that, while not yet introduced in any country, the use of plain packaging for tobacco products (i.e. restricting or prohibiting the use of logos, colours, brand imagery or text other than brand names printed in a standard colour and font size) is likely to strengthen the impact of health warnings.

Most research assessing the effect of plain packaging on health warnings has focussed on text-only warnings, suggesting that the removal of branding cues from packaging may enhance the memorability of the health warning (Beede & Lawson, 1992; Goldberg et al, 1995; Goldberg et al, 1999; Centre for Health Promotion, 1993; Rootman & Flay, 1995).

While young people appear more likely than older people to see the benefits of plain packaging in discouraging smoking (Centre for Health Promotion, 1993; Rootman & Flay, 1995; Goldberg et al, 1995; Goldberg et al, 1999; Carter & Chapman 2006). Research conducted in Victoria suggests that support for plain tobacco packaging amongst adult Australians may be increasing. A tracking survey showed that approval for plain packaging amongst Victorians aged 18 years and over rose from just over half the sample (52%) in 2004 to 63% in 2006. Approval was lower amongst older people (60% of those aged 50+ years) and smokers (51%) (The Centre for Behavioural Research in Cancer cited in The Cancer Council Victoria, 2007).

2. Introduction

2.1 Background

The following document, prepared by Elliott & Shanahan Research for the Department of Health and Ageing (DoHA), details the findings of a review of the literature on graphic health warnings on tobacco product packaging conducted during December 2007 to February 2008. It is the first stage of a study to evaluate the effectiveness of Australian graphic health warnings on tobacco product packaging.

The study will ultimately provide an extensive evaluation of the graphic health warning system as per the requirements of the Trade Practices Consumer Product Information Standards (Tobacco) Regulations 2004. It will examine in detail the perceptions, impressions, experiences of, and attitudes toward, the graphic health warnings on tobacco product packaging.

The study is being undertaken in two stages: firstly, a review of existing research on graphic health warnings on tobacco product packaging; and secondly, primary research that will use exploratory, qualitative and quantitative survey techniques to evaluate the health warnings.

2.2 Research Objectives

The overall aim of the project was to determine and evaluate the effectiveness of the graphic health warnings on consumers, and to evaluate the impact of the content of the health warnings system in achieving their purpose to:

- Increase consumer knowledge of the health effects relating to smoking;

- Encourage the cessation of smoking; and

- Discourage smoking uptake or relapse.

This literature review aims to provide a contextual background for the evaluation, as well as providing input into the development of discussion/interview guides and a survey questionnaire that were used in the second research stage.

2.3 About this Report

The research reviewed in this report comprises a range of Australian and international studies on health warnings on tobacco product packaging. The previous literature reviews by Elliott & Shanahan Research on health warnings (conducted in 1996 and 2000) have also been reviewed and included. However, where relevant the emphasis is on more recent data and focuses on the use of graphic health warnings.

3. The Evolution of Health Warnings on Tobacco Product Packaging

3.1 Increasing Global Usage of Graphic Health Warnings

Health warnings on tobacco product packaging are a generally accepted part of tobacco control strategies worldwide, with many countries requiring tobacco packaging to include some form of health warning that alerts smokers to the potential health risks of smoking tobacco.

Government approved health warnings became mandatory in many countries during the 1970s, including Australia. At this time, health warnings tended to be small, text-only and conveyed one general health warning (akin to *"Warning Smoking is a Health Hazard"*, which was the first Australian warning, developed in 1973). Since then, health warnings in many countries have evolved considerably, becoming progressively larger, situated in more prominent positions on the pack and conveying more specific health messages.

The Australian Government is a Contracting Party to the World Health Organization Framework Convention on Tobacco Control (FCTC), an international tobacco treaty which provides a global policy framework for strong measures to address the death and disease caused by smoking. The FCTC entered into force on 27 February 2005, making the provisions of the treaty legally binding for Contracting Parties. Article 11 of the FCTC contains the following requirements for "Packaging and labelling of tobacco products":

> *"Each Party shall, within a period of three years after entry into force of this Convention for that Party, adopt and implement, in accordance with its national law, effective measures to ensure that:*
>
> *…each unit packet and package of tobacco products and any outside packaging and labelling of such products also carry health warnings describing the harmful effects of tobacco use, and may include other appropriate messages. These warnings and messages:*
>
> - *Shall be approved by the competent national authority;*
>
> - *Shall be rotating;*
>
> - *Shall be large, clear, visible and legible;*
>
> - *Should be 50% or more of the principal display areas but shall be no less than 30% of the principal display areas; and*
>
> - *May be in the form of or include pictures or pictograms.*
>   (World Health Organization, 2003).*

While the use of graphics/pictures is a recommendation rather than a requirement in the FCTC, there has been a global trend towards applying graphics to health warnings on tobacco product packaging in recent years. Canada was the first country to introduce graphic health warnings, replacing text-only health warnings in 2000, with Brazil following in 2002. By February 2008, governments in Singapore, Jordan, Thailand, Venezuela, Panama, Australia, Uruguay, Chile, Belgium, Hong Kong, Korea and New Zealand had also introduced graphic health warnings, with many others considering or planning to do so in the future. A table listing these countries (as known at the time of writing), together with the number, size and position of the warnings appears in the Appendix.

3.2   Strong Public Support for Graphic Health Warnings

In the countries where graphic health warnings have been introduced, they have met with strong public approval. In a survey conducted in Brazil following the introduction of graphic health warnings in 2002, some three-quarters (76%) of the sample approved of the introduction of the new health warnings, including 73% of smokers in the study (Cavalcante, n.d.). Similarly, in Canada, public support for the health warnings has remained high since their introduction in 2000, with around 8 in 10 Canadians seeing them as an important source of information about the health effects of smoking (Environics Research Group, 2005a).

The literature suggests that, for the public, health warnings on tobacco product packaging generally are a significant sign of government commitment to tobacco control. An evaluation of Australian text-only health warnings in 2000 found that nearly half of all respondents (49%) claimed that health warnings were "very important", with this proportion increasing significantly from 43% in 1996. Non-smokers tended to be most adamant about the significance of the warnings, with some 73% deeming them "very important" (Elliott & Shanahan Research, 2000).

The type of health warnings in circulation have been subject to public scrutiny, with general support for more explicit health warnings. For example, the 2000 evaluation noted an increasingly common perception amongst the Australian community that health warnings on tobacco product packaging needed to be "stronger" in order to have a significant impact on smokers' behaviour, and recommended the introduction of "harder hitting" graphic health warnings (Elliott & Shanahan Research, 2000). Similarly, a 2002 Eurobarometer survey found that some 38% of European Union (EU) citizens believed that the addition of colour images to cigarette packages would be useful in persuading people either not to smoke, to smoke less or to quit (Commission of the European Communities, 2005).

Conversely, the continued use of text-only health warnings has sometimes been seen as a sign of government indifference or neglect in regard to the issue. For example, a study comparing young adults' impressions of health warnings in Canada, where warnings are large and graphic, and the United States, where warnings are small and text-only, found that study participants felt that the Canadian Government must "care more" about its citizens (O'Hegarty, Pederson, Yeokyan, Nelson & Wortley, 2007). Similarly, the text-only health warnings used in the EU were regarded as serving the self-interest of either the government or the tobacco industry (European Health Research Partnership and Centre for Tobacco Control Research, 2002).

In Australia, while public response to the introduction of graphic health warnings is yet to be assessed, the issue has been covered extensively in the media. Overall, there has been strong support for the graphic health warnings, as a means of encouraging smokers to quit and stay quit, and discouraging young people from starting to smoke.

4. The Effectiveness of Graphic Health Warnings

In Australia, health warnings play an important role in tobacco control efforts. The purpose of the graphic health warnings, as outlined in the Trade Practices Consumer Product Information Standards (Tobacco) Regulations 2004, is to provide for a system of warnings, explanatory messages and graphic images to:

- Increase consumer knowledge of the health effects relating to smoking;

- Encourage the cessation of smoking; and

- Discourage smoking uptake or relapse.

There has been a great deal of national and international research assessing the effectiveness of health warnings in meeting these and other similar objectives. Significantly, recent studies suggest that the use of graphics in health warnings may lead to considerably better outcomes on most of these measures:

> *"All evidence suggests that graphic warning labels are (i) a prominent source of health information, second only to television in many jurisdictions; (ii) more likely to be noticed and discussed than text warnings; (iii) associated with greater health knowledge; (iv) associated with increased cessation behaviour; and (v) enjoy high credibility and support from smokers themselves."* (Hammond, Fong, McDonald, Cameron & Brown, 2006, p.224)

4.1 Methodological Issues

Some methodological issues are being overcome through the design and scope of the International Tobacco Control (ITC) Project.

Assessing the impact of health warnings on tobacco product packaging continues to be a popular research subject. Prior to describing the findings of these studies, however, it is important to bear in mind the methodological limitations that many encounter. As described in the previous review (Elliott & Shanahan Research, 2000), these include:

- *The difficulty in measuring attitudinal and behavioural change in relation to smoking behaviours, making it almost impossible for internal and external validity (Cox, Hoyer, Krshna, 1995). There is also difficulty in determining the link between noticing the health warnings and action or thought while smoking, 'perhaps because psychological events before and after lighting up a cigarette might be more independent than was expected'. (Borland, 1997, p.1435);*

- *The difficulty in isolating progress made through other anti-smoking campaigns (e.g. banning sponsorship/advertising from tobacco companies) and tobacco health reforms (e.g. price increases etc.) to that made from health warnings on tobacco packages; and*

- *The different criteria used to measure effectiveness (e.g. memorability, format, noticeability etc)."* (Elliott & Shanahan Research, 2000, p.37)

There have, however, recently been some significant developments in tobacco health warning research. Most notable is the ITC Project, which overcomes several of the traditional research limitations by employing multiple country controls, a longitudinal design, and theory driven models, that enable hypotheses about the effects of specific tobacco control policies to be tested with greater reliability (see detail below).

The International Tobacco Control (ITC) Project

This study was initiated in 2002 to track and compare the impact of different tobacco control policies on representative samples of adult smokers in the United States, Canada, the UK and Australia. Since that time, it has broadened to involve Ireland, Thailand and Malaysia, South Korea and China, and is being developed in New Zealand, France, Mexico and Uruguay.

By involving a range of countries and tracking smoker behaviour over time, the study uses both a longitudinal and "quasi-experimental" research design. In so doing, the study is better able to distinguish changes that occur over time from differences that existed among people at baseline and, with the use of control groups, can determine the effects of specific tobacco control policies (including different types of health warnings) with greater certainty (Thompson, Fong, Hammond, Boudreau, Driezen, Hyland, Borland, Cummings, Hastings, Siahpush, Mackintosh & Laux, 2006).

As well as monitoring the impact of tobacco control policies on knowledge and behaviour, this study assesses possible reasons for these effects, by tracking factors that reflect psychosocial literature and health communication theories about the causes of behavioural change (Fong, Cummings, Borland, Hastings, Hyland, Giovino, Hammond & Thompson, 2006).

Much of the literature that is reviewed in this report relates to various aspects of this study. At the time of writing, most of the available ITC research relates to the original four country project involving Canada, UK, USA and Australia, with a few studies additionally including data from Malaysia and Thailand.

These are referred to in the review as, respectively, the "ITC Four Country Survey" and the "ITC Six Country Survey".

Additionally, a number of other recent studies have attempted to assess the impact of warnings on a smaller scale, using more experimental techniques, in controlled settings (e.g. Kees, Burton, Andrews & Kozup, 2006; Thrasher, Rousu, Anaya-Ocampo, Reynales-Shigematsu, Arillo-Santillan & Hernandez-Avila, 2007). While the artificiality of these environments can be seen as a methodological limitation in itself, these studies have generally produced results that are similar to those obtained by previous studies.

Overall, the consistency of research findings across a wide-range of studies employing a variety of methodological techniques strengthens the validity of many significant hypotheses about tobacco warnings. This includes those relating to the effectiveness of graphic health warnings in increasing knowledge of smoking, and encouraging attitudinal and behavioural change.

4.2   Graphic Health Warnings Increase Knowledge

> **Graphic health warnings are more effective than text-only warnings in increasing knowledge of the health risks of smoking.**

As detailed in the previous review (Elliott & Shanahan Research, 2000), the link between exposure to health warnings and knowledge of health consequences of smoking has been well-established.

Following the introduction of a new series of text-only health warnings in Australia in 1995, smokers were found to be more knowledgeable of the constituents of tobacco smoke, and better informed of a range of tobacco related afflictions (Borland, 1997). Similarly, in the 2000 evaluation conducted by Elliott & Shanahan Research, some 60% of smokers claimed that their knowledge of the health effects of tobacco consumption had improved, with one in three claiming that their knowledge had improved "a lot" (Elliott & Shanahan Research, 2000). International studies have also noted the positive influence of text-only warnings on public awareness of the health risks of smoking (e.g. Canada: Tandemar Research Inc, 1996; European Union: Portillo & Antonanzas, 2002).

The literature suggests that larger, graphic health warnings on tobacco product packaging may have a stronger impact on smoker knowledge than text-only warnings. A study by Fong et al (2002) found that exposure to pictures on health warnings improved memory of the accompanying text, with smokers more likely to remember a health consequence of smoking if they had seen a picture of it. In the ITC Four Country Survey (including Canada, USA, UK and Australia), Canadian smokers were more likely to cite health warnings as a source of health information, and more likely to be aware of a range of adverse health effects of smoking than smokers in countries where health warnings at the time were text-only:

> *"For example, over 84% of smokers living in Canada – the country with the strongest health warnings – cited packages as a source of health information, compared with only 47% of those in the USA, the country with the weakest health warnings."* (Hammond, Fong, McNeill et al, 2006, p.iii23)

This study also demonstrated a clear link between the specific health risks cited on graphic health warnings and smokers' acceptance that these health concerns may be consequences of smoking. For example, smokers in Canada were significantly more likely than smokers in the other countries to believe that smoking can cause impotence, with Canada the only country of the four using a warning message that related specifically to this issue. Moreover, the researchers noted that California had run a multimillion dollar advertising campaign prior to the study, that highlighted the link between smoking and impotence, yet smokers in California were still less likely than smokers in Canada to accept this as true (Hammond, Fong, McNeill et al, 2006).

The introduction of graphic health warnings in other countries also appears to have increased awareness of the health risks of smoking:

- In Brazil, an evaluation conducted three months after the introduction of graphic health warnings revealed that over half (54%) the smokers interviewed claimed that they had changed their minds about the consequences of smoking after seeing the images (Datafolha Institute, 2002, cited in Agencia Saude, 2003);

- In Singapore, 57% of respondents claimed that new graphic warnings had increased their concern about the health effects of smoking, and 71% felt that they knew more about the health risks of smoking as a result of the new warnings (Channelnewsasia.com, 2006); and

- In Thailand, an evaluation of the influence of graphic health warnings among factory workers indicated that some 61% of respondents agreed that the warnings had helped them understand the harmfulness of tobacco (Silpasuwan, 2006).

4.3 Graphic Health Warnings Motivate Cessation & Discourage Relapse

Graphic health warnings are more effective than text-only health warnings in bringing about positive attitudinal and behavioural changes associated with smoking cessation. These include discouraging relapse, increasing motivation to quit and changes in actual smoking behaviour including cessation.

The link between exposure to health warnings on tobacco product packaging and behaviour is more difficult to assess because of the frequent reliance on self-reporting in studies investigating behavioural change. Nonetheless, several studies, some of which use longitudinal designs, have indicated that both text-only and graphic health warnings have contributed to changes in smoking behaviours (Borland, 1997; Elliott & Shanahan Research, 2000; Willemsen, 2005; Hammond, Fong, Borland, Cummings, McNeill, Driezen, 2007).

Falls in tobacco consumption have often been partially attributed to the introduction of health warnings in various countries. Indeed, the World Bank cites research demonstrating that, in Turkey, the introduction of (text-only) health warnings led to a decline in smoking rates by around 8% over six years; while in South Africa, there was also a significant fall in tobacco consumption following the introduction of (text-only) health warnings in 1994, with some 58% of smokers saying the health warnings had motivated them to quit or reduce their smoking (Research cited by the World Bank Group, 1999). Moreover, calls to smoking "helplines" in several countries have risen dramatically following the citation of helpline numbers on text-only health warnings (Willemsen, Simons & Zeeman, 2002; Department of Health (UK), 2006).

Some Canadian research suggests that, as well as strengthening the influence of health warnings in educating smokers about the health risks of smoking, the use of graphics may also help to motivate cessation behaviours. In 2001, shortly after graphic warnings were introduced, smoking rates in Canada fell to their lowest level in thirty-six years (Dennis, 2002 cited in Nimbarte, Aghazadeh & Harvey, 2005), and have continued to decline since then (Shields, 2007). While it is not possible to attribute this fall to the introduction of the graphic health warnings exclusively, several studies suggest that they may have played a significant contributing role. For example, in a longitudinal study of smokers conducted in the same year, smokers who had read, discussed or thought about the health warnings were more likely to have quit, attempted to quit or reduced smoking after three months (Hammond, Fong, McDonald, Cameron, Brown, 2003).

Further, a survey of ex-smokers found that some 46% claimed to have quit smoking following the introduction of the new graphic health warnings, with these respondents 2.78 times more likely to list the warnings as a motivation to quit compared with former smokers who quit before the graphic health warnings had been introduced. Moreover, some 26.5% of ex-smokers in the study asserted that the health warnings had helped them not to re-start (Hammond et al, 2004a).

Research in other countries also attests to the positive influence of graphic health warnings in increasing smoker's intention to quit and changes in actual smoking behaviour:

- In Singapore, some 47% of survey respondents said that they smoked less frequently after seeing graphic health warnings; with 28% claiming that they now smoked fewer cigarettes; 14% asserting that they made a point of not smoking in front of children; 12% saying they avoided smoking in front of pregnant women; and 8% saying they smoked less at home (Channelnewsasia.com, 2006);

- In Brazil, some two-thirds of smokers interviewed (67%) claimed that viewing the images had increased their desire to quit smoking (Datafolha Institute, 2002, cited in Agencia Saude, 2003), while calls to the quitline increased markedly (Cavalcante, n.d);

- In the Thai study of the impact of graphic health warning among factory workers, half of those surveyed claimed that the warnings had made them hesitant to smoke, and increased their thoughts about quitting (Silpasuwan, 2006); and

- While the impact of graphic health warnings in Australia has not yet been evaluated, calls to the "Quitline" have risen markedly since their introduction, increasing from around 80,000 in 2005 to approximately 165,000 in 2006 (Department of Health and Ageing, 2007b). Moreover, data collected by Quit Victoria (2007) indicates that, in Victoria, the proportion of "Quitline" callers asking to speak to a counsellor who claimed to have obtained the "Quitline" number from a cigarette pack rose from 6% of callers prior to the distribution of the graphic health warnings (March 2006), to 33% of callers after they had been in circulation for two months (June 2006).

The apparent greater effectiveness of graphic health warnings in encouraging the adoption of cessation behaviours is further illustrated in studies comparing smokers' response to graphic warnings with their response to text-only health warnings. For example, Thrasher, Hammond, Fong & Arillo-Santillan (2007) found that Canadian graphic health warnings were more likely to trigger positive quit intentions amongst smokers than Mexican text-only health warnings. Similarly, young adult smokers and former smokers in America perceived Canadian warnings to be more effective in discouraging non-smokers from smoking, motivating smokers to quit, discouraging former smokers from re-starting, and raising concerns about the health effects of smoking compared to US text-only health warnings (O'Hegarty, Pederson, Nelson, Mowery, Gable & Wortley, 2006). Indeed, Willemsen (2005), assessing the impact of Dutch text-only health warnings, compared findings with equivalent evaluative findings for Canadian warnings, and observed:

> *"On average, 10% (of smokers) reported that the warning labels had made them smoke less. A Canadian study conducted 9 months after the introduction of graphic warning labels reported that 19% of Canadian smokers said they smoke less because of the new labels. In our study, 18% of smokers reported a greater motivation to quit, whereas in the Canadian study 33% reported an increased likelihood of quitting. These differences between the European and the Canadian study might be explained by the fact that the Canadian graphic warnings are much harder hitting than the European text-only ones."* (p.391)

Studies monitoring the potential impact of graphic health warnings on smoking behaviour in more experimental settings have produced consistent results. For example, in another Mexican study, respondents were asked to attribute a financial value to packets of cigarettes with either text-only or graphic health warnings (Thrasher, Rousu et al, 2007). A significantly lower mean value (17% lower) was consistently assigned to graphic health warnings, with researchers estimating that this would *"translate to a fairly profound reduction in tobacco consumption."* (Thrasher, Rousu et al, 2007, p. 2923)

Similarly, in a study gauging response to tobacco pack "mock-ups" that combined US text-only warnings with relevant Canadian images, the addition of the images was found to increase both smokers' personal intentions to quit smoking and the perceived ability of the pack to encourage others to quit (Kees et al, 2006). Likewise, a study by Fong, Cameron, Brown, Campbell, Zanna, Murnaghan & Clayton (2002), which used a quasi-experimental research design to compare the responses of US and Canadian high schools to health warnings produced similar findings.

4.4 Graphic Health Warnings Discourage Smoking Uptake

> **Graphic health warnings are more effective than text-only warnings in discouraging the uptake of smoking.**

The literature also suggests that graphic health warnings when compared with text-only warnings have a stronger impact on potential smokers, namely young non-smokers.

In a study measuring response to American text-only health warnings and Canadian graphic health warnings, Nimbarte et al (2005) found that, for non-smokers, graphic health warnings were more effective than text-only health warnings in conveying that tobacco products were hazardous and implying that consumption of such products generally should decrease. Another study found that young non-smokers examined graphic warnings for longer durations, and formed more negative associations with smoking cues and the image of smoking (Peters, Romer, Slovic, Jamieson, Wharfield, Mertz & Carpenter, 2007).

Similarly, in a qualitative comparison of young adults' (both smokers and non-smokers) perceptions of cigarette health warnings in the United States and Canada, the larger graphic Canadian health warnings were considered more visible and more informative, with many study participants recommending that the US health warnings be revised with similar images (O'Hegarty et al, 2007).

Indeed, a study tracking the effectiveness of Canadian graphic health warnings indicates that they have had a positive influence on potential smokers in Canada, seemingly helping to discourage them from taking up smoking. In 2004, there was almost universal agreement amongst young non-smokers that the warnings provided them with important information about the health effects of smoking (97%), with 95% perceiving the messages to be accurate, and 83% saying that they made smoking seem less attractive (Environics Research Group, 2005b).

4.5 Long-Term Impact of Graphic Health Warnings

> **Graphic health warnings may be less susceptible to wear-out than text-only warnings.**

Much of the research points to the eventual "wear-out" of health warnings - that is, after some time in public circulation, their impact and effectiveness diminish (Kaiserman, 1993, Fletcher, Krugman, Fox, Fischer & Rojas, 1995; Elliott & Shanahan Research, 1996; Informa Market Research, 1999). There is a great deal of evidence for the "wear-out" of text-only health warnings in several countries:

- In Australia in 2000, an evaluation of text-only health warnings introduced in 1995 revealed that lower proportions of both smokers and ex-smokers claimed to read the warnings than the proportion aware of them. There was also a significant increase between 1996 and 2000 in the proportion of respondents claiming that "health warnings on cigarette packs should be stronger" (Elliott & Shanahan Research, 2000);

- In the United States, where text-only health warnings have not been replaced since 1984, teenagers in a qualitative study described the warnings as "vague", "stale" and "worn out" (Crawford, Balch & Mermelstein, 2002);

- A 1999 assessment of the Canadian text-only health warnings that were introduced in 1994 found that some 65% of adult smokers and 74% of youth smokers agreed that health warnings were "worn out and lost their effectiveness" (Environics Research Group, 1999); and

- Two and a half years following the introduction of a new series of text-only health warnings in the UK, proportions of smokers who reported noticing the health warnings declined (Hammond, Fong, McNeill et al, 2006), while the number of callers to the UK "Stop Smoking" helpline citing pack warnings as their reason for calling continues to fall (Department of Health (UK), 2006).

The literature suggests that graphic health warnings may be less susceptible to "wear out" than text-only health warnings. For example, the ITC Four Country Survey found that, two and a half years following the introduction of graphic health warnings, Canadian smokers were more likely to report thinking about the health risks of smoking, to decide not to have a cigarette, and to think about quitting because of graphic health warnings, compared with smokers in the UK two and a half years following the introduction of large, but text-only health warnings (Hammond et al, 2007).

Similarly, a comparison of health warnings in Mexico and Canada found that health warning salience was significantly stronger in Canada, despite the fact that they had been in circulation for three years longer than Mexican text-only health warnings (Thrasher, Hammond et al, 2007). Indeed, in the ongoing tracking survey of the Canadian health warnings, the proportion of Canadian smokers claiming that the health warnings were "very effective" in informing them about the health effects of smoking, increasing their desire to quit smoking, and encouraging them to smoke less around others was found to have increased from 2001 to 2003 (Environics Research Group, 2005).

Nonetheless, more recent studies suggest that the Canadian graphic health warnings may now be experiencing the first stages of wear-out. The ninth wave of the tracking study conducted in 2004 revealed:

- A trend towards less frequent viewing of the health warning messages since 2000;

- A slight decrease since December 2003 in the proportion of the general public who said that the messages had been "very effective" or "effective" in informing them about the health effects of cigarette smoking; and

- A slight decline since December 2003 in the proportion of adult smokers who strongly agreed that the messages were accurate, provided them with important information about the health effects of smoking, and made smoking seem less attractive (Environics Research Group, 2005).

4.6 Effectiveness of Graphic Health Warnings with Different Audiences

> Research continues to show that the effectiveness of health warnings on tobacco product packaging may vary according to audience, reflecting factors such as socio-economic background, gender, age and smoking behaviour.

4.6.1 Socio-economic Background and Literacy level

> Graphic health warnings may have more impact than text-only warnings on lower socio-economic groups and those with limited literacy.

On an international level, studies suggest that health warnings may have a greater impact in developing countries than in "high-income" countries. For example, in the ITC Six Country Survey involving smokers in Canada, USA, UK, Australia, Malaysia and Thailand, smokers in the Asian countries were generally more likely than smokers in the high income countries to say that: they had "often" or "very often" noticed health warnings; read or looked closely at them; and that the warnings had "often" or "very often" stopped them from having a cigarette when they were about to smoke one (Fong, 2006). Fong speculates that this may be due to the fact that there are fewer other sources of anti-smoking information in low income countries.

By contrast, within each of the countries involved, the same study indicated that those on moderate incomes in all six countries were more likely to read and scrutinize health warnings, with these factors also associated with smoking cessation behaviours (Omar, Lajis, Foong, Sirirassamee, Sethaput, Borland, Fong, Hammond, Thompson, Driezen, Elton-Marshall, 2006). Other studies suggest that the effectiveness of health warnings amongst different socio-economic groups within the same country may vary depending on the nature of the health warnings.

Unsurprisingly, text-only health warnings have been found to have limited impact on those with poor literacy or language skills. In a study assessing the influence of US text-only health warnings on people from a range of ethnic backgrounds, it was found that some 97% of Spanish and Chinese speaking people surveyed said they did not know or could not comprehend the meaning of the health warnings, while nearly six in ten of those surveyed said that they found the health warnings too technical or unclear. Some 89% of all respondents in this study supported the introduction of graphic health warnings (Browne, Hennessy-Lavery & Rodgers, 2007).

Indeed, researchers have speculated for some time that graphic health warnings would be more effective in influencing people with poor literacy skills (Liefeld, 1999). This appears to have been borne out in Brazil, where the introduction of graphic health warnings was found to have a particularly positive influence on smokers from low income groups, amongst whom literacy skills are likely to be limited. For example, those from low income groups were more likely than others to say that the health warnings had increased their desire to quit, at nearly three-quarters (73%) of low income smokers, and 72% of smokers who left school after junior high, compared to 67% of all smokers in the study (Instituto Datafohle 2002, cited in Agencia Saude, 2003). Similarly, in Thailand, a study evaluating the effectiveness of graphic health warnings amongst factory workers found that the warnings had increased their understanding of the health risks of smoking, and encouraged smokers to think about quitting (Silpasuwan 2006). Furthermore, in the ITC Four Country Survey, knowledge and awareness of the health risks of smoking amongst lower socio-economic groups was highest in Canada, the only country in the study with health warnings featuring pictures (Siahpush, McNeill, Hammond, Fong, 2006).

Conversely however, while the researchers concluded that this difference was likely to reflect the use of graphics in health warnings on tobacco product packaging (in addition to other anti-smoking campaign efforts), in a separate qualitative study, Canadian graphic warnings were found to be generally ineffectual amongst smokers with low levels of literacy (Createc+, 2003). The researchers claimed that, despite the use of graphics, health warnings could not effectively communicate either the nature or the seriousness of the health risks of smoking to less literate individuals or to prompt them to question their own health knowledge. They pointed to a range of barriers, including:

- The tendency for those with poor literacy to "scan" rather than read information means that they rely on the image for meaning;

- The abstract nature and complexity of many of the words used;

- Their inability to understand unfamiliar images that are from the field of medicine;

- Difficulty conceptualising the effects of cigarettes on the body; and

- Difficulty conceptualising future health effects.

It was found that the complexity of many graphic health warnings often led less literate smokers to assign meaning that reflected their existing beliefs about smoking rather than anything "new". The report concluded that:

> *"Because of the extremely basic medical knowledge of less-literate smokers and their inability to conceptualize abstract concepts, it is difficult for the image alone to be the message or replace the text. In short, some risks just cannot be simplified or summarized in a message."* (Createc+, 2003, p.6)

4.6.2 Gender

Several assessments of gender differences in response to graphic health warnings have elicited inconsistent findings.

While the literature suggests that the impact of both text-only and graphic health warnings may also vary according to the gender of smokers, there is some **inconsistency** in terms of the nature of this relationship.

In the ITC Six Country Survey (including Canada, USA, UK, Australia, Malaysia, Thailand) males were found to be more likely to take note of, and be influenced by, both text-only and graphic health warnings (Omar et al, 2006). By contrast, several other studies have found that females tend to respond more strongly to health warnings (Elliott & Shanahan Research, 1996). In a Dutch study assessing response to new text-only health warnings, women were more likely than men to consider the health warnings unattractive, though they were neither more motivated to quit nor reported smoking less as a result of them (Willemsen, 2002).

Other studies indicate that this gender difference may be more pronounced in terms of smokers' responses to graphic health warnings on tobacco product packaging. For example, in the Mexican study in which respondents were asked to attribute a financial value to packets of cigarettes with contrasting health warnings, females were more likely than males to perceive a greater difference between the values of graphic and text-only health warnings (Thrasher, Rousu et al, 2007). Similarly, several studies assessing young people's perceptions of Canadian graphic health warnings have found that females tend to consider them more effective (Koval, Aubut, Pederson, O'Hegarty & Chan, 2005; O'Hegarty et al, 2006).

4.6.3 Age

Graphic health warnings may have greater success than text-only warnings in influencing younger people.

The literature indicates that, overall, both text-only and graphic health warnings may have greatest impact on middle aged to older smokers. In all countries in the ITC Six Country Survey (including Canada, USA, UK, Australia, Malaysia, Thailand), it was found that health warnings were more salient and potentially more motivating for 40-54 year olds (Omar et al, 2006). This finding was, to some extent, replicated in the Dutch study, in which smokers aged over 49 years were more likely than younger smokers to claim that, as a result of the new EU (text-only) health warnings, they were less willing to buy cigarettes, more motivated to quit and had smoked less (Willemsen, 2002). Previous research studies have also pointed to the limited effectiveness of text-only health warnings in influencing young people and adolescents (Robinson & Killen, 1997; Les Etudes de Marche Createc, 1999; Liefeld, 1999).

However, recent research suggests that graphic health warnings may have greater success in reaching younger smokers (O'Hegarty et al, 2006). For example, in Brazil, some 71% of smokers aged 18-24 years and 73% of smokers aged 25-34 years claimed that seeing the images on new tobacco warnings made them want to quit smoking, compared with 67% of all smokers in the study (Datafolha Institute, 2002 cited in Agencia Saude, 2003). The Canadian tracking survey has noted a similar response to graphic health warnings amongst younger smokers, who were found to be more likely than older smokers to say that the health warnings were accurate, agree that they provided them with important health information about the health effects of smoking, and made smoking seem less attractive. Moreover, higher proportions of younger smokers rated the warnings "very effective" in increasing their desire to quit smoking and in informing them of the health effects of smoking (Environics Research Group, 2005a).

Teenagers also appear to have responded positively to the Canadian graphic health warnings. Research monitoring the impact of the warnings amongst 12-18 year old smokers found that in 2004, some 71% claimed that they looked at or read tobacco packaging at least once a week (compared to 63% of adult smokers), and nearly one in two (48%) felt that they had been very effective in informing them about the health effects of smoking (compared to 34% of adult smokers). Sizeable proportions of teenaged smokers in this study also claimed that the warnings were influencing their behaviour: by increasing their desire to quit smoking (55%); smoking less around others than they used to (48%); getting them to try to quit smoking (46%); and getting them to smoke less (44%) (Environics Research Group, 2005b).

The potential impact of graphic health warnings on teenagers was also demonstrated in a study that assessed their influence on teenagers' responses to smoking scenes in movies. Researchers divided teenagers into three groups, showing one group a text-only warning, one group a graphic health warning, and not showing the remaining group anything. They then compared their responses to a movie scene in which smokers were depicted in a socially desirable light. They found that those who were shown the graphic warning were less likely to support a range of pro-smoking stereotypes, and showed a weaker intent to smoke compared with those who viewed the smoking scene without prior exposure to any warning or those who had seen a text-only warning (Golmier, Chebat & Gelinas-Chabat, 2007).

An exception to these findings, however, emerged in a study of young Canadians' perceptions of graphic health warnings by Koval et al (2005). This study was conducted in 2002, when the graphic warnings had been in use for two years, and comprised a self-completion survey with 1267 respondents aged 20-24 years, one-third of whom were smokers. Interestingly, the majority of respondents in this study did not think that the graphic warnings would make some young people less likely to start smoking, while most smokers claimed that the warnings neither made them think about trying to quit, nor led them to decide not to have a cigarette in the past month.

The researchers put forward a number of hypotheses for this finding, some of which were similar to explanations for young people's response to text-only health warnings suggested in the past, including: smoking is a more acceptable behaviour for younger people than for older people; and that they may therefore be reluctant to support the use of graphic health warnings or concede that they influence their behaviour or that the risks conveyed by the health warnings were insufficiently relevant for this age-group (Koval et al, 2005).

4.6.4 Smoker Types

> **All health warnings appear to have greater effect on lighter smokers and those intending to quit than on heavy smokers or more committed smokers.**

As in previous studies (Informa Market Research, 1999; Shanahan, Elliott & Dahlgren, 2000; Elliott & Shanahan Research, 2000; Environics Research Group, 2001), recent research continues to indicate that both text-only and graphic health warnings may be more effective in influencing lighter smokers and those who are intending to quit than more committed smokers.

In a Dutch study, smokers who were intending to quit within one month were found to be almost eight times more likely to say that they smoked fewer cigarettes because of new text-only tobacco warnings. In contrast, these warnings appeared to elicit a far less positive response amongst heavy smokers in the study, with some 15% asserting that the warnings had increased their motivation never to quit (Willemsen, 2005). Similarly, Nimbarte et al (2005) noted a relationship between smoking consumption and perceived effectiveness of all types of health warnings, demonstrating that the more someone smokes, the less important health warnings become to them. Koval et al (2005) found that experimental smokers were more likely than current smokers to believe that graphic health warnings might make young people less likely to start smoking. Another study revealed a strong positive correlation between smokers' intentions to quit and the extent to which they had read, thought about and discussed Canadian graphic health warnings (Hammond et al, 2004a).

Indeed, in the tracking study of the Canadian health warnings on tobacco product packaging, potential quitters were more likely than others to:

• Find the graphic health warnings accurate;

• Agree that they provided them with important health information about the health effects of smoking;

• Agree that they made smoking seem less attractive;

• Claim that they had been very effective in informing them about the health effects of smoking;

• Say that the they had been very effective in getting them to smoke less around others than they used to;

• Say that they had been very effective in increasing their desire to quit smoking;

- Say that they had been very effective in getting them to try to quit smoking; and

- Say that they had been very effective in getting them to smoke less (Environics Research Group, 2005).

These findings tend to support the notion that those who are more accepting of the dangers of smoking to health are generally more willing to believe warnings pertaining to specific health risks. Indeed, as O'Hegarty et al (2006) note, current smokers who are concerned about the health effects of smoking generally tend to react more strongly to both text-only and graphic health warnings than those with little or no health concerns.

By contrast, the literature indicates that health warnings on tobacco product packaging may be more likely to produce a "boomerang" effect amongst heavy smokers or those who remain unconvinced of the risks of smoking – that is, when new information is so incompatible with pre-existing knowledge that it serves to reinforce denial of the intended message.

Qualitative research studies often note a defensive reaction to graphic health warnings amongst those who are not considering quitting. In an EU study, for example, committed smokers were found to adopt a hostile response to health warnings depicting negative health consequences (European Health Research Partnership and Centre for Tobacco Control Research, 2002). Similarly, in developmental research for new Australian graphic health warnings, "hardened smokers" were found to react angrily to the more extreme graphics, and tended to challenge their credibility (Elliott & Shanahan Research, 2003).

4.6.5 Cigar Smokers

Cigar smokers appear to be less responsive than cigarette smokers to graphic health warnings.

While there are fewer studies in the literature that have examined cigar smokers' response to health warnings on cigar packaging, the research that has been undertaken suggests that they may have a weaker influence on this cohort of smokers.

A recent Canadian study that explored the response of cigar smokers to graphic health warnings indicated that, while cigar smokers generally support the idea of health warnings, they are unlikely to have a significant impact on their attitudes or behaviours. The researchers found that many cigar smokers assumed that they already knew the health risks of smoking, while others, who had started smoking cigars in a bid to reduce their cigarette consumption, were reluctant to accept that the same health risks applied to cigars. Indeed, many cigarillo smokers in the study questioned the credibility of the warnings, claiming that they were untruthful, misleading and inappropriate (Les Etudes de Marche Createc+, 2003).

5. Factors that Influence the Effectiveness of Health Warnings on Tobacco Product Packaging

As detailed in the previous literature review in 2000, a range of factors may influence the overall effectiveness of health warnings on tobacco product packaging. An analysis from a social-psychological perspective (Strahan, White, Fong, Fabrigar, Zanna & Cameron, 2002) points to the significance of the "elaboration likelihood model", illustrating the importance of both content and presentation features in accommodating the different ways in which people tend to process health warnings.

According to this model, in certain cases, the strength of the content of a message is what underlies its impact. In this instance, people tend to think carefully about the contents of a message, weighing up the merits of the claims presented in the context of their existing knowledge, and considering issues that go beyond what is stated. In other situations, people are either unwilling or unable to digest the contents of the message, so peripheral factors, such as how and where the message is delivered, and its visual impact, become more significant. Strahan et al (2002) point out that, in order to be effective with a broad audience, health warnings must be developed with both of these processes in mind.

5.1 Health Warning Design Features That Increase Noticeability

Noticeability of health warnings is enhanced through the use of graphics; large size; contrasting colours; placement on the front of the pack; large, uncluttered text; and rotation of messages.

One of the primary reasons that health warnings provide a particularly effective format for both conveying the risks of smoking, and weakening the impact of the brand is that smokers are exposed to tobacco packaging both when they purchase cigarettes, and each and every time they have a cigarette. As noted by Fong (2006), someone who smokes a packet of cigarettes a day is potentially exposed to the pack 7,300 – 9,125 times a year.

Clearly, in order to exploit this considerable advantage, health warnings must be noticed (Borland & Hill, 1997). Warning noticeability/salience is a critical determinant of its overall effectiveness, as is demonstrated repeatedly in the literature:

- The ITC Four Country Survey revealed that smokers who claimed to notice health warnings (both text-only and graphic) were between 1.5–3 times more likely to accept the health effect cited by the warning (Hammond, Fong, McNeill et al, 2006);

- The evaluation of Canadian graphic health warnings in 2000 found that smokers who read, thought about, and discussed the health warnings in greater depth when they were first introduced, were more likely to say that they intended to quit in the next six months, and to quit, attempt to quit or reduce their smoking after three months (Hammond et al, 2003);

- Similarly, in an evaluation of the effects of graphic health warnings in Thailand, it was found that the more often smokers looked closely at the health warnings, the more they reported that the health warnings made them think about the health risks of smoking, and the more they thought about quitting (Sirirassamee, Sethaput, Guest, Prommoh, Polprasert, Gainroj, Borland, Yong, Fong, Ross, 2006); and

- Another study comparing response to Canadian graphic health warnings and Mexican text-only health warnings also noted an independent association between warning salience and quit intention (Thrasher, Hammond et al, 2007).

As reported in the previous literature review (Elliott & Shanahan Research, 2000), many studies have examined how different design aspects of health warnings may affect their noticeability, including features such as: the size of the warning; use of colour; the position of the warning on the pack; the selection and layout of text; as well as, the range and variety of messages. Most of these point to the greater effectiveness of larger, uncluttered health warnings that include pictorial representations of potential health consequences of smoking, feature contrasting colours, displayed in a prominent position on the pack, and rotated periodically.

Donovan & Henley (2003) refer to changes made in Australia to the original text-only warnings on tobacco packs resulting in changes in space, position, and typeface size requirements to enhance the noticeability of cigarette pack health warnings. The authors maintain that "mechanical factors" (e.g. eye-catching pictures, colour, etc) are important when messages in general must compete for attention against a large number of other messages or against a strong background.

5.1.1 Graphics

The literature shows that the use of graphics in itself considerably enhances the noticeability of health warnings on tobacco product packaging. Much of the qualitative research used to inform the development of graphic health warnings has demonstrated that graphic health warnings tend to attract more attention and create greater impact than text-only health warnings (Liefeld, 1999; European Health Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; BRC Marketing & Social Research, 2004b, 2005; O'Hegarty et al, 2007). In noting this response to new graphic health warnings in the EU, the researchers explain:

> *"Three mechanisms are at work here. First, their bigger more prominent format facilitates processing of the health messages and makes it difficult for the smoker who wants to 'screen out' or avoid them. The message was the first aspect of the pack noticed and mentioned by smokers. Second, the new format created 'noise' that undermined the brands' ability to interact with the smoker; as a result brand imagery was diluted and impaired. Third, the fact that the messages are present at the point of consumption means that they provide very timely reminders of the risks of smoking and the benefits of quitting."* (Devlin et al, 2005, p.47)

The literature provides a great deal of evidence for the impact of graphics on health warning salience. Much of this research has compared response to Canadian graphic health warnings with response to text-only health warnings in other countries; for example:

- In a study comparing Canadian graphic warnings with US text-only health warnings respondents spent around twice as long looking at Canadian health warnings than looking at the US health warnings (Peters et al, 2007);

- Warning noticeability was found to be significantly higher in Canada, where health warnings feature images, than in Mexico, where health warnings are text-only, despite the fact that Canadian health warnings had been in circulation for three years longer (Thrasher, Hammond et al, 2007); and

- A comparison of the impact of new text-only health warnings in the UK with response to the graphic health warnings in Canada after the same period of time, revealed that, while UK smokers were more likely to say that they had read or noticed health warnings, Canadian smokers were more likely to report that they had noticed cessation information on packs, and that the warnings had made them think of the health consequences of smoking and stopped them from having a cigarette (Hammond et al, 2007).

The significance of the inclusion of graphics on Canadian health warnings in eliciting these responses appears to be illustrated by the fact that when the graphic health warnings were first introduced, some 81% of respondents who noticed that the warnings had changed identified the addition of images, while only 23% noticed that the warnings were larger (Environics Research Group, 2001). This was also reflected in a developmental study in New Zealand, in which participants considered a graphic health warning to have greater impact than larger sized text-only warnings (BRC Marketing & Social Research, 2004b).

5.1.2   Size of Health Warning

Ultimately, however, larger graphic health warnings are likely to have the greatest impact (Liefeld, 1999; BRC Marketing & Social Research, 2005). As Allen (n.d.) asserts "*larger (label) size means higher visibility and better ability to compete with other package elements*" (p.22).

As reported in the previous review (Elliott & Shanahan Research, 2000), several studies have demonstrated the impact of warning size on noticeability and consequently, overall effectiveness (Borland, 1997; Informa Market Research, 1999; Nilsson, 1999; Environics Research Group, 1999). Research in Belgium and Poland for example, showed that larger health warnings influence smoker attitudes and behaviours, with smokers in both countries claiming that new larger text-only health warnings had motivated them to stop smoking (Onderzoek, 2004; World Bank, 1999; both cited in Commission of the European Communities, 2005).

More recent research continues to highlight the important role that size plays in terms of the noticeability, and overall effectiveness, of health warnings. Over the course of the ITC Four Country Survey for example, UK (text-only) health warnings increased considerably in size, with the original health warnings that covered only 6% of the surface area replaced in 2003 with health warnings that occupied some 35% of the surface area. Following the replacement, survey findings showed that UK smokers were significantly more likely to have noticed and read the health warnings, with this proportion increasing from 44% to 82% (Hammond et al, 2007). Moreover, compared with smokers in Australia and the USA, where, at the time of the survey, (text-only) health warnings were smaller (30% of the total surface area in Australia, side of pack only in the USA), higher proportions of UK smokers had noticed and read the larger warnings. They were significantly more likely to claim that the warnings had led them to think about quitting, the health risks of smoking, and deterred them from having a cigarette (Hammond et al, 2007).

Research in New Zealand suggests that warning size is equally important for graphic health warnings. In a study gauging response to different sized graphic health warnings (one sized 50% of the front of the pack, and another sized 30% of front of pack), participants strongly preferred the larger sized warning. They felt that the larger sized warning was more prominent, and more likely to stand out from product branding, and they also pointed out that when the pack was opened some of the messages on the front of the pack remained visible (BRC Marketing & Social Research, 2004b).

5.1.3   Position of Warning on Pack

Many past studies have also demonstrated the significance of the position that the health warning occupies on the pack in affecting its noticeability (Elliott & Shanahan Research, 1996; Borland & Hill, 1997; Environics Research Group, 1999; Informa Market Research, 1999).

Research continues to show that the front of the pack is by far the most prominent position for health warnings, with fewer differences between the noticeability of health warnings on the back, side or inside of the pack. The evaluation of Australian text-only health warnings found that almost all of the smokers in the study claimed to have read the front of the pack (93%), with between five and six in ten reporting that they had seen warning messages on the side (58%) and the back (54%) of the pack (Elliott & Shanahan Research, 2000).

For graphic health warnings, the front of the pack has also been shown to be the most conspicuous position. For example, the study tracking the impact of Canadian graphic health warnings found that 63% of adult smokers reported looking at or reading health warning messages on the front of the pack at least once a week, in contrast to: only 17% who claimed to look at or read the information on the back; 12% who claimed to look at or read the information on the side; and 12% who claimed to look at or read the insert (Environics Research Group, 2005).

Interestingly, the developmental research study for New Zealand graphic warnings additionally noted that the exact position of the warning on the front of the pack also affected its impact. When shown a warning on which the image was placed on the front flip-top "lid" of the pack, with warning text appearing below, participants commented that it would be more effective if they were both positioned below the lid, allowing both to be seen when the pack was open. Participants in this study also reported that side of pack messages were unlikely to be read at all (BRC Marketing & Social Research, 2004b).

5.1.4   Colours

A great deal of research has been conducted on the use of colours in 'warning' communications. Studies examining response to warnings on tobacco product packaging and safety warnings more broadly, suggest that the following may be effective in strengthening noticeability:

- Contrasting colours (Gill, Barbera & Precht, 1987, cited in Wolgater, Conzola & Smith-Jackson, 2002; Liefeld, 1999; Informa Market Research,1999; BRC Marketing & Social Research, 2004a);

- Colours rather than black and white (Kline, Braun, Peterson & Silver, 1993; Liefeld, 1999); and

- Red (Braun, Sansing, Kennedy & Silver, 1994; BRC Marketing & Social Research, 2004a).

As well as affecting noticeability, the selection of specific colours on health warnings has been found to influence message "take out", through their association with certain qualities. For example, in their social psychological analysis of the features of health warnings on tobacco product packaging, Strahan et al (2002) noted that orange is associated with warning and may communicate this message, even when the contents of the warning are disregarded.

Interestingly, research into safety warnings more generally indicates that red may be the most powerful colour in terms of communicating risk. In experiments comparing response to signal words printed in a range of colours, red has been consistently found to convey the highest level of hazard (Chapanis, 1994; Braun & Silver, 1995), with one study indicating that red signal words were also associated with greatest behavioural compliance (Braun & Silver, 1995).

In research to inform the development of New Zealand health warnings it was observed that the use of white-coloured font on a red background not only stood out, but also conveyed a sense of "danger" to study participants (BRC Marketing & Social Research, 2004a). A subsequent colour test, however, found that yellow and black was a more powerful colour combination, because of its striking visual impact that was thought to stand out against tobacco product branding, as well as its association with hazard warnings (BRC Marketing & Social Research, 2004b).

5.1.5 Text and Layout

The literature suggests that the selection of fonts and text and their placement on health warnings may also attract attention and enhance readability. Print type and style determine the legibility and feel of a printed communication (Egger, Spark, Lawson & Donovan, 1999). Research assessing response to warnings on tobacco product packaging, as well as response to safety warnings generally, indicates that the following may be effective:

- Larger font sizes (Viscusi & Magat, 1986, cited in Popper & Murray, 1989; Karnes & Leonard, 1986 cited in Popper & Murray, 1989; Engel, Blackwell & Miniard, 1993; Young, Wogalter, Laughery, Magurno & Lovvoll, 1995; Borland & Hill, 1997; Nilsson, 1999; Informa Market Research, 1999);

- Upper case lettering (UK Health Authority, 1990, cited in Centre for Behavioural Research in Cancer, 1992);

- Borders around the warning text (Wogalter & Rashid, 1998, BRC Marketing & Social Research, 2004b);

- Bold type (Sanders & McCormick, 1993, cited in Wogalter et al, 2002);

- Text that is concise, specific and complete in conveying the hazard, while being sufficiently brief to ensure that people notice the warning (Wogalter et al, 2002). In specific reference to graphic health warnings on tobacco packaging, BRC Marketing & Social Research (2004b) noted that it is important that text accompanying graphic health warnings is short and to the point or risks it losing impact or becoming "lost" to the picture;

- Bullet points on safety warnings generally have been found to be more likely to be read than continuous text presented in paragraph form (Hartley, 1994 cited in Wogalter et al, 2002; Wogalter & Shaver, 2001, cited in Wogalter et al, 2002);

- Signal words ("Warning", "Danger") have been found to enhance the noticeability of safety warnings and convey the degree of risk (Wogalter, Fontenelle & Laughery, 1985; Young et al, 1995); and

  In studies comparing response to popular signal words, "Danger" is generally associated with the highest level of hazard, followed by "Warning" and, subsequently, "Caution" (Braun & Silver, 1995; Chapanis, 1994). Other studies have found that "Danger" and "Deadly" are most powerful, while people are less likely to distinguish between "Warning" and "Caution" (Drake, Conzola & Wogalter, 1996).

5.2   Content of Health Warning Messages

Warning messages pertaining to personal health risks appear to have most impact, though messages relating to the impact of smoking on others, the social consequences of smoking, and the benefits of quitting are also be effective.

As the format of health warnings has changed over the years, so too has the content of the messages they convey, evolving from general health warnings to more specific messages that address a range of issues, including: specific personal health risks, health risks for others, the benefits of quitting, and negative social consequences.   Recent research continues to investigate the effectiveness of these themes, while also exploring how graphics may be used to maximize their impact.

5.2.1   Personal Health Risks

Concern about the health risks of smoking has been shown to be a primary driver for cessation behaviour (Romer & Jamieson, 2001).   Hammond et al (2004a) found that virtually all former smokers (93%) in the study had been motivated to quit by personal health risks, with concern about health the best predictor of long-term abstinence. Warnings that reinforce these risks are therefore likely to help motivate smokers to consider quitting.

Much of the past research has pointed to the greater effectiveness of messages that refer to specific health risks rather than to health more generally (Mahmood, 1995; Hammond, Fong, McNeill et al, 2006; Ferrence, Hammond & Fong, 2007).   In a study conducted to inform the development of New Zealand graphic health warnings, the researchers explain:

> *"Specifically, on the one hand messages need to be easily understood, but at the same time not overly general or universally known, such that the message is not adding anything to smokers' generally high awareness of the adverse health and other effects of smoking, nor easily overlooked from the perspective of 'what is this message telling me that I don't already know?'"* (BRC Marketing & Social Research, 2005, p.14)

The effectiveness of messages relating to specific health concerns tends to vary for different smoker groups, reflecting their perceived personal relevance.   This is covered in more detail in Section 5.6.

5.2.2   Impact on Others

Concern about the impact of smoking on others has also been found to influence decisions about quitting (Romer & Jamieson, 2001).   In particular, health warning messages that convey the risks of passive smoking for babies and children appear to have widespread impact.

These messages often trigger an emotional response, most strongly amongst those who have children, and who tend to personalise the message, by relating it to their own children (European Health Research Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; Thrasher, Allen, Reynales-Shigematsu, Anaya, Lazcano-Ponce, Hernandez-Avila, 2006).

In developmental research for the new graphic health warnings in the EU, for example, participants found such messages both relevant and important, with many viewing the protection of children's health as a moral responsibility (European Health Research Partnership and Centre for Tobacco Control Research, 2002).

5.2.3   Encouraging Positive Attitudes about Quitting

The research suggests that warnings that focus on the benefits of quitting may also be effective in encouraging cessation. Strahan et al (2002) point out that smokers' attitudes to smoking are not the exact opposite of their attitude towards quitting:

> *"For example, a smoker might have a negative attitude toward smoking and might believe it is unhealthy and dangerous to smoke, but if this person's attitude and beliefs about quitting smoking are even more negative, they will continue to smoke."* (p.184)

Strahan et al (2002) recommend providing positive, factual messages about the benefits of quitting, as well as statements about quitting efficacy that convey either general motivation, reassurance about the process of quitting, or information about how to quit.

Recent studies attest to the potential effectiveness of warnings that encourage positive attitudes about quitting. In developmental research for the Australian graphic health warnings, it was found that smokers warmed to the warning: *"Quitting smoking will improve your health"*, with the positive tone of this message representing hope for those who claimed to find it hard to quit or difficult to motivate themselves to consider quitting (Elliott & Shanahan Research, 2003). In the EU, warnings focusing on the benefits of quitting were also found to increase smokers' motivation and confidence about quitting (European Health Partnership and Centre for Tobacco Control Research, 2002). Similarly, in New Zealand, smokers responded positively to pro-quit warnings: *"Quitting now will improve your health"* and *"You CAN quit – call Quitline 0800 778 778"* (BRC Marketing and Social Research, 2004a). Positive, self-efficacy messages can also used effectively in combination with fear appeals (See Section 5.3).

5.2.4   Negative Social Consequences

The literature also points to the potential effectiveness of tobacco warning messages that appeal to subjective norms and social approval. Strahan et al (2002) point out that these factors influence a wide-range of behaviours, including smoking.

Further, there are many studies that demonstrate that the threat of social disapproval is the most effective strategy when communicating with young people (Bacher, Rogers & Sopory, 1992; Elliott & Shanahan Research, 1994; Shanahan et al, 2000). Schoenbachler & Whittler (1996) point out from research they conducted among 371 adolescents on reactions to physical and social threat appeals in drug prevention public service announcements that:

> *"A social threat communication in which the social implications of a teenagers' response were clearly laid out was more persuasive than a physical threat communication from which teenagers could draw their own conclusions about what others would think of them if they chose a particular response."* (p52)

For young people, the research suggests that messages that highlight potential negative social consequences of smoking (e.g. smoking causes bad breath/yellow teeth) may be particularly influential (Strahan et al, 2002). This has been observed in several developmental studies both in Australia and overseas. For example, a qualitative study assessing EU health warnings conducted amongst smokers in England and Wales found that younger smokers tended to react most strongly to "intimate" or vanity related messages (Department of Health (UK), 2007). In research conducted by Elliott & Shanahan Research (2003) to test new Australian health warnings, younger smokers also tended to respond more strongly to these types of messages – like the facial appearance of sufferers of mouth cancer.

5.3   Positive and Negative Messages

The increasing use of health warnings with "frightening" tonal qualities appears to be effective, providing self-efficacy messages about quitting are also conveyed.

Based on an assessment of the issues in the use of threat appeals Elliott (1996) makes the point that in some instances a fear arousing appeal may affect the tendency to agree publicly with the desired message. He says *"strong appeals are more likely than mild appeals to give the audience the impression that the position being advocated is important to the source"* (p.9) and suggests focusing on when to use positive versus negative appeals.

To this end, Prospect Theory (Kahneman & Tversky, 1973) provides a useful framework for developing messages because it is about risk taking behaviours. People's attitudes toward risks concerning gains may be quite different from their attitudes toward risks concerning losses. Watkins (n.d.) states that in making decisions concerning risks people make decisions based on subjective assessments of probabilities which may be quite different from the objective or true probabilities. When offered a choice formulated in one way people might display risk aversion but when offered the same choice formulated in a different way they might display risk taking behaviour. The terms positive frame and negative frame are used.

Prospect Theory proposes that negatively framed information should be more effective than positively framed information in persuading people to perform a behaviour that is seen as a risky option. It also asserts that people avoid risks when considering gains but prefer risks when considering losses. Elliott (1996) contends preference for a risky option depends on whether the option is expressed in terms of gains (positively framed) or losses (negatively framed).

Framing studies dealing with health messages show mixed results although in general there is a tendency towards negative framing. Involvement with the message has been hypothesised to account for these mixed results, in that under high involvement conditions, negative framing has been found to be more effective, with positive framing more effective under low involvement situations (Donovan & Jalleh, 1999). Hewitt, Elliott and Shanahan (1995) in a review of risk taking behaviours of young people aged 15-24 years indicate that young people focus more on the opportunity for gain while adults focus on opportunity for loss.

Strahan et al (2002) assert that health warning messages should utilize "gain framed" as well as "loss framed" messages – i.e. appeal in a positive way, by presenting the avoidance of health risks as a benefit of quitting as well as, more negatively, describing the undesirable consequences of smoking that smokers are at risk of acquiring. They point out that gain framed messages have been effectively used to motivate other preventative behaviours such as using sunscreen or engaging in physical exercise, and may therefore be effective in encouraging smoking cessation (Strahan et al, 2002).

5.3.1 The Use of Negative or "Fear" Appeals

Donovan & Henley (2003) point out that "fear" appeals are common in a number of health areas, particularly anti smoking and road safety.

Increasingly, tobacco health warnings use harder hitting, loss framed messages designed to arouse fear as a means of creating impact and motivating action. This is particularly evident in graphic health warnings, many of which use "gruesome" and "shocking" images to depict the various risks of smoking.

Fear based messages are often found to have a high level of "cut-through" and produce an emotional response from smokers, and in so doing, may help to establish unfavourable associations with smoking. Many researchers argue that the "affective associations" that this type of appeal may produce, serve to strengthen the perceived risk of smoking which, in turn, may deter smoking uptake and motivate cessation (Damasio, 1994, cited in Peters et al 2007; Romer & Jamieson, 2001; Slovic, 2001). Specifically, explicit health warnings are thought to work by:

- Generating an immediate emotional response from viewers (Epstein 1994; Zajonc, 1980, 2001);

- Conferring negative affect to smoking cues (Marlatt & Gordon, 1985; Niaura, Rohsenour, Blinkoff, Monti, Pedraza & Abrahms, 1988); and

- undermining the appeal and attractiveness of smoking (Pollay, 2000, cited in Peters et al, 2007).

Both smokers and non-smokers themselves see fear based warnings as effective motivators of smoking cessation. For example, in a concept test of different messages used to inform the development of New Zealand graphic health warnings, it was found that two of the messages that elicited greatest impact (*"Smoking gives you mouth and throat cancer"*, *"Smoking while pregnant starves your baby"*) were associated with shock, unpleasantness and were considered to have a confrontational style and unsettling nature (BRC Marketing & Social Research, 2005).

Similarly in a 2001 study assessing response to the new Canadian graphic health warnings, images portraying a diseased mouth and showing a lung tumour were considered to be most effective at discouraging smoking (Focus Canada, 2001). This finding was consistent with the results of developmental research for these health warnings that found that "emotionally strong" photographs elicited the most positive reaction from study participants (Environics Research Group, 1999; Informa Market Research, 1999).

Elliott (1996) concludes that negative messages and especially "fear" arousing messages appear to have greatest impact on those who are highly involved in the issue and that this impact is greatest if the message or risk is personalised. Egger, Donovan and Spark (1993) suggest we need to emphasise the "me" in the message because people are motivated out of self interest, and therefore messages need to portray the personal consequences and the high probability of negative consequences.

Some researchers, however, continue to question the use of "fear" based appeals, asserting that, while the audience may claim that these messages will motivate behavioural change, in practice, this does not tend to occur, particularly for those most at risk. In an article refuting the effectiveness of fear-based graphic health warnings on tobacco product packaging, Ruiter & Kok (2005) argue:

> *"In summary, high personal relevance (smoking), in combination with low self-efficacy for the recommended action (quitting), leads to defensive actions as a result of fear-arousing messages. This 'psychological immune system' helps in maintaining a positive self-image and may operate largely outside of awareness. Defensive reactions serve to get rid of the fear, not necessarily the threat. Policy makers should thus be reluctant to introduce cigarette warning labels and should instead focus on more effective interventions and policies."*
> (p.329)

Indeed, when graphic health warnings were first introduced in Canada in 2000, a number of concerns reflecting this viewpoint were raised. It was speculated that the images would potentially cause excessive emotional distress and that smokers would simply avoid them; that they would undermine the credibility of the message, and that, as a result, they might in fact lead to increases in smoking rates (Hammond, Fong, McDonald, Brown & Cameron, 2004b).

In response to these assertions, Hammond et al (2004b) conducted a study examining the graphic health warnings in terms of emotional out-take, avoidance behaviours, and impact on smoking habits. They found that the health warnings did elicit strong emotional reactions from smokers, but that this response was associated with quitting, attempting to quit or reducing cigarette intake (i.e. that the use of fear in fact, enhanced the effectiveness of the warning). Further, while some smokers did try to avoid the health warnings, these smokers were equally likely to read and think about the health warnings and engage in cessation behaviours. Moreover, there was little indication that the graphic health warnings were less credible than text-only health warnings. The researchers conclude:

> *"This research provides no evidence of any reactance or boomerang effect in response to graphic pictorial warning labels. On the contrary, the findings suggest that the Canadian warnings may yield a public health benefit."* (p.8)

Nonetheless, some questions remained about the validity of this study because of a lack of controlled exposure to the warnings, and the difficulty in isolating the effects of changes in packaging from other tobacco control efforts that occurred at the same time. In response to these claims, Peters et al (2007) compared response to Canadian graphic health warnings with response to US text-only health warnings in an experimental setting. This study produced consistent results, with the graphic health warnings triggering a more negative emotional response to smoking cues and to the smoker image than text-only health warnings, and no evidence that they elicited defensive avoidance amongst smokers:

> *"Smokers spent as much time viewing the labels as nonsmokers, rated them as equally credible to existing U.S. labels, and supported their use in the U.S. market to nearly the same level as nonsmokers. At the same time they reported that the Canadian labels were more emotionally powerful than the U.S labels and their reactions to smoking words and cues in the Canadian condition were both more negative and accessed more rapidly than in the U.S. condition."* (p.479)

Likewise, another American study by Kees et al (2006) showed that the addition of graphic Canadian warning visuals to US text-only warnings increased levels of negative affect such as fear and anxiety, while reducing the perceived attractiveness of the pack. Moreover, following the addition of the image, smokers in the study were more likely to assert that the warnings would increase their intention to quit, and discourage others from starting to smoke.

5.3.2   The Importance of Self-Efficacy Messages in Fear Appeals

Bacher et al (1992), after interviewing practitioners and communication experts, maintain that fear appeals should be coupled with mechanisms for reducing the anxiety created by the fear appeal.

Significantly, the effectiveness of the Canadian health warnings has been, in part, attributed to the inclusion of self-efficacy messages (advice about how to quit and what to expect on trying to quit) that appear alongside the fear arousing images. Hammond et al (2004a) speculated that, following the introduction of the new health warnings, the significant increase in the proportion of ex-smokers who said that the warnings had motivated them to quit may have been due to their ability to:

> *"Encourage cessation by convincing smokers of the benefits of stopping smoking and increasing their self-efficacy for quitting through the cessation skills and quit-tips included on packages."* (p. 204)

This observation is consistent with the increasingly accepted approach to using fear based appeals in communication. Much of the literature suggests that fear appeals can be effective in motivating behavioural change providing that they are sufficiently strong and credible, and are accompanied by efficacy messages that help smokers develop positive attitudes towards quitting, by demonstrating both how the health risk can be avoided (i.e. by quitting), and how this can be achieved (i.e. how to quit or where to get help) (Strahan et al, 2002; Elliott & Shanahan Research, 2003). Smokers who believe that they are capable of quitting are more like to attempt to do so, and have a greater chance of success than those with low self-efficacy (Tunstal 1985, cited in Strahan et al, 2002). In a meta-analysis of fear appeals used in public health campaigns, Witte (2000) concludes:

> *"Strong fear appeals and high efficacy messages provide the greatest behaviour change, whereas strong fear appeals with low self-efficacy messages produce the greatest levels of defensive responses."* (p.608)

The importance of coupling fear-based appeals with self-efficacy messages has also been noted in various developmental studies. For example, in research conducted to inform the new EU graphic health warnings, it was found that some smokers reacted defensively to some of the more "shocking" health images presented to them, tending to rationalise or reject the message. The researchers asserted that there was therefore a clear need for supportive messages and cessation advice to accompany these images (European Health Partnership and Centre for Tobacco Control Research, 2002). As Hammond et al (2007) note:

> *"As the health risks depicted on packages become more explicit and direct, this type of supportive information may become increasingly important for helping smokers to change their behaviour."* (p.215)

The effectiveness of this approach is demonstrated by frequent increases in the number of calls to helpline services, following the addition of cessation information to fear-based health warnings. For example, in Australia, the number of calls to Quitline doubled following the introduction of graphic warnings that cite the Quitline number, increasing from 80,000 calls in 2005 to more then 165,000 calls in 2006 (Department of Health and Ageing, 2007b). Similarly, in Brazil, calls to the "Call to Quit Smoking" helpline increased progressively after the number was added to graphic health warnings (Cavalcante, n.d).

Interestingly, another recent study indicates that the effectiveness of fear-based health appeals may be additionally enhanced by exposure to self-affirming messages (or messages that encourage thought about personal values and characteristics perceived to be positive and desirable), as well as those promoting self-efficacy. These researchers found that self-affirmation tended to reduce the potential for fear based appeals to elicit a defensive reaction, encouraging smokers to see graphic health images as more threatening and personally relevant, contributing to more negative thoughts and feelings about smoking and stronger intentions to reduce cigarette consumption, and increasing perceived self-efficacy about their ability to do so. Significantly, the researchers noted that self-affirmation increased the effectiveness of fear based appeals with more committed smokers, as well as, the more easily influenced 'lighter' smokers, strengthening the resolve of both groups to reduce their cigarette consumption (Harris, Mayle, Mabbott & Napper, 2007).

5.4   Health Warning Clarity

> **The effectiveness of health warnings is dependent on the clarity and comprehensibility of both messages and images.**

The literature suggests that, regardless of the subject, in order to be both noticed and understood, messages must be brief, concise and simple. CML Research found that smokers in the UK responded best to messages that were "immediate" in that they did not require much reading and were not "overly-metaphorical" (Department of Health UK, 2007). Similarly, in an Australian developmental study, messages that were overly wordy or used technical language tended to be less meaningful and were rejected by study participants (Elliott & Shanahan Research, 2003).

The need for simplicity is also evident in terms of the picture used in graphic health warnings. Several studies have found that graphics must be both clear and recognisable, and relate to the message in a meaningful way (Elliott & Shanahan Research, 2003; BRC Marketing & Social Research, 2004a, 2004b). For example, a Mexican study comparing smokers' response to graphic warnings from Canada, Brazil and the European Union found that easily recognisable images of tumours tended to have greater impact than those that needed to be explained or described, with respondents more likely to associate them with pain and suffering (Thrasher et al, 2006). Similarly, in qualitative research comparing response to graphic and text-only warnings, graphics were seen to be less effective than text warnings when they were considered irrelevant, not believed, or were not evocative (e.g. images for "quitting") (Elliott & Shanahan Research, 2003; Department of Health (UK), 2007).

Interestingly, developmental research suggests that narrative style pictures may be more effective in enhancing understanding of warning messages. For example, a qualitative study in New Zealand found that participants responded well to health warnings that depicted situations with cause-effect implications, like pictures of a disfigured baby with the message "*You're not the only one smoking this cigarette*", or photographs of happy families accompanying pro-quit messages (BRC Marketing & Social Research, 2004a, 2004b). Many of the Brazilian graphic health warnings that have been particularly successful with low income groups also use narrative pictures.

Indeed, the importance of using images that are easily understood is particularly pertinent for those with poor literacy. As reported earlier, a Canadian study found that many of the medical words and images used in Canadian health warnings were too complex and too abstract to be comprehended by less literate smokers (Createc+, 2003).

5.5   Health Warning Credibility

> **The credibility of health warnings may be enhanced by using personalised, direct and unambiguous messages, citing official sources and using signal words.**

The importance of presenting warnings that are credible for the audience is also apparent from the literature. There is general agreement amongst researchers that, in order to influence behaviour, communication must be believable (Fishbein & Azjen, 1975).

Recent studies continue to demonstrate the significance of health warning credibility in increasing knowledge and awareness of the effects of smoking, and potentially leading to positive behavioural change. For example, the ITC Four Country Survey revealed a correlation between belief in the various health risks of smoking and intention to quit smoking. Smokers who were more accepting of the adverse health effects of smoking were more likely to claim that they planned to quit smoking, with this intention increasing in a linear fashion with the total number of afflictions that they believed were caused by smoking (Hammond, Fong, McNeill et al, 2006).

Similarly, research conducted to inform the development of graphic health warnings in New Zealand found that those messages that had the greatest impact amongst study participants tended to be regarded as honest and believable, as well as attention grabbing and personally relevant (BRC Marketing & Social Research, 2005). On the other hand, a study of young adults' perceptions of health warnings in the USA and Canada found that messages that were not believable to viewers were less likely to motivate smokers to quit smoking (O'Hegarty et al, 2007).

The importance of presenting messages that do not appear to exaggerate the risks of smoking is therefore critical. There is some indication that the credibility of health warning messages can be weakened by the use of claims about diseases that cannot be readily linked to smoking or are not well known. In a recent American study, for example, young adult smokers claimed that they would be unaffected by messages relating to gum disease and impotence, because they were unaware that these health risks related to smoking and questioned their veracity (O'Hegarty et al, 2007).

The research suggests that the credibility of warning messages can be enhanced in a number of ways:

- Using messages that are personalised, direct and unambiguous has been shown to increase the credibility of the warning. Messages that appeal to the individual (for example "*Smoking can kill you*" rather than "*Smoking can kill*") add both impact and credibility (Mahmood, 1995; Environics Research Group, 1999; Elliott & Shanahan Research, 2003);

- Similarly, warnings that do not offer any room for doubt tend to be accepted more readily than messages that use probabilistic words like "may" and "can" (Ferrence et al, 2007). In a recent study, American teenagers claimed that such wording gave the impression that the health risks of smoking were in fact fairly small (Crawford, Balch & Mermelstein, 2002). Smokers in the EU were also found to rationalise that these words implied that the stated health consequence was unlikely to affect them (European Health Research Partnership and Centre for Tobacco Control Research, 2002);

- Perceived credibility of the message may also be strengthened if an official source for the warning is cited, and this may increase people's likelihood of compliance (Wogalter, Kalsher & Rashid, 1997).

  While studies show that in order to be effective, sources should be specific, reputable and expert (Wogalter et al, 1997), there appears to be some inconsistency, as to whether government or medical sources are more appropriate (Wogalter et al, 1997; Elliott & Shanahan Research, 2003; BRC Marketing and Social Research, 2005). For example, in an Israeli study there was general support for the referral to a source on the health warning, though non-smokers were more likely to endorse government sources, while smokers tended to be more in favour of citing "medical studies" (Guttman & Peleg, 2003). In the EU, smokers were more accepting of health warnings that were attributed to recognised bodies such as cancer leagues or charities, believing these organisations to be more trustworthy than governments or regulatory bodies (European Health Research Partnership and Centre for Tobacco Control Research, 2002); and

- Interestingly, there is also evidence to suggest that visual elements such as the use of a signal word ("Warning") (Wogalter et al, 1997), and the size of the warning may further influence their perceived credibility (Etudes de Marche Createc, 1999).

5.6   Health Warning Relevance

The relevance of specific health warning messages for smokers varies according to factors such as gender, age and culture.

The importance of targeting messages to specific audiences is also clear from the literature. In developing messages for new UK warnings, CML Research found that messages that create empathy were particularly effective, by putting the audience "in the picture" (Department of Health (UK), 2007). Conversely, in a Canadian study, messages that were not considered personally relevant tended to be dismissed (Createc+, 2003). Similarly, Koval et al (2005) speculated that part of the reason that young people in their study were sceptical about the effectiveness of the new Canadian warnings in influencing younger people was because they lacked relevance for this age-group.

Strahan et al (2002) point out that the specific issues that might make smoking desirable for one group might be quite different for another group, and that messages should therefore be developed accordingly. This is illustrated in the literature in the varied ways in which different groups respond to specific warnings, which tends to reflect the extent of personal relevance of particular subjects.

Egger et al (1999) maintain that developing successful communication strategies involves "getting the right message" (message content) and "getting the message right" (message execution). Donovan & Henley (2003), in formulating a message, stress the importance of taking into account the target groups' initial knowledge, beliefs and attitudes. As well, they maintain that getting the message right entails ensuring the message attracts attention, *"is believable, relevant, understandable, arouses appropriate emotions, and does not lead to counter argument"* (p90).

5.6.1   Gender Differences

Not surprisingly, gender differences have often been observed in reaction to messages relating to impotence and pregnancy. Males have generally been found to react more strongly to messages about impotency, being more likely to recall them, and more likely to consider them "impactful" (European Health Research Partnership and Centre for Tobacco Control Research, 2002; Environics Research Group, 2005a; BRC Marketing & Social Research, 2005).

In contrast, females and those with families have often been found to react more strongly to messages relating to pregnancy and children (European Health Research Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; Environics Research Group, 2005a; BRC Marketing & Social Research, 2005; Thrasher et al, 2006; O'Hegarty et al, 2006; Department of Health UK, 2007).

Gender differences amongst young people are also evident. For example, in the New Zealand study, young female smokers were more likely than males to rank *"Smoking makes you look older"* as one of the messages with greatest impact (BRC Marketing & Social Research, 2005). Similarly, in Canada, females were more likely than male smokers to recall health warning images depicting rotten teeth (Environics Research Group, 2005).

5.6.2 Age Differences

Age differences in response to different health warnings are also apparent. In some studies, older people have been found to respond more strongly to terminal/existential risks such as cancer, heart problems and stroke or diseased lungs (Environics Research Group, 1999; European Health Research Partnership and Centre for Tobacco Control Research, 2002; Environics Research Group, 2005a; O'Hegarty et al, 2006; Department of Health UK, 2007). By contrast, the research suggests that younger people are more likely to be influenced by messages pertaining to more immediate health effects, such as impaired athletic performance.

In New Zealand, for example, research assessing the effectiveness of a range of graphic health warnings with different audiences found that younger people were more likely than others to view "*Quitting smoking improves energy and mental alertness*" as a high impact message (BRC Marketing & Social Research, 2005). Conversely, young people tend to dismiss messages about cancer as "older smokers' problems", unlikely to affect them because they intend to give up in the future (Beede & Lawson, 1992; Elliott & Shanahan Research, 1996; Environics Research Group, 1999).

As reported previously, messages that highlight the negative social consequences or cosmetic effects of smoking may also be particularly effective for influencing younger smokers (Strahan et al, 2002; European Health Research Partnership and Centre for Tobacco Control Research, 2002; Elliott & Shanahan Research, 2003; BRC Marketing & Social Research, 2005, Department of Health (UK), 2007).

5.6.3 Cultural Differences

Research in the EU further points to the importance of considering the cultural and social context in developing warnings. In a study assessing response to proposed new warnings in seven European countries it was found that the use of humour and puns in warning messages was effective in the UK, while smokers in Finland and Sweden found it inappropriate for what they perceived as a very serious issue. Similarly, smokers in Southern European countries were more likely than those in the North to rationalise messages conveying the negative health effects of smoking, reflecting more of a pro-smoking culture in these countries (European Health Research Partnership and Centre for Tobacco Control Research, 2002).

In order to maximise their effectiveness, therefore, some researchers argue that health warnings should be targeted to audiences in a similar fashion to the way that tobacco manufacturers target cigarette brands and advertising to specific market segments. As researchers in the EU study assert:

> *"This may seem a difficult route to follow, but it is exactly what the tobacco industry does in all its marketing. Their internal documents show how potential quitters, new recruits and regions within the UK – let alone Europe – are targeted not just with customized messages but entire marketing strategies (e.g. Hastings and MacFadyen, 2000). One lesson from this research is that health promoters need to approach this issue with the assiduity and resources as tobacco executives..."* (Devlin et al, 2005, p.47)

5.7   Variety, Rotation and Periodic Review

Maintaining a broad variety of health warnings through rotation and periodic review enhances the salience of the warnings, and enables better targeting of different consumer groups.

As reported in the previous literature review (Elliott & Shanahan Research, 2000) several researchers have pointed to the importance of variety in enhancing the noticeability and salience of health warnings and broadening their relevance for target groups (Krugman et al, 1994; Nilsson, 1999; Strahan, 2002; Devlin et al, 2005; Hammond et al, 2003, 2007). Systems of rotation and periodic review are commonly used to maintain health warning variety, keeping warnings "fresh", and allowing coverage of a wide variety of health risks.

Variety has been found to be significant in counteracting over-exposure and wear-out of health warnings. For example, in explaining the fact that, after 9-12 months in circulation, there was little evidence of decline in the noticeability of Canadian warnings (Hammond et al, 2003). They point to:

> *"The number of different warnings, the amount of information they provide on the inside and outside of the packages, and the variety of information provided, including cessation advice and information on the benefits of quitting."* (p.394)

Variety of health warnings also facilitates better targeting of specific smoker groups, whose primary concerns about smoking tend to vary (Nilsson, 1999; Strahan, 2002; Donovan & Henley, 2003) (See Section 5.6). In the exploration of European smokers' responses to the proposed introduction of new health warnings, for example, Devlin et al (2005) concluded that using a broad variety of health warning messages was essential for ensuring that warnings were relevant for different genders, ages and cultures.

Periodically reviewing and revising health warnings are commonly advocated as means of increasing variety, and thereby boosting warning salience and relevance for different consumer groups (Krugman et al, 1994; Strahan, 2002; Donovan & Henley, 2003; Hammond et al, 2007).

Indeed, increases in levels of consumer attention to, and readership of, health warnings have often been observed following revision of existing health warnings (Hammond et al 2003, 2007). As reported previously, the introduction of new (text-only) health warnings in the UK in 2003 resulted in a marked increase in the proportions of smokers claiming to notice and read health warnings on tobacco product packaging. Significantly, the new UK warnings were considerably more likely to be noticed than (text-only) health warnings in Australia, which despite being only slightly smaller than UK warnings, had been in circulation for some eight years at the time of the study (Hammond et al, 2007). Hammond et al conclude:

> *"The findings highlight the novelty effect of health communications and the importance of periodically revising the warnings on cigarette packages."* (p.215)

An experimental study by Krugman, Fox, Fletcher, Fischer and Rojas (1994) provides more clinical evidence for the association between health warning revision, attention and readership. The researchers used eye-tracking to compare the response of adolescents to new and existing text-only health warnings, recording the proportion of respondents who attended to the warnings, the length of time they took to do so, and how long they spent reading them. It was found that, compared with the existing warnings, new warnings gained the attention of more respondents, in a shorter period of time, and when the warning text was of equivalent length, that respondents spent more time reading the new warnings.

Donovan & Henley (2003) also suggest that "novelty" is a mechanical factor, contending that message execution should therefore be continually revised in order to avoid wear out. They point to the Canadian graphic health warnings as an example, asserting that they "*need to be continually revised to prevent habituation*" (p.67).

Rotating health warnings may also be used as a means of countering over-exposure and broadening targeting (Strahan, 2002). As noted in the previous review by Elliott & Shanahan Research (2000), researchers such as Andrews (1995) and Greenfield (1996) note the effectiveness of implementing rotating warning information and presenting new and specific information for reducing inattention and processing habituation.

For Health Canada, both rotation and periodic review are seen as significant to the overall effectiveness of the Canadian graphic health warnings. In response to recent tracking survey findings that indicate that the health warnings may now be starting to "wear-out" (See Section 4), Health Canada is considering some 48 new graphic health warnings, displaying a number at a time and rotating them every two years (Health Canada, 2004, 2006). It is hoped that this system will both refresh the health messages, and enable more effective targeting of audiences on whom the existing warnings have had least impact (such as adults with low literacy skills, potential quitters and heavily committed smokers).

5.8 Health Warning Reinforcement

> **The impact of health warnings is likely to be strengthened by campaigns that reinforce messages through the use other means of tobacco control.**

Several researchers note that the impact of health warnings on tobacco product packaging is likely to be significantly stronger if they are one component of a broader tobacco control communications campaign, with a number of easily discernable themes and common messages (Elliott & Shanahan Research, 2003; Devlin et al, 2005). The use of a range of media to convey health messages not only increases the "reach" of the campaign, but also strengthens the likelihood of message "uptake" through constant reinforcement. As Strahan et al (2002) note:

> *"Warning labels would be more effective if they were specifically designed to remind people of anti-smoking themes they had been exposed to via mass media (for example, television commercials, magazine ads, billboards etc), point of sale displays, and school based programmes...If warning labels were coordinated with broader more extensive campaigns, they would likely have greater impact on the public."* (p.187)

Similarly, research indicates that the effectiveness of health warnings is likely to be greater if they are supported by other tobacco control policies, such as legislation requiring certain environments to be "smoke free". Both media activity and legislation of this nature work together to "denormalise" smoking. This has been shown to be an important motivator of smoking cessation. As Costa e Silva (2003) notes:

> *"Promoting change in social norms is essential to successful smoking cessation, since the smoking environment provides the context for smoking cessation and encourages smokers in their attempts to quit."* (p.1)

In research evaluating graphic health warnings on tobacco packaging among factory workers in Thailand, for example, it was asserted that part of the effectiveness of these warnings was due to their contribution to a change in the perceived rights of non-smokers in the workforce, and the ensuing alienation of smokers in this environment (Silpasuwan, 2006).

Indeed, in a study examining the positive influence of the introduction of both graphic health warnings and smoke-free laws in Ontario, Canada, in motivating smoking cessation, Hammond et al (2004a) pointed to the combined effect of these measures in strengthening both intrinsic and extrinsic reasons for quitting, explaining:

> *"Both policies reinforce the health risks of smoking – the most common motivation to quit cited in the current study – and the best predictor of long-term abstinence among reasons for quitting. Bylaws and graphic warnings also help to 'denormalise' smoking and may render extrinsic factors such as subjective norms and social approval more salient."* (p.204)

5.9   Plain Packaging

Plain tobacco packaging may help to increase the impact of health warnings.

As reported in the previous literature review (Elliott & Shanahan Research, 2000), researchers have pointed to the use of plain packaging (i.e. restricting or prohibiting the use of logos, colours, brand imagery or text other than brand names printed in a standard colour and font size) on tobacco products as a means of strengthening the impact of health warnings. It is suggested that this works by increasing the noticeability of the warning and by weakening the impact of the brand.

There is a great deal of literature demonstrating the way in which tobacco companies manipulate packaging colours, typeface, shape and illustration, in creating a brand that conveys an "identity" or "image" for tobacco products (Trachtenberg, 1987; Centre for Health Promotion, 1993; Cunningham & Kyle, 1995; Wakefield, Morley, Horan & Cummings, 2002; DiFranza, Clark & Pollay, 2002; Carter, 2003; Freeman, Chapman & Rimmer, 2007).

Tobacco industry documents suggest that, as a result, tobacco packaging can be used to target specific consumer groups, communicate misleading information, such as reassuring smokers about the "safety" of certain products, and weaken the salience of the health warning message (Wakefield et al, 2002; Wakefield & Letcher, 2002; DiFranza, Clark & Pollay, 2002; Hammond, 2006; Freeman et al, 2007).

As plain packaging has not yet been introduced in any country, the likely impact of plain packaging on health warnings is drawn from experimental research studies. It is also important to note that all of the research gauging the impact of plain packaging on health warnings has focused on text-only health warnings. We were unable to find any research relating to how plain packaging on tobacco products affects response to graphic health warnings.

5.9.1 The Impact of Plain Packaging on Health Warnings

Some research suggests that the removal of all other visual distractions may strengthen noticeability and recall of health warnings (Beede & Lawson, 1992; Goldberg, Kindra, Lefebvre, Liefeld, Madill-Marshall, Martohardjono & Vredenburg, 1995; Goldberg, Liefeld, Madill, Vredenburg, 1999). In a study with adolescents in New Zealand, it was found that removing brand image cues from tobacco packaging had a positive impact on recall of text-only health warnings, with participants better able to remember warning messages when they appeared on plain packaging than when they appeared on branded packaging (Beede & Lawson, 1992). Similarly, research with Canadian teens revealed greater recall of the text-only message "*Smoking Can Kill You*" when it appeared on a plain package than on a branded package (Goldberg, Kindra, Lefebvre, Liefeld, Madill-Marshall & Martohardjono, 1995). This finding led the researchers to speculate:

> *"Occasional glimpses of a health warning message on an uncluttered plain white package may generate more attention and better recall of the message, relative to when it is viewed on a more cluttered regular package with many more "competing" messages. If this proves to be the case, the expectation is that the message may have at least a little more potential for persuasive impact."* (p.109)

Interestingly, other research indicates that the effect of plain packaging on the memorability of text-only health warnings may depend on the complexity of the message. Goldberg, Liefeld, Madill & Vredenburg (1999) found that recall of more simple text-only warnings: "*Smoking can kill you*" and "*Cigarettes are addictive*" was greater when they appeared on plain packaging than when they appeared on branded packaging. However, recall of a more technical and lengthy warning (*"Tobacco smoke causes fatal lung disease in non-smokers"*) was weaker when it featured on plain packaging than on branded packaging.

In two other studies, plain packaging was not found to have a significant effect on recall of text-only health warnings, but did appear to enhance the credibility of the warnings (Centre for Health Promotion, 1993; Rootman & Flay, 1995). Rootman & Flay (1995) found that students viewed text-only health warnings to be more "serious" when they appeared on plain packaging, leading the researchers to speculate that plain packaging may strengthen their believability for young people. Similarly, in a study by the University of Toronto's Centre for Health Promotion (1993), students claimed that plain packaging made smoking seem more serious.

Research conducted in Victoria suggests that support for plain tobacco packaging amongst adult Australians may be increasing. A tracking survey showed that approval for plain packaging amongst Victorians aged 18 years and over, rose from just over half the sample (52%) in 2004 to 63% in 2006. Approval was lower amongst older people (60% of those aged 50 + years) and smokers (51%) (The Centre for Behavioural Research in Cancer cited in The Cancer Council Victoria, 2007).

6. Appendix

The table below lists the countries where, at the time of writing, graphic health warnings on tobacco product packaging had been, or were intended to be, introduced.

Countries requiring graphic health warnings on tobacco product packaging

Country	Year in effect	Number of warnings	Size and position	Reference
Canada	2000	16	50% of front and back panels	Physicians for a Smoke-Free Canada, 2008
Brazil	Series 1: 2002 Series 2: 2004	Series 1: 9 Series 2: 10	100% of front or back panels	Physicians for a Smoke-Free Canada, 2008
Singapore	Series 1: 2005 Series 2: 2006	Series 1: 6 Series 2: 6	50% of front and back panels	Physicians for a Smoke-Free Canada, 2008
Jordan	2005	1	Image: 33% of front or back panels Written warning: 33% of front or back panels	Physicians for a Smoke-Free Canada, 2008
Thailand	Series 1: 2005 Series 2: 2007	Series 1: 6 Series 2: 9	50% of front and back panels	Physicians for a Smoke-Free Canada, 2008 Thai Government Public Relations Department, 2005
Venezuela	2005	10	100% of front or back panels	Physicians for a Smoke Free Canada, 2008
Panama	2005	2	100% of front or back panels	Physicians for a Smoke Free Canada, 2008
Australia	2006	Set 1: 7 Set 2: 7	30% of front panel 90% of back panel	Department of Health and Ageing, 2007a
Uruguay	Series 1: 2005 Series 2: 2008	Series 1: 8 Series 2: 6	50% of front and back panels	Tobacco Labelling Resource Centre, 2008
Chile	2006	1 graphic warning	50% of front and back panels	Tobacco Labelling Resource Centre, 2008

		1 text warning		
Belgium	2007	3 x sets of 14	48% of front panel 63% of back panel	Physicians for a Smoke Free Canada, 2008
Hong Kong	2007	6	50% of front and back panels	Tobacco Labelling Resource Centre, 2008
Korea	2008	2	30% of bottom of pack	Park Chung-a, 2007
New Zealand	2008	Set 1: 7 Set 2: 7	30% of front panel 90% of back panel	Physicians for a Smoke Free Canada, 2008
Romania	2008	14	30% of front panel 40% of back panel	Physicians for a Smoke Free Canada, 2008
UK	2008	15	43% of front panel 53% of back panel	Tobacco Labelling Resource Centre, 2008
Vietnam	2008	5	30% of package surface	VietNamNet, 2008
China	2009	(not known)	30% of pack	Reuters, 2007
Finland	2009	(not known)	(not known)	Finnish News Agency 2007 cited in tobacco.org, 2008
Switzerland	2010 2012 2014	Series 1: 14 Series 2: 14 Series 3: 14	48% of front panel 63% of back panel	Tobacco Labelling Resource Centre, 2008
Ireland	TBC	14	(not know)	Tobacco Labelling Resource Centre, 2008

Images of many of these health warnings can be viewed at the Tobacco Labelling Resource Centre website:
http://www.igloo.org/community.igloo?r0=community&r0_script=/scripts/folder/view.script&r0_pathinfo=%2F%7Bf0ce20c6-7a3c-409a-a5c9-15e2b251a129%7D&r0_output=xml

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