

# Are alcohol warning signs and labels working? An examination of approaches and outcomes

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*ABSTRACT: In its broadest sense, 'public health' refers to the prevention of negative disease outcomes and the promotion of healthy citizens through informed choices and organized efforts. This article looks specifically at the legislative approach of mandated warning labels and point-of-purchase signs to examine whether these efforts have raised awareness or changed behaviors related to alcohol consumption. For comparison, the article discusses tobacco warning labels in the United States and Canada; how these efforts differ from methods used in alcohol use prevention and whether they ultimately result in changed behavior or healthy outcomes. The authors conclude with potential lessons learned.*

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## Introduction

In its broadest sense, ‘public health’ refers to the prevention of negative disease outcomes and the promotion of healthy individuals and communities through informed choices and organized efforts. Public health promotion takes many forms but most often includes raising awareness, developing greater health services, and increasing and improving efforts to modify attitudes and behaviors.

The benefits of initiatives designed to improve public health are numerous, ranging from measurable economic effects (e.g., decreased use of healthcare services, less time lost from work) to less tangible results (e.g., quality of life, increased time with family). In the case of negative health outcomes that are avoidable but cannot

be cured or reversed past onset, such as Fetal Alcohol Spectrum Disorders (FASD), health promotion becomes even more critical.

This article looks specifically at the legislative approaches of 1) mandated warning labels on alcohol products, and 2) health warning signs posted at points-of-purchase, to examine whether these efforts are successful in raising awareness or changing behaviors related to alcohol

This article is broken into the following discussions:

- Part I - Background: The establishment of the Federal law mandating warning labels on all bottles of alcohol sold in the U.S., as well as the origin of state-level laws mandating point-of-purchase alcohol warning signs.
- Part II - Implementation Factors: Elements that impact a public health intervention such as warning labels, including the nature of the message, the communication channels used, how long the intervention is carried out, and who is receiving the message.
- Part III - Efficacy Findings: Results from multiple evaluations of the Federal warning label, as well as background on the lack of state-level efficacy data.
- Part IV - Lessons From Tobacco: What can be borrowed from efforts to reduce tobacco consumption both in the U.S. and Canada.
- Part V - Implications: What we’ve learned and how it might impact future efforts at public health legislation, message design, and research related to the prevention of alcohol use during pregnancy.
- Conclusion: Including possible topics for future consideration.

consumption. For comparison, the article discusses the use of mandated labels in relation to tobacco in the United States and Canada; how these efforts differ from methods used in alcohol use prevention and whether they ultimately result in changed behavior or healthy outcomes. The authors conclude by summarizing potential lessons learned.

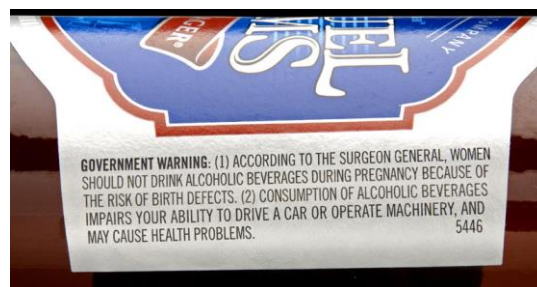
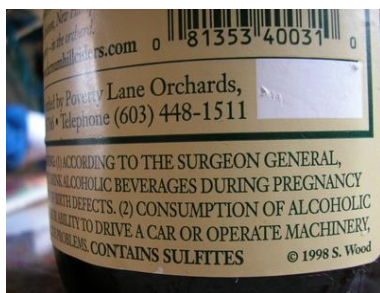
## **Part I: Background**

### *The Federally-Mandated Warning Label*

The Alcoholic Beverage Labeling Act of 1988 required alcohol producers to include a health warning on all containers of alcoholic beverages sold in the United States (Center for Science in the Public Interest, 1999). Officially implemented in November of 1989, the Act (27 USC 215(a)) stipulated that a warning statement be “located in a conspicuous and prominent place on the container,” with the text to “appear on a contrasting background.” The labels were to read as follows:

**GOVERNMENT WARNING: (1) According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects. (2) Consumption of alcoholic beverages impairs your ability to drive a car or operate machinery, and may cause health problems.**

Below are actual examples of how the label appears on current wine and beer products:



Evaluation of the efficacy of the warning label was required in the original legislation (Greenfield, Graves, & Kaskutas, 1999). However, as pointed out by Parker et al., the legislation was only part of a much larger ‘war on drugs’ bill (Parker, Saltz, & Hennessy, 1994). This

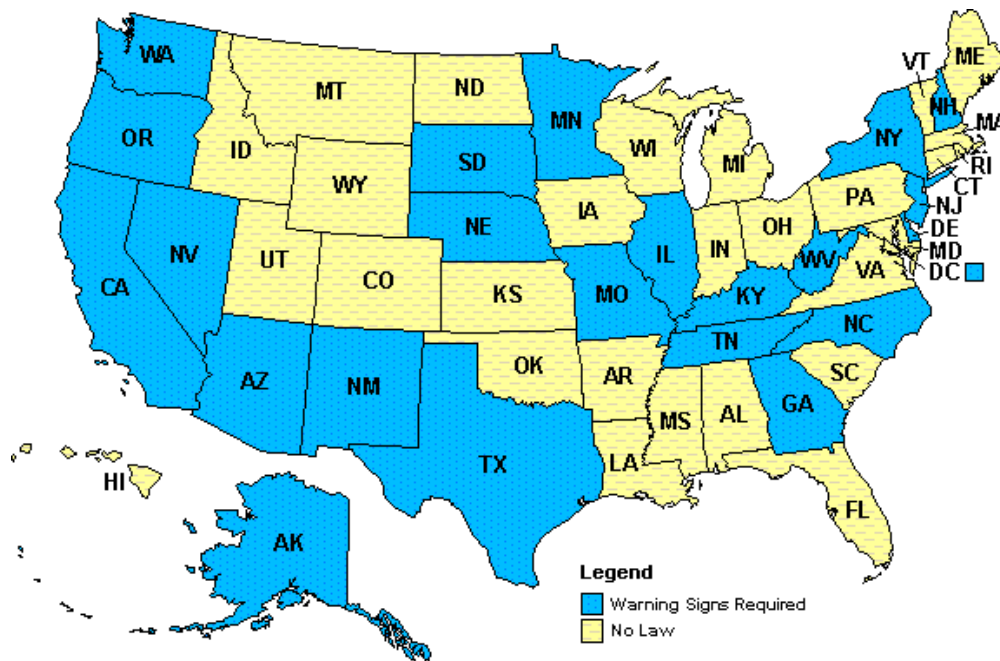
relatively buried inclusion, combined with rapid implementation, left minimal time for collecting baseline data that would have allowed for better future comparison and evaluation.

In 1999, more than 100 public health, Federal, consumer, advocacy, religious, and child protective organizations joined members of Congress in petitioning the Bureau of Alcohol, Tobacco, and Firearms (BATF) to have the warning label redesigned (Center for Science in the Public Interest, 1999). The petition asserted that the label as it typically appeared did not meet the specifications of the original legislation and was, in many cases, unnecessarily difficult to read. The requirements set forth by the BATF remained unchanged, and the current warning labels are similar in appearance to the labels instituted over 20 years ago.

#### *State-Mandated Warning Signs*

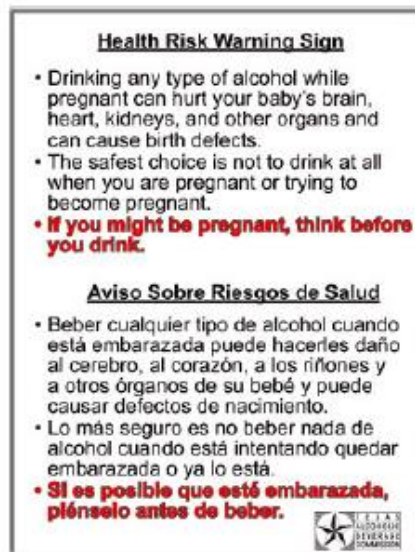
In addition to the federally-mandated warning label, 22 states<sup>1</sup> and the District of Columbia (see map below) have enacted legislation requiring certain settings, including businesses that serve or sell alcohol as well as some providers of health care services, to post signs that specifically warn of the risk of alcohol consumption during pregnancy (National Institute on Alcohol Abuse and Alcoholism, 2009). There is no national, uniform method or language required in the creation of such legislation, which has led to great variation from state to state in how these laws are worded and what they stipulate or mandate (see examples on following page). In addition, none of the state-level laws contain language requiring scientific evaluation of the impact of the mandated signs.

## Alcohol and Pregnancy: Mandatory Warning Signs as of January 1, 2009



Source: Alcohol Policy Information System (APIS), National Institute on Alcohol Abuse and Alcoholism (NIAAA).

### State-Required Warning Signs, Georgia and Texas



Images from: Center for Science in the Public Interest (CSPI).

Both the Federal and state-level mandates constitute broad-based public health interventions. As such, their qualitative and quantitative impact is subject to variables, e.g., quality of the message

design, placement, and degree of compliance. These and other common health intervention variables are discussed in the next section.

## **Part II: Implementation Factors**

Before discussing the impact of warning signs and labels, it is relevant to be realistic about the reasonable expectations of a single health intervention in isolation. As Parker and colleagues observe, the impact of a label by itself could be expected to be no more than modest at best (Parker et al., 1994). Greenfield et al. concur: “It seems only reasonable that only modest effects could follow such a [limited] intervention.” Even less so in the case of a sign in a store or office since, unlike a purchased bottle of alcohol, a sign isn’t carried away by the target audience. However, these researchers point out that modest effects, when applied ubiquitously and accounting for avoided healthcare costs over time, can add up to a significant impact (Greenfield et al., 1999).

This latter assertion is supported by Diffusion Theory. Most famously discussed by Rogers,

**“...we would not anticipate a measurable impact on such distal outcomes as fetal alcohol effects, alcohol-involved motor vehicle accidents or even alcohol consumption itself, given the measurement errors and the host of contemporaneous influences on these phenomena.”**

*Parker et al., 1994, p. 1640*

Diffusion Theory predicts a slow rise in exposure to any widespread message, and thus the emergence of significant results only over time (Greenfield, 1994; Greenfield & Kaskutas, 1998; Greenfield

et al., 1999). The theory further suggests that the degree to which the knowledge and behavioral implications of a message are adopted by members of a broad audience is influenced by four factors: 1) The innovation itself; 2) the communication channels used to spread information about the innovation; 3) time; and 4) the nature of the recipient (Rogers, 1962).

### *1) The Innovation Itself*

In the case of warning labels and signs, the message itself represents an innovation, which presents general and case-specific challenges. Generally, communications research has shown that messages, if they are intended for a diverse general population (as in the U.S.), must be carefully developed (Nohre, MacKinnon, Stacy, & Pentz, 1999; Driver, 1987). Moreover, if the target audience includes people who are familiar with or loyal to a product (such as a brand of alcohol), those individuals may be less likely to look for, be aware of, read, or comply with a warning on that product (Godfrey, Allender, Laughery, & Smith, 1983; Goldbaber & deTurck, 1988a; Goldbaber & deTurck, 1988b).

The Center for Science in the Public Interest (1996) has pointed out a number of more specific potential flaws in both the Federal warning label and the state-mandated signs, including poor legibility, small font sizes, vertical rather than horizontal positioning, and backgrounds that do not sufficiently contrast with the type. In addition to design and placement issues, Nohre and colleagues have suggested that the language of the Federal warning label is at a college reading level, which may create an added obstacle to message reception among a large segment of the public (Nohre et al., 1999).

## *2) The Communication Channels Used*

Greenfield et al. have pointed out that an effective delivery channel was chosen for the Federal warning, since having the message on every alcoholic beverage container sold in the U.S. makes the message difficult to avoid (Greenfield et al., 1999). At the state level, the delivery channels are more problematic. A review of the language in the various statutes shows that the requirements (from where these signs must be displayed, to how large the sign or lettering must be) are inconsistent from state to state.

In addition to where the messages are located or what they look like, one must also consider enforcement of the law to be a channel by which the message is delivered. The universal nature of the Federal legislation has led to essentially 100 percent compliance in the U.S., but assessing enforcement at the state level is much more difficult, for several reasons:

- Penalties: In a number of states, there is no stated penalty for violating the warning sign laws, or the penalty is nominal (in some states, as low as \$25). In other states, although penalties are clearly indicated, no provision is made for repeat offenders.
- Jurisdiction: Who has authority to decide whether sellers are observing the law (and whether to invoke penalties for non-compliance) is not always clear. The CSPI points out that the Alcoholic Beverage Control (ABC) agency has primary responsibility for this task in most states, but in other states it may share that task with the Health Department. In California, on the other hand, the responsibility falls to a sub-office of the state's Environmental Protection Agency. In Florida, food inspectors monitor compliance as part of their rounds (Center for Science in the Public Interest, 1996). The Center for Science in the Public Interest (2008) goes on to suggest that such fragmented authority may weaken enforcement.
- Data: Little to no data has been gathered to show whether state-mandated warning signs are being enforced or are having the desired effect.

**The statutes outlining the requirements relating to warning signs are inconsistent from state to state, and in a number of cases no penalty is spelled out for violating the law.**

### 3) *Time*

Diffusion Theory generally suggests that adoption of an innovation (such as the recommended behaviors in a health message) will be slow and gradual at the start, followed by a more rapid



growth rate, leading to a tapering off and plateau effect if no further elements are introduced to sustain the intervention (Yates, 2001). As stated earlier, the Federal warning label was accompanied by a requirement for evaluation, and various findings are presented in the next section. State warning signs laws do not have any such requirements, and have not all been implemented at the same time. Thus, although warning sign laws have been in place for a sufficient length of time in a number of states to allow for meaningful assessment, little to no state-level data has been collected, making assessment difficult if not impossible.

#### *4) The Nature of the Recipient*

The general receptivity of the target audience is the fourth factor impacting message adoption. In the case of warnings designed specifically for pregnant women, the indicators are positive.

Research has suggested that women tend to look for, read, and comply with product warnings more than men (Nohre et al., 1999; Godfrey et al., 1983; LaRue & Cohen, 1987; Laughery & Brelsford, 1991). In addition, at least one study has shown that a majority of Americans favor the use of warning labels. In 1989 and 1990, just as the federally-mandated label was being implemented, Giesbrecht and Greenfield examined the views of over 15,000 respondents ages 18 and over in Canada and the United States on alcohol-related policy topics. Their research found strong support for using warning labels on alcohol products (76.2 percent of respondents in Canada agreeing with using such policies, and 88.1 percent of respondents in the U.S.), with stronger support among women than men (Giesbrecht & Greenfield, 1999).

The combination of these factors in relation to alcohol warning labels and point-of-purchase signs presents a mixed picture when predicting efficacy. As Part III will show, the findings have been just that; mixed.

### Part III: Efficacy Findings

As mentioned previously, there is little to no data available to be summarized in relation to state-mandated signs. However, there is much more research available on the federally-mandated warning label, due in large part to the requirement for evaluation built into the original legislation. A summary of these findings is best divided into the two distinct goals of the Federal message; 1) raising awareness, and 2) changing behavior.

#### *Raising Awareness*

The initial study into the efficacy of the Federal warning label, funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA), showed that the percentage of respondents in the U.S. who reported seeing the label in the prior 12 months peaked after approximately three and a half to four years. Greenfield and colleagues (1999) conducted parallel telephone surveys in the United States and Ontario, Canada in 1990 and 1991, then again in 1993 and 1994, and found that the percentage had increased from 30 percent in 1990 to 43 percent in 1993 and 1994. They concluded that, within the limited scope of influence of a single intervention, there *was* a general awareness of the label and its message among their sample.

Later studies also identify an initial increase in awareness followed by the predicted plateau effect.

MacKinnon, Nohre, Pentz, & Stacy (2000) reached a typical conclusion when they published the findings of

**“...effects leveled off approximately 3.5 years after the inclusion of the warning on alcohol beverage containers.”**

*MacKinnon et al., 2000, p. 1589*

their examination into the effects of the Federal warning label on high school students between 1989 and 1995. They found increases in warning awareness, exposure, and recognition memory, but these effects leveled off approximately three and half years after implementation. This echoes the earlier conclusion of Hankin, Firestone, Sloan, Ager, Sokol, & Martier (1996), who

tracked awareness of the warning among pregnant African American women between 1989 and 1993. Their findings indicated that levels of awareness continued to increase through December 1992, followed by a statistical flattening out.

### *Changing Behavior*

While initial headway has been made in the area of general awareness, behavioral change includes the *application* of gained knowledge (e.g., actual reductions in alcohol consumption), and the progress in this area has not been as encouraging. Parker et al. (1994) conducted a five-wave random-digit phone survey in northern California among men and women 18 and over. They found that, while the labels were being seen and understood by respondents, there was very little evidence to suggest that this awareness was causing them to change their drinking-related behavior. This is seconded by Hankin and colleagues (1996): In a time series analysis of over 17,000 pregnant African American women from September 1986 to September 1993, they found that multiparae women (women with at least one previous live birth) showed no change in reported drinking after the label was implemented, although self-reported drinking among nulliparae women (women with no previous live births) did decline post-label. In a study of more than 16,000 Indiana high school students across the years 1989-1990 to 1994-1995, MacKinnon and colleagues (2000) found no beneficial change attributable to the warning label in terms of beliefs, alcohol consumption, or alcohol-impaired driving. In addition, a 2001 report in the *International Journal of Drug Policy* cited these and other studies and concluded that, since the introduction of the label in 1988, there has been no significant reduction in the United States in the following outcomes:

- 1) The occurrence of drunk driving incidents;
- 2) The proportion of pregnant women who habitually consumer alcohol in excess; or

- 3) The occurrence of Fetal Alcohol Syndrome (FAS – in fact, separate reports from the Centers for Disease Control and Prevention [CDC] show that incidents of FAS in the United States actually *increased* between 1979 and 1992, as did rates of alcohol use during pregnancy between 1991 and 1995 [1993; 1997]).

Interestingly, one possible reason noted for why young people might not be buying into warning messages is that if the individual has not experienced harm through a given behavior, they generally won't associate that behavior with risk (Stockley, 2001). To paraphrase the old line about smoking, 'It won't kill me because it never has.' Hankin and colleagues (1996) noted a similar 'immunity' effect among multiparae women, suggesting that because some of these women had experienced having a healthy child despite drinking during pregnancy, they may feel their other births are less vulnerable to alcohol-related birth defects. However, as a 'cue to action,' Rosenstock (1979) suggests that some in an 'immunity' group may still be nudged toward caution by reminders such as the label or a warning sign. This is consistent with Lehto & Miller (1988), who found that in general, a warning label is most effective when it serves to remind a consumer of a hazard they already know about, rather than as original education or persuasion.

One behavioral change noted by Greenfield et al. (1999) was that the likelihood of having conversations about drinking during pregnancy was higher among women

**Researchers suggest that labels may be more effective when they act as reminders rather than attempting to provide consumers with new information.**

who had seen the label than those who had not. However, over time, the general public tendency toward such conversations has shown decline in the U.S., again suggesting that the message may have lost impact as it lost novelty and freshness.

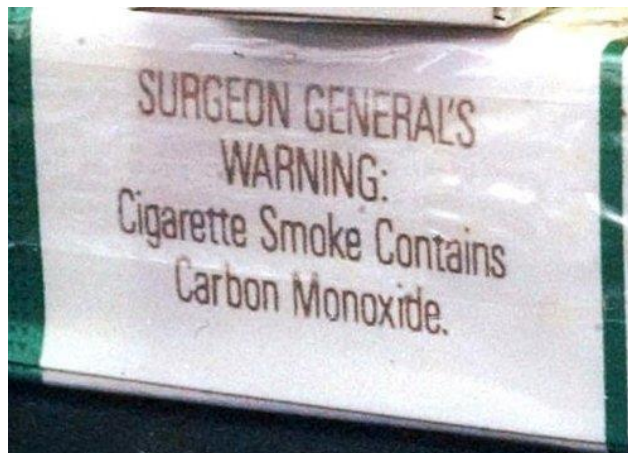
Overall, the findings regarding the efficacy of the Federal warning label are in keeping with predictive models such as Diffusion theory; the rise and plateau pattern of an innovation with widespread application that has gone on for more than 20 years but which has not been revised or altered since onset. In another public health arena, the promotion of tobacco cessation, the approach has been somewhat different. As Part IV outlines, the results may offer a positive alternative for those interested in reducing alcohol consumption through a messaging approach.

#### **Part IV: Lessons From Tobacco?**

The role of the warning label on cigarette packaging is reasonably comparable to the warning label on alcoholic beverages. Both are federally mandated, both have been required for over 20 years, and both have shown little effect on changing behavior. In 1965, the Federal Cigarette Labeling and Advertising Act required tobacco companies to include the statement, “Caution: Cigarette smoking may be hazardous to your health” on one side panel of every cigarette pack. In 1984, after it was decided that the message did not provide sufficient information to consumers about the health hazards of smoking, Congress enacted the Comprehensive Smoking Education Act, which required the rotation of four different messages describing the dangers of smoking (O’Hegarty, Pederson,

Yenokyan, Nelson, & Wortley, 2007):

1. *Surgeon General’s warning:  
Smoking causes lung cancer, heart disease, emphysema, and may complicate pregnancy.*
2. *Quitting smoking now greatly reduces serious risk to your health.*



3. *Smoking by pregnant women may result in fetal injury, premature birth, and low birth weight.*
4. *Cigarette smoking contains carbon monoxide.*

No changes have been made to warning labels on cigarette packaging in the U.S. since that time. However, evidence is mounting that perhaps change is warranted. Specifically, a 2002 survey of smoking adults in four countries (Hammond, Fong, McNeill, Borland, & Cummings, 2006) suggests that the U.S. approach is less effective than methods applied elsewhere. The study examined variation in smoker knowledge about tobacco risks and the impact of the package warning among more than 9,000 adults in Australia, Canada, the United Kingdom, and the U.S. Knowledge on particular health concerns was significantly greater among respondents in countries with warnings describing those health concerns. For example in Canada, where the warning label is strongly worded and also contains images (see examples on the following page), over 84 percent of smokers cited packages as a source of health information, compared to only 47 percent of those in the U.S., where wording requirements are less stringent (and do not currently contain images).

**“Sizable proportions of adolescent smokers are not seeing, reading, or remembering cigarette warning labels.”**  
*Robinson & Killen, 1997, p. 267*

A 1994 study of more than 800 high school students in California reached similar conclusions. Authors Robinson & Killen (1997) found that a sizable proportion of adolescent smokers were not seeing, reading, or remembering cigarette warning labels. From a behavioral standpoint, the study went on to assert that knowledge of warning labels on cigarette packages and advertisements is not associated with any reduction in smoking.

*The Canadian Approach*

In 2000, Canada became the first country to add images to its cigarette warning labels. These images take up as much as half of the face of some cigarette packages, and accompany any of 16 different textual messages that discuss the hazards of smoking from a variety of perspectives, from “Cigarettes Are Highly Addictive” to “Tobacco Smoke Hurts Babies” (The Canadian Press, 2007).

### Warning Labels for Consumer Tobacco Products in Canada



Images from: Health Canada (above) and WhyQuit.com (below)



While these messages may resemble the ‘scare tactics’ that have often been denounced in the literature on public health promotion, multiple studies support the efficacy of Canada’s approach. Researchers at the University of Waterloo in Ontario assessed over 600 adult smokers, approximately one fifth of whom reported smoking less as a result of the labels. In their 2004 article in the *American Journal of Public Health*, Hammond, Fong, McDonald, Brown, & Cameron (2004) concluded that

“Policymakers should not be reluctant to introduce vivid or graphic warnings for fear of adverse outcomes.”

More support comes from a comparison of government surveys in each country. The 1997-2006 National Health Interview Survey (NHIS), administered to a nationally representative sample of

individuals 18 and over, indicated that approximately 22.5 percent of U.S. adults were current smokers in 2002. This was down from 24.7 percent in 1997, and would drop further to 20.8 percent by 2006 (National Center for Health Statistics, 2007). Meanwhile, the Canadian Tobacco Use Monitoring Survey (Annual), 1999-2002, found that 21 percent of Canadians aged 15 and over were smoking in 2002, down from just less than 25 percent in 1996-1997 (Centre for Chronic Disease Prevention and Control, 2004). Canada's rate was not only lower in 2002 (despite a sample group starting at a younger age), but was also in a faster rate of decline, since the two countries had nearly identical smoking rates in 1997.

To some extent, the U.S. government seems to be heeding the example of our northern neighbors. In June of 2009, both houses of Congress passed the Family Smoking Prevention and Tobacco Control Act (H.R. 1256), which will require cigarette makers to add large, graphic health warnings on each pack by 2012 (Wilson, 2009, June 11).

These findings suggest that, if the federally-mandated message approach in the U.S. is to become more effective, the innovation may need to be less static. Even if 'scare tactics' are not the answer, some type of variation may be worth considering. Part V will discuss specific ways in which effective variation might be achieved.

### **Part V: Implications**

This article has reviewed 1) the origin of the Federal warning label and state-mandated warning signs related to alcohol, 2) the theoretical basis for developing widespread public health messages, and 3) the research into the efficacy of the Federal warning label and other labeling approaches. The pattern that emerges is of health interventions that hold promise for creating awareness and impacting alcohol-related risk behaviors, but which can be augmented for greater impact. Three areas for potential enhancement can be identified.



## Legislation

The Federal legislation mandating the warning label on all alcohol containers sold in the U.S. is fairly clear (although that has not eliminated debate over its interpretation).

At the state level, stronger and clearer models of legislation are needed.

One example of proposed language for states interested in enacting or improving alcohol-related health interventions through warning signs is provided by the Center for Science in the Public Interest (CSPI), a DC-based health advocacy organization. In 2008, the CSPI published *State Action Guide: Mandatory Point-of-Purchase Messaging on Alcohol and Pregnancy*. The *Guide* provides model language that addresses critical elements

of a sign-based health intervention, including wording, size, where signs are to be posted, jurisdiction (i.e., how compliance is enforced and by whom), and what the penalties are for noncompliance. The *Guide* also provides fact sheets on female alcohol consumption and sample testimony that can be used with policymakers, as well as sample articles that can be submitted to local media to raise awareness of the need for action. (For a real-world example, see the sidebar on this page for a discussion of the statute enacted in Alaska in 1993. It is worth noting that

### **Alaska's Warning Sign Mandate: A Model Legislation**

Alaska's law mandating point-of-purchase warning signs (AS 04.21.065) is a strong example of a statute that addresses key impact points for a broad-based health intervention:

1. **Audience:** Alaska's statute requires not one but three separate signs to be posted in liquor stores. One required sign relates to alcohol and pregnancy, while the other two relate to the sale of alcohol to those below the legal drinking age.
2. **Location:** Signs must be in a conspicuous location in a variety of environments in which alcohol may be sold, from wineries and breweries, to restaurants, to catered and special events.
3. **Wording and Size:** The required language and minimum size of the signs is clearly spelled out in the legislation.
4. **Method of Enforcement:** Any peace officer has the authority to issue a citation for any violation.
5. **Penalty for Noncompliance:** Each day after a citation is issued constitutes a separate offense if the situation is not corrected, with each violation punishable by a fine not to exceed \$300. In addition, Alaska's State alcohol board can consider such violations in license suspension cases.

Alaskan officials report that there was a 32 percent drop in incidence of Fetal Alcohol Syndrome in the State between 1996 and 2002, though they point out that a series of treatment and prevention grants issued by the State in 2000 are also a likely factor in this reduction [Shinohara, 2010, February 20].)

### *Message Design*

Two recent research-based articles promote the value of a more informed linguistic approach to message design. In *How Does Our Perception of Risk Influence Decision Making? Implications for the Design of Risk Information* (2007),

Williams and Noyes (2007) contend that, heretofore, risk information has often been developed without sufficient regard for how people process risk messages. According to

**Factors to consider in designing a warning include:**

1. Use and variation of *signal words* (e.g., ‘danger,’ ‘caution’)
2. Proper use of *color*
3. Variation in *shaping* (e.g., increase in font size, distinctive lettering)

their report, as well as *Considering the Impact of Medicine Label Design Characteristics on Patient Safety* by Hellier, Edworthy, Derbyshire, & Costello (2006), the universal factors that should be considered in designing a warning include: 1) the careful choice and alteration of signal words (single terms such as ‘danger,’ ‘caution,’ or ‘warning’ which denote the level of risk being communicated); 2) proper use of color (for example, the color red is most associated with risk in Western cultures, while white is least associated); and 3) variation in shaping, (i.e., increases in font size, distinctive lettering, and the framing of the message). This leaves out issues of cultural appropriateness in message design, which obviously are also important but which become less prominent in health messaging initiatives which are broadly applied and do not have specific racial or ethnic target audiences.

According to other research, keeping the message fresh may be as important as how it's designed. Kaskutas and Greenfield noted that the four hazards included in the final version of the federally-mandated alcohol warning label—birth defects, impaired ability to drive a car, impaired ability to operate heavy machinery, and 'may cause health problems'—were selected from a list of nine possible risk factors which also included:

1. *Alcohol is a drug that may be addictive.*
2. *Drinking alcohol can increase the risk of developing high blood pressure.*
3. *Drinking alcohol can increase the risk of developing liver disease.*
4. *Drinking alcohol can increase the risk of developing cancer.*
5. *Alcohol is hazardous in combination with other drugs.*

The authors suggested that existing awareness of the four chosen hazards was not low even before the label, and that rotating the message to include the other five might result in increased consumer knowledge (Kaskutas & Greenfield, 1992). MacKinnon and colleagues (2000) agreed, suggesting that “changing the format of the warning, rotating warnings, or using other methods to increase the noticeability and novelty of the warning may be necessary.”

#### *Research*

The original legislation mandating the Federal warning label required evaluation, and extensive research was conducted just after the label was

**“...a warning label policy...might experience greater success if the less widely known dangers...were instead selected.”**

*Kaskutas & Greenfield, 1992, p. 13*

introduced and through the mid 1990's. However, as Diffusion Theory clearly suggests the accumulation of impact *over time*, it may be advisable after 20 years of implementation to institute new or follow-up studies. At the state level, research into compliance and efficacy is nearly non-existent but highly warranted.

## **Conclusion**

Consistent legislation, effective message design, and increased research are just some of the steps that can be taken to assess and bolster the impact of sign- and label-based health interventions. Other factors to consider are the use of public programming and the media to promote and enhance such efforts, as well as the use of appropriate clinical interventions for individuals engaging in alcohol risk behaviors regardless of mandated health messages.

The authors will continue to develop technical reports that address the components of public health messaging and behavioral change. For now, this report is intended to encourage researchers, policymakers, advocates, and others to take a closer look at what they can do in their states and communities to promote greater public health and reduce the impact of alcohol-related harm on our families and our children, our communities, and our Nation.

## **Note**

<sup>1</sup> In September of 2009, a special committee of the South Dakota Legislature recommended that stores in that state no longer be required to post warning signs about the dangers of alcohol consumption for pregnant women. In 2010, the full Legislature will consider the recommendation as part of a larger package of seven alcohol-related bills.

[http://www.capjournal.com/articles/2009/11/22/opinions/perfectly\\_blunt/doc4b03860582f4e357249869.txt](http://www.capjournal.com/articles/2009/11/22/opinions/perfectly_blunt/doc4b03860582f4e357249869.txt)

## References

The Canadian Press. (2007, February 6). Graphic warnings on cigarette packages effective:

Study. *The Canadian Press*, online. Retrieved February 2, 2011, from

<http://www.cbc.ca/news/story/2007/02/06/cigarette-packages.html>

Center for Science in the Public Interest. (2008). *State Action Guide: Mandatory Point-of-*

*Purchase Messaging On Alcohol and Pregnancy*. Retrieved February 2, 2011, from

[http://cspinet.org/new/pdf/state\\_action\\_guide.pdf](http://cspinet.org/new/pdf/state_action_guide.pdf)

Center for Science in the Public Interest. (1999, November 17). Members of Congress and 121

groups urge alcoholic-beverage warning label improvements. Retrieved February 2,

2011, from [http://www.cspinet.org/booze/batf\\_labels2.htm](http://www.cspinet.org/booze/batf_labels2.htm)

Center for Science in the Public Interest. (1996). *A National Campaign for Alcohol Health*

*Warning Signs*. Retrieved February 2, 2011, from

<http://www.cspinet.org/booze/alcwarn.html>

Centers for Disease Control and Prevention. (1997, April 25). Alcohol and Other Drug-Related

Birth Defects Awareness Week – May 11-17, 1997. *MMWR Weekly*, 46(16), 345.

Retrieved February 2, 2011, from

<http://www.cdc.gov/mmwr/preview/mmwrhtml/00047303.htm>

Centers for Disease Control and Prevention. (1993, May 7). Fetal Alcohol Syndrome – United

States, 1979-1992. *MMWR Weekly*, 42(17), 339-341. Retrieved February 2, 2011, from

<http://www.cdc.gov/mmwr/preview/mmwrhtml/00020497.htm>

Centre for Chronic Disease Prevention and Control. (2004). *Progress Report on Cancer Control*

*in Canada*. Population and Public Health Branch, Health Canada. Retrieved February 2,

2011, from [http://www.phac-aspc.gc.ca/publicat/prccc-relccc/pdf/F244\\_HC\\_Cancer\\_Rpt\\_English.pdf](http://www.phac-aspc.gc.ca/publicat/prccc-relccc/pdf/F244_HC_Cancer_Rpt_English.pdf)

- Driver, R.W. (1987). A communication model for determining the appropriateness of on-product warnings. *Transactions on Professional Communication*, PC-30 IEEE, 157-163.
- Giesbrecht, N., & Greenfield, T.K. (1999). Public opinions on alcohol policy issues: A comparison of American and Canadian surveys. *Addiction*, 94(4), 521-531.
- Godfrey, S.S., Allender, L., Laughery, K.R., & Smith, V.L. (1983). Warning messages: Will the consumer bother to look? Proceedings of the Human Factors Society, 27th Annual Meeting, 950-954.
- Goldbaber, G.M., & deTurck, M.A. (1988a). Effectiveness of warning signs: Gender and familiarity effects. *Journal of Products Liability*, 11, 271-284.
- Goldbaber, G.M., & deTurck, M.A.. (1988b). Effects of consumers' familiarity with a product on attention to and compliance with warnings. *Journal of Products Liability*, 11, 29-37.
- Greenfield, T.K., Graves, K.L., & Kaskutas, L.A. (1999). Long-term effects of alcohol warning labels: Findings from a comparison of the United States and Ontario, Canada. *Psychology & Marketing*, 16(3), 261-282.
- Greenfield, T.K. (1994). Improving causal inference from naturalistic designs: Self-selection and other issues in evaluating alcohol control policies. *Applied Behavioral Science Review*, 2(1), 45-61.
- Greenfield, T.K., & Kaskutas, L.A. (1998). Five year's exposure to alcohol warning label messages and their impacts: Evidence from diffusion analysis. *Applied Behavioral Science Review*, 6, 39-68.

- Hammond, D., Fong, G.T., McNeill, A., Borland, R., & Cummings, K.M. (2006). Effectiveness of cigarette warning labels in informing smokers about the risks of smoking: Findings from the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control, 15*(Suppl 3:iii), 19-25.
- Hammond, D., Fong, G.T., McDonald, P.W., Brown, K.S., & Cameron, R. (2004). Graphic Canadian cigarette warning labels and adverse outcomes: Evidence from Canadian Smokers. *American Journal of Public Health, 94*(8), 1442-1445.
- Hankin, J.R., Firestone, I.J., Sloan, J.J., Ager, J.W., Sokol, R.J., & Martier, S.S. (1996). Heeding the alcoholic beverage warning label during pregnancy: Multiparae versus nulliparae. *Journal of Studies on Alcohol and Drugs, 57*(2), 171-177.
- Hellier, E., Edworthy, J., Derbyshire, N., & Costello, A. (2006). Considering the impact of medicine label design characteristics on patient safety. *Ergonomics, 49*(5-6), 617-630.
- Kaskutas, L., & Greenfield, T.K. (1992). First effects of warning labels on alcoholic beverage containers. *Drug and Alcohol Dependence, 31*(1), 1-14.
- LaRue, C., & Cohen, H.H. (1987). Factors affecting consumers' perceptions of product warnings: An examination of the differences between male and female consumers. Proceedings of the Human Factors Society, 31st Annual Meeting, 610-614.
- Laughery, K.R., & Brelsford, J.W. (1991). Receiver characteristics in safety communications. Proceedings of the Human Factors Society, 35th Annual Meeting, 1068-1072.
- Lehto, M.R., & Miller, J.M. (1988). The effectiveness of warning labels. *Journal of Products Liability, 11*, 225-270.

- MacKinnon, D.P., Nohre, L., Pentz, M.A., & Stacy, A.W. (2000). The alcohol warning and adolescents: 5-year effects. *American Journal of Public Health, 90*(10), 1589-1594.
- National Center for Health Statistics, Early Release of Selected Estimates Based On Data From the 2006 National Health Interview Survey, Centers for Disease Control and Prevention (June 8, 2007) [http://www.cdc.gov/nchs/data/nhis/earlyrelease/200706\\_08.pdf](http://www.cdc.gov/nchs/data/nhis/earlyrelease/200706_08.pdf).
- National Institute on Alcohol Abuse and Alcoholism. (2009). *Alcohol and Pregnancy: Mandatory Warning Signs: Drinking During Pregnancy*. Alcohol Policy Information System. Retrieved February 2, 2011, from [http://www.alcoholpolicy.niaaa.nih.gov/Alcohol\\_and\\_Pregnancy\\_Mandatory\\_Warning\\_Signs.html](http://www.alcoholpolicy.niaaa.nih.gov/Alcohol_and_Pregnancy_Mandatory_Warning_Signs.html)
- Nohre, L., MacKinnon, D.P., Stacy, A.W., & Pentz, M.A. (1999). The association between adolescents' receiver characteristics and exposure to the alcohol warning label. *Psychology & Marketing, 16*(3), 245-259.
- O'Hegarty, M., Pederson, L.L., Yenokyan, G., Nelson, D., & Wortley, P. (2007). Young adults' perceptions of cigarette warning labels in the United States and Canada. *Preventing Chronic Disease, 4*(2), A27.
- Parker, R.N., Saltz, R.F., & Hennessy, M. (1994). The impact of alcohol beverage container warning labels on alcohol-impaired drivers, drinking drivers and the general population in northern California. *Addiction, 89*, 1639-1651.
- Robinson, T.N., & Killen, J.D. (1997). Do cigarette warning labels reduce smoking? Paradoxical effects among adolescents. *Archives of Pediatric & Adolescent Medicine, 151*(3), 267-272.
- Rogers, E.M. (1962). *Diffusion of innovations*. New York: Free Press.



- Rosenstock, I.M. (1979). Historical origins of the Health Belief Model. *Health Education Quarterly*, 2(4), 328-335.
- Shinohara, R. (2010, February 20). Fetal Alcohol Syndrome rate in Alaska is declining. *Alaska Daily News*, online. Retrieved February 2, 2011, from <http://www.adn.com/2010/02/19/1148098/fas-rate-among-natives-declining.html>
- Stockley, C.S. (2001). The effectiveness of strategies such as health warning labels to reduce alcohol-related harms - An Australian perspective. *International Journal of Drug Policy*, 12(2), 153-166.
- Williams, D. & Noyes, J. (2007). How does our perception of risk influence decision-making? Implications for the design of risk information. *Theoretical Issues in Ergonomics Science*, 8(1), 1-35.
- D. Wilson, D. (2009, June 11). Senate approves tight regulation over cigarettes. *The New York Times*, A1. Retrieved February 2, 2011, from <http://www.nytimes.com/2009/06/12/business/12tobacco.html>
- Yates, B.L. (2001). Applying diffusion theory: Adoption of media literacy programs in schools. Paper presented at the International Communication Association Conference, Washington, DC, May 24-28, 2001.
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