



CORE

Public Health Functions for BC

Evidence Review:
Healthy Living –
Tobacco Control

Population Health and Wellness
BC Ministry of Health

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This paper is a review of the scientific evidence for this core program. Core program evidence reviews may draw from a number of sources, including scientific studies circulated in the academic literature, and observational or anecdotal reports recorded in community-based publications. By bringing together multiple forms of evidence, these reviews aim to provide a proven context through which public health workers can focus their local and provincial objectives. This document should be seen as a guide to understanding the scientific and community-based research, rather than as a formula for achieving success. The evidence presented for a core program will inform the health authorities in developing their priorities, but these priorities will be tailored by local context.

This Evidence Review should be read in conjunction with the accompanying Model Core Program Paper.

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EXECUTIVE SUMMARY

The review of the literature suggests that multiple activities contribute to effective tobacco control. Offered in isolation, these activities may demonstrate small (perhaps negligible) to moderate impact. But woven together and delivered through multiple channels—especially by committed internal and external (local, provincial and national) partners—they have the potential to effect meaningful, large-scale change.

Taxation

- Tobacco taxation measures are most effective when implemented in combination with a comprehensive tobacco control program that is well-publicized, well-funded (e.g., by dedicated tax revenues), responsive to the price sensitivity of smokers and supplemented by smoking restrictions and media campaigns. It is difficult, however, to calculate an “optimal” level of taxation, as risks and benefits are apparent whether tobacco taxes are raised or not. Concerns over unintended harms to vulnerable population can be averted by matching tax increases with complementary interventions targeted specifically at at-risk individuals. Worries about the heightened potential for cigarette smuggling can be mitigated by balancing tax increases with (1) adequate funding and ample human resources to address tax evasion activities (especially large container shipments of tobacco), and (2) reliable access to cessation services to ensure that smokers quit in the face of tax increases, rather than seek out other means (e.g., non-taxed or low-taxed products) to satisfy their needs.

Communications

- Other possibilities for broadening communication initiatives include engaging the media in advertising of the compliance successes and failures of individual tobacco retailers (Canadian Cancer Society 2002). The benefits of such advertising are realized by keeping both retailers and the general public aware of the presence of meaningful enforcement (and overall tobacco control) programs in the community. As well, Quitnow should be used as a vehicle to link activities (cessation, prevention and protection-related) across regions and populations, thereby generating wider recognition of tobacco control successes. As evidenced by statewide and national research, the greater the collaboration and consistency between partners, the more widespread and forceful the program effects will be.
- Media anti-smoking campaigns have been seen to reduce smoking and save life-years at an extremely low expense relative to other tobacco control measures (e.g., clinical approaches). The cost-effectiveness and potential benefits of mass media campaigns are substantial, when they are expanded broadly. However, evidence indicates that when funded inadequately (e.g., Minnesota’s \$0.35 per capita media strategy), campaigns will have little or no impact. Unfortunately, local data on cost-utility are lacking, but estimates put a price of \$1 to \$3 US per capita per year as the minimum investment necessary to fund a moderately-sized but forceful media intervention.

Brief Intervention

- A few minutes of cessation-specific advice by physicians is a critical component to comprehensive tobacco control, and a key factor in increasing cessation rates and stimulating quit attempts among adult smokers. Problematically, brief intervention does not appear to be used on a consistent basis, suggesting that better systems to facilitate its delivery are essential for success.
- Use of brief intervention among youth shows mixed results, possibly owing to poor application by health care providers. Recruiting other members of the health community (pharmacists, dentists and nurses) to deliver brief advice has the potential to increase its application and broaden its effects across both younger and older audiences. Considering the burden of harm and its distribution by substance type, screening for tobacco and alcohol use should take priority among professionals. Ultimately though, sustainable brief intervention demands a coordinated system that (1) clearly identifies smoking status in client records; (2) prompts providers to check on client smoking behaviours; and (3) helps providers and administrators to monitor brief intervention usage over time, as well as individual client progress. Unfortunately, programs to train professionals in giving brief advice have not seen great impact on cessation rates.
- Brief intervention is one of the most cost-effective cessation services available to health care providers, with some evidence indicating that the costs per life-year saved via such support can fall under \$500 US. The application of brief intervention can be achieved at a relatively low expense, and its positive impacts can be felt at costs below other popular quit interventions, including the universal subsidization of nicotine replacement products.

Pharmacotherapy

- There is no doubt about the efficacy of pharmacological treatments (nicotine replacement therapy [NRT] and bupropion) in increasing cessation success among adults, but the issue of universal subsidization of such treatments is more complicated. Considering related expenses and questions about who is most likely to benefit from pharmacotherapy, attention is perhaps best focused on assisting people who bear a heavier burden of smoking harm—for instance, individuals on lower incomes, or with mental illness or multiple dependencies, who are backed by existing behavioural support.
- Reflecting on related evidence, McDonald (Ministry of Health 2005) argues that pharmacotherapies (including NRT and bupropion) should be available at no cost to all heavy smokers and individuals with recognized medical conditions (e.g., psychiatric illness and multiple dependencies).
- Pharmacotherapy has been documented as successful among populations ranging from minorities to seniors to the mentally ill, although it is likely to have greater impact when offered alongside some form of behavioural support (brief or more intensive). In terms of impact on heavier versus lighter smokers, NRT effectiveness has most often been reported for individuals who smoke between 15 and 20 cigarettes per day. However, emerging work has begun to document its impact on lighter smokers (≤ 15 cigarettes) as well. It seems too early, then, to make a definitive statement about NRT efficacy, based solely on number of cigarettes smoked. On the other hand, knowing that certain

populations bear an inordinate share of the burden of smoking harm and can benefit from pharmacotherapy means that targeting such therapy to these audiences could have meaningful outcomes.

- Pharmacotherapies appear to be cost-effective relative to other common health care interventions. Moreover, calculations find their cost to be far below the amount the public claims to be ready to pay for one quality-adjusted life-year (QALY) saved (i.e., far under \$17,700 to \$45,700 US, as cited by Bolin, Lindgren, and Willers 2006). Estimates set the expense per life-year saved via pharmacotherapy at anywhere between about \$600 US to over \$10,000 US, with several calculations falling between about \$2,000 to \$4,000 US. It is unclear whether bupropion is more cost-effective than NRT. However, it is clear that compared to other smoking interventions, pharmacotherapy tends to rank lower on cost-utility analyses because of its larger expense and smaller overall effect size. Given these findings, universal subsidization of pharmacological treatments is questionable, but targeted subsidization for vulnerable individuals who demonstrate good odds of success could prove valuable.

Formal Counselling Programs

- Group counselling programs, pre-operative programs, cessation options for persons with mental illnesses or multiple dependencies (including pharmacotherapy coverage), and telephone- and web-based quitlines have all shown success in improving cessation rates among various populations. Intensive individual counselling can impact on smoking behaviour, but not necessarily with any more strength than can brief counselling or group options. Peer-led programs on university campuses appear to have promise, as do emerging text-messaging interventions for youth. In some cases, telephone support for young people also seems to have boosted quit rates; however, meaningful options for youth are still far too rare.
- Proactive systems that ensure smokers have access to ongoing support are important elements to many counselling services. Telephone- and web-based programs have proven effective in scientific trials, but their usual audience appears to be overpopulated by certain users, suggesting they may not be appropriate (or may need tailoring) for various audiences. Cessation support options should be attentive to the role that smokers' partners play in enabling—or hindering—quit success. Integrating partners into these programs, and even integrating parents into youth-oriented programs, could enhance outcomes.
- Clear research on cessation expenses is relatively rare, meaning that conclusive statements about the cost-effectiveness of formal counselling are problematic. Group programs should prove cost-effective if uptake is strong—but little evidence is available to confirm or deny this presumption. Telephone systems demonstrate cost-efficacy; however, precise expenses and QALY estimations differ by country and program components. In the end, it is important to note that cessation support in general saves human life-years at costs far below those of other common health care interventions.

Smoke-Free Policies

- Smoking bans in public places are a critical element to comprehensive tobacco control, standing as the most effective means for reducing second-hand smoke exposure, and as key tools in preventing tobacco use, decreasing consumption, reducing serious health-related hospital admissions, increasing quit attempts and boosting overall cessation rates. Smoke-free restrictions have proven beneficial to both adults and youth, and appear to have the most powerful effects when implemented on a voluntary basis by individuals in their own homes (see Section 9.0 for further details on home-based policies).
- Smoking bans do not negatively impact upon the profitability of public establishments—this is a myth perpetrated primarily by the tobacco industry. Clean air regulations have, at times, been seen to enhance sales and employment within the hospitality and entertainment industries, and the Capital Regional District’s experience offers a basic model for successful implementation of such regulations. Enforcement is a critical component in ensuring the effectiveness of smoking bans, particularly as these bans are extended to cover more and more environments.
- The cost-effectiveness of smoking bans is reflected not only in reduced health care costs, but in fewer expenses associated with smoker-related productivity shortfalls, profit losses, property damage, insurance premiums and maintenance and cleaning fees. Relative to the price of nicotine replacement therapy, smoke-free regulations are nine times more affordable. Estimates put the approximate cost of clean air laws at \$350 per DALY (disability-adjusted life-year) saved, and BC-specific calculations predict the overall savings from such laws to be \$49 to \$96 million per year.

Smoke-Free Homes and Vehicles

- Home smoking policies are effective as tools of protection, prevention and cessation. They are linked to decreased exposure to second-hand smoke, decreased experimentation, increased quit attempts and longer intervals between relapse. Such policies can perhaps even counteract the effects of peer influence; however, their overall impact is debatable given that they are usually unequally applied (meaning they are prevalent in homes that are occupied by individuals from higher socio-economic brackets, by adult non-smokers or by children) (Green, Courage and Rushton 2003). Unfortunately, restrictions on smoking in vehicles appear not to have been subject to rigorous scientific evaluation, and evidence of the impact of partial bans in homes is mixed (cf. Farkas et al. 2000; Szabo et al. 2006).
- However, Proescholdbell et al.(2000) also determine that, for high school students, the relationship between such policies and less experimentation is specific to households with non-smoking parents. Szabo et al.’s (2006) research presents similar findings that suggest that home smoking bans have their greatest impact on adolescents whose parents do not use cigarettes.
- Smoke-free homes and vehicles are arguably better facilitated by jurisdiction-wide policies regulating smoking in public places, than by specific smoke-free home/vehicle initiatives. Information pamphlets alone are not sufficient to influence home smoking behaviour. Rather, cessation support and brief intervention by health care providers are

essential to increasing the proportion of home/vehicle no-smoking policies, as well as increasing the participation of socio-economically underprivileged groups in the implementation of such policies. Media engagement, following the tailored approach of New South Wales, Australia, could also prove effective, but both smokers and non-smokers need to be targeted to support smoke-free home/vehicle bans.

Enforcement of Sales to Minors Laws

- Tobacco sales to minors are informed by a variety of factors, from youth behaviour to type of retail outlet to the characteristics of clerks themselves. The complicated nature of smoking regulation means that enforcement programs have to be well-supported and well-tracked to adapt to changing and complex circumstances. In particular, these programs need to be responsive to the real, on-the-ground conduct of young smokers. The best research on this topic suggests that enforcement efforts should work to:
 - Supplement or substitute official enforcement data with youth survey data or more faithful measurements of “risk exposure.”
 - Target high-risk retail outlets and high-risk clerks.
 - Employ realistic minor test shoppers, including actual smokers and older youth (16 to 17 years old).
 - Ensure that clerks are properly trained in checking identification—and that they apply this knowledge effectively and consistently (note that electronic devices to facilitate ID readings have little, if any, evidence of effect).
 - Engage the media in advertising the compliance histories of individual retailers.
 - Consider implementation of a licensing system to track retailers.
- Enforcement programs have typically not been subject to careful cost-benefit analysis, but research suggests that even inefficient programs can be pegged at a cost-effectiveness of \$8,200 per life-year saved. The pressing question is: how much should be invested in enforcement when other interventions (e.g., tax increases, smoke-free policies) require less subsidization while yielding greater returns?

Restricting Point-of-Purchase Tobacco Promotions

- Strict restrictions on point-of-purchase (POP) tobacco promotions have seen relatively little testing in the academic literature, and, as of yet, have demonstrated no clear association with changes in smoking behaviours or intentions. Studies of tobacco-related advertising in the retail environment, while occasionally lacking rigour, imply that point-of-purchase promotions may increase, among other things, tobacco sales, impulse purchases of tobacco products, smoking experimentation by youth, adolescents’ perceptions of ease of access to cigarettes and the likelihood that youth will consider both accepting cigarettes offered to them by their friends and smoking in the upcoming year. Ultimately, comprehensive advertising bans that include POP restrictions appear to be correlated with lower potential exposure to tobacco influences than bans without such restrictions.

- Tobacco POP promotions have increased considerably in recent years, and have been significantly and repeatedly associated with outlets utilized by youth, minorities, the poor and rural populations. Given such associations, comprehensive restrictions on POP materials will likely have their greatest effect on reducing risks among already vulnerable individuals. Implementation of these restrictions, however, necessitates a solid understanding of their potential impact on retailers. Research testifies to the strong bonds between storeowners and tobacco companies, but few studies speak to the challenges faced by retailers in transitioning to POP-free environments, or to appropriate means by which tobacco control workers can facilitate such a transition.

Parent and Youth Education

- There is ongoing debate over the value of school-based youth tobacco education, but, if done well, such education has the potential to bring about small, likely short-term, yet beneficial changes in smoking initiation rates and smoking-related harm. Effective education programs do not have to be tobacco-specific—since multi-drug-focused and general healthy living-centred interventions also have potential for success—or concentrate solely on adolescents. Indeed, education across the lifespan is important, and parent programs that aim to enhance parenting skills (especially communication skills), and link parents to youth-oriented initiatives, can have an especially meaningful impact on well-being.
- Smoking-related education does not have to be limited to programs delivered in the school environment. Peer-led programs, workplace programs, mentoring programs and alternative community activities (e.g., after-school or late-night programs) can be used to broaden the reach and reinforce the effects of prevention messages. In schools, though, evidence indicates that effective education initiatives tend to depend on:
 - Intervention during early adolescence (as opposed to during later youth).
 - High-quality teacher training.
 - High-fidelity implementation (meaning standardized program delivery; little to no deviation from the ideal; and monitoring of program deliverers—staff, teachers, peer leaders—to ensure adherence and exposure to the program).
- The only substantial cost-effectiveness data on smoking-related education appears to come from studies of strictly school-based, youth-oriented programs. While some continue to question the investment of any money at all in school-based activities, the data suggest that every \$1 expended on school programs should yield between \$2 and \$15 in beneficial returns. Estimates put the cost-effectiveness of a national American program at about \$20,000 per QALY saved.

Research and Evaluation

- An adaptive, goal-driven, integrated and well-maintained regional tobacco control strategy demands systems that can manage best practice data, gather relevant research information, monitor the process of service delivery and collect final outcome data.

- Research priorities should focus on identifying and testing effective interventions for high-prevalence groups, including Aboriginal peoples and individuals with mental illness. Such research should seek to take advantage of the extensive and powerful system of social and environmental scaffoldings that are maintained by collectives like faith-based and cultural organizations and workplaces, rather than focus only on interventions that address individual smokers.

1.0 OVERVIEW/ SETTING THE CONTEXT

In 2005, the British Columbia Ministry of Health released a policy framework to support the delivery of effective public health services. The *Framework for Core Functions in Public Health* identifies healthy living as one of the 21 core programs that a health authority provides in a renewed and comprehensive public health system.

The process for developing performance improvement plans for each core program involves completion of an evidence review used to inform the development of a model core program paper. These resources are then utilized by the health authority in their performance improvement planning processes.

This evidence review was developed to identify the current state of the evidence based on the research literature and accepted standards that have proven to be effective, especially at the health authority level. In addition, the evidence review identifies best practices and benchmarks where this information is available.

1.1 An Introduction to This Paper

Building an effective local tobacco control program is a complicated task made more complex by the fact that research on the topic has tended to be skewed toward larger-scale provincial/state/national tobacco control efforts. This bias is understandable given that it is larger-scale policy and regulation innovation that tends to have the most profound impact on public health (Verheijden and Kok 2005). However, regional approaches are also a key element to broader tobacco strategies; in fact, it is regional-level action that often provides the impetus for wider change.

At the core of effective tobacco control is comprehensive programming that balances solid investments in cessation, protection and prevention against a clear communications plan and an integrative, adaptive research/evaluation methodology. No individual system has the capacity to single-handedly deliver all of these components to the local population in a meaningful way. As a necessity, tobacco strategies depend upon productive and clearly-defined internal and external partnerships to meet their goals. Similarly, these strategies require mechanisms to tie their assorted program components together.

In the end, systems at the regional, provincial and national levels (both tobacco-specific and healthy living-oriented) need to work hard to interact in a complementary, goal-driven fashion. Indeed, to have a significant impact on the burden of harm demands this kind of cooperation.

A review of the literature suggests that there are several elements that contribute to effective tobacco control. These elements (not listed in order of priority) include:

- Taxation
- Communications
- Cessation to help smokers quit
- Protection focused on smoke-free policies
- Prevention focused on keeping youth and youth adults tobacco free
- Research and evaluation

In terms of relative impact, taxation, smoke-free public policy, and communications focused on large-scale, cross-jurisdiction mass media campaigns, demonstrate the greatest population-wide effects on reducing smoking-related harms. From a financial perspective, taxation can be a cost-effective approach available to the tobacco control community, with smoke-free public place policy, brief intervention by health professionals, communications campaigns, and smoking cessation quitlines also showing good returns on investment. While cost-effectiveness data on pharmacotherapies, sales to minors enforcement, and youth education are less definitive, each appears to prove affordable in comparison to other common (but costly) health care interventions. Research on targeted programs for at-risk groups is in its infancy. Evidence hints, though, that smoke-free public places, smoke-free homes and vehicles, brief intervention, pharmacotherapies, formal counselling, parent/youth education and taxation can facilitate a reduction in smoking-related harms among these vulnerable individuals.

In the end, if offered in isolation, these activities may demonstrate small (perhaps negligible) to moderate impact. But woven together and delivered through multiple channels—especially by committed internal and external partners—they have the potential to effect meaningful, larger-scale change.

2.0 METHODOLOGY

This paper offers a review of the scientific evidence on effective means to reduce smoking-related harms at the regional level. It draws upon both scientific studies circulated in the academic literature (retrieved through systematic search of the Web of Science, PsycINFO, Medline, ERIC, Sociological Abstracts, the Cochrane Database of Systematic Reviews, CINAHL, Google Scholar, and EMBASE), and observational or anecdotal reports recorded in community-based publications (retrieved through Google Scholar and Google, and through referral by members of the tobacco control community). By bringing together multiple forms of evidence, it aims to provide a proven context through which health and enforcement workers can focus their local and provincial tobacco control objectives. This document should be seen as a guide to understanding the scientific and community-based research, rather than as a formula for achieving success. In the end, different regions will set their own priorities based on their individual needs and varying environmental contexts.

The literature cited here reflects the current status of academic research on regional tobacco control. This means that its content is rigorous and comprehensive, but also limited by the very nature of the research. In other words, because academic tobacco control trials have tended to focus on certain people (e.g., Caucasian, middle-class Americans) and settings (e.g., urban, statewide and national-level campaigns), they are not sensitive to all circumstances. This does not mean that their findings are not usable; however, it does mean that all populations have not been equally served by the evidence, speaking to the need for continued exploration of targeted tobacco control work. Importantly, opportunities for addressing various sub-populations (e.g., youth, parents, individuals on lower incomes, individuals with mental health concerns, etc.) are noted in various sections of this paper.

3.0 TAXATION

3.1 Evidence Base

Tax increases on tobacco-related products are an important means for preventing smoking uptake and reducing tobacco consumption. The World Health Organization (WHO 2002) has called tobacco taxation “the intervention of choice in all regions”, and the tobacco industry itself has acknowledged the power of taxes—above all other measures—to severely restrict tobacco sales (Philip Morris Company quoted in Hodge and Eber (2004)). Both theoretical models and practical scientific analyses testify to the links between higher taxes and reductions in smoking initiations, increases in cessation and reductions in the consumption of cigarette products by long-time users. Increased taxation has been shown to play a significant role in improving overall population health, increasing government revenues and decreasing inequity (Chaloupka et al. 2000).

Laugesen et al. (2000) report that a rise in tobacco prices will reduce overall tobacco consumption. The World Bank (1999) notes that an increase in price compels a drop in demand, thus predicting more attempts at cessation, fewer initiations into smoking and less of a chance that ex-smokers will reacquire the habit. Bridge and Turpin (2004) cite research that suggests that a 10 per cent hike in cigarette prices would trigger a 5 per cent decline in consumption by men and a 6 per cent decline by women. Jha and Chaloupka (2000) estimate that a 10 per cent increase in tobacco price would have the same health-related impact as a whole compendium of interventions (including no-smoking bylaws, bans, warning labels and consumer information), decreasing the number of smokers in high-income countries by 4 million and the number of smoking deaths by 1 million. Complementing this research, Sung et al.’s (2005) review of cigarette use in California reveals that a 50 cent increase in tax on cigarette packs coupled with a 45 cent increase in cigarette prices (implemented by the tobacco industry) shrunk consumption by 1.3 billion packs over 4 years.

Hopkins et al. (2001), along with the World Bank (1999) and Laugesen et al. (2000), document the significant inverse correlation between tobacco prices and consumption by adolescents and young adults, noting that a 10 per cent price increase predicts a 4 per cent to 16 per cent reduction in child smoking (also see Ministerial Council on Drug Strategy 2004). Chaloupka and Wechsler (1997) observe a similarly powerful response among college students. Harris and Chan (1999) indicate that higher cigarette prices are particularly effective in persuading inexperienced youth to adopt a permanent non-smoking lifestyle, as well as in persuading regular young adult users to reduce their consumption. Stephens et al.’s (2001) study confirms that as cigarette prices rise, the odds of being a non-smoker increase, and the number of cigarettes smoked daily decrease.

However, contradictory evidence does exist. Gospodinov and Irvine (2005) find that Canadian sensitivity to tobacco prices has dropped in recent years, with a 35 per cent increase in prices between 2000 and 2002 manifesting itself in only a 7.7 per cent drop in domestic shipments of cigarettes. As the authors note, taxation is definitively lucrative, but it might have less impact on demand than once thought. Research by Keeler et al. (2001) maintains that the impacts of taxation on cigarette consumption have been overestimated as a result of not controlling for

variables such as anti-smoking sentiment among the population. When correcting for this bias, Keeler et al. argue the price elasticity of cigarette demand is fairly stable (-0.2 to -0.4 between 1960 and 1990) in the United States (i.e., a 10 per cent increase in price leads to a 2 to 4 per cent decrease in consumption).

Interestingly though, Guindon et al.'s (2002) study of longitudinal labour-oriented data suggests that in the year 2000, cigarettes proved more affordable in Canada than ten years prior. The authors advise that “ample room for tax increases” is evident in light of the fact that tobacco prices have not kept pace with general cost trends in goods and services.

3.2 Key Considerations

Best practice in tobacco control suggests that tax increases unaccompanied by other reduction measures (e.g., clinical treatment and prevention campaigns) are not as effective in minimizing tobacco use as are tax increases accompanied by smoking prevention-related products, services, programs and earmarked funds (Laugesen et al. 2000; Peretti-Watel 2004; Sung et al. 2005). In fact, Peretti-Watel (2004) writes that price increases in France—applied without any associated preventive strategies—were inadequate in deterring tobacco use among youth in view of the country's accepted smoking culture. Stephens et al. (2001) observe that pricing policies and no-smoking bylaws are equivalent in terms of their disincentive effects, and that, applied singularly, price increases would have less impact than a coordinated strategy of taxation and bylaw enforcement. Rivara et al. (2004) make a comparable statement, suggesting that taxation in combination with mass media campaigns will have a greater effect than either intervention applied alone. Harris and Chan's (1999) study shows that the older one becomes, the less likely one's smoking behaviour will change with price inflations. But Goel and Nelson (2005) indicate that, among adults (particularly men) more than youth, tax increases are strong deterrents to tobacco use, while non-price-related control policies have insignificant effects. Chaloupka et al. (2000) and Bridge and Turpin (2004) add evidence that individuals from lower socio-economic strata are especially responsive to price increases (a 10 per cent rise in price can be expected to lead to a 10 per cent drop in consumption among the lowest income earners).

Tobacco taxation is a topic of much controversy, with many stakeholders recognizing that tax policy impacts on human ethics and safety issues, not just biological health and revenue. McLachlan (2002) hints at this complexity when he writes that tobacco tax is not a fair tax, but is nevertheless a “good one”, meaning that it offers essential income to the state, it is relatively easy to collect and it has clear health benefits, although it also burdens smokers more than non-smokers (thus it can be undemocratic), diverts smoking-related revenues to non-smoking coffers, can potentially reduce autonomy and can have an effect on smuggling and illegal activities. Wilson and Thomson (2005) conclude that tax increases are justifiable, but should be complemented by additional measures to reduce health-related and socio-economic harms.

There is ongoing debate about the potential for taxation policies to unfairly encumber or worsen the circumstances of already vulnerable populations (e.g., Marsh and McKay 1994; Wilson and Thomson 2000). But emerging research from New Zealand (Wilson et al. 2004) suggests that tobacco taxes are (1) less harmful to vulnerable smokers than is smoking itself, and (2) far less harmful to vulnerable smokers than are circumstances of deprivation. This suggests that tax increases are a preferable alternative to the status quo. As a complement to Wilson et al.'s (2004)

research, Chesterman et al. (2005) provide evidence that cessation services for underprivileged smokers in England have been successful in reaching their target audience. Lowey et al.'s (2003) work in the United Kingdom also finds that “smoking cessation services are reducing inequalities.” As the authors put it, even with modest investment into the system, disproportionately more smokers living in deprived areas are contacting cessation services, setting quit dates and successfully quitting. The implication of these findings is that measures are available to support vulnerable groups in the face of increasing tax rates.

There is also ongoing debate about the links between taxation and smuggling, with some groups arguing that smuggling activities are rare and thus of limited concern, and other groups arguing that they are rampant and directly traceable to crime and terrorism. The reality is that tax evasion exists to varying degrees in different places. In Canada, Galbraith and Kaiserman (1997) have suggested that smuggling can potentially negate taxation policies, but, in the end, Canadian sensitivity to cigarette prices still remains “significantly non-zero.” Similarly, Gruber, Sen and Stabile (2003) argue that in spite of smuggling activity in Canada in the 1990s, price elasticity of cigarette demand still ranged from -0.45 to -0.47. This means that tax policies need not be abandoned out of fear of inevitable evasion problems. Rather they must be implemented alongside strong anti-smuggling programs, and reliable, widespread and targeted cessation support services. Beare (2002) implies that Canada needs to refocus its anti-smuggling strategies on major corporate and organized criminals, rather than on individuals and minority groups. Wiltshire et al. (2001) make clear that if government does not commit itself to supporting cessation and treatment in vulnerable communities, then those communities might indulge in—and feel justified in indulging in—smuggled tobacco products.

3.3 Cost Effectiveness

Taxation is ranked as the most cost-effective intervention for curbing tobacco use, as it has the greatest population health impact at the least expense (Shibuya et al. 2003; WHO 2002). Higher taxes require little or no financial investment by governmental agencies (Ranson et al. 2000; World Bank 1999, p. 77).

Bridge and Turpin (2004), citing the World Bank, state that a 10 per cent increase in cigarette excise taxes would inflate tobacco tax revenues by 7 per cent. Sung et al. (2005) testify that a 50 cent rise in taxes on cigarette packs boosted California tax revenues by \$2.1 billion. Ranson et al. (2000) estimate that, in a worldwide context, increases in tobacco prices could be put into place for \$18 US to \$151 US per life year (DALY) saved. Rivara et al. (2004) explain that a mixed tobacco control strategy including taxation (\$1 US increase on each pack of cigarettes) plus mass media coverage, could reduce smoking by 26 per cent and be achieved at neutral cost (if, that is, new tax revenues are directed towards funding the media campaign).

3.4 Summary

- Tobacco taxation measures are most effective when implemented in combination with a comprehensive tobacco control program that is well-publicized, well-funded (e.g., by dedicated tax revenues), responsive to the price sensitivity of smokers and supplemented by smoking restrictions and media campaigns. It is difficult, however, to calculate an “optimal” level of taxation, as risks and benefits are apparent whether tobacco taxes are

raised or not. Concerns over unintended harms to vulnerable population can be averted by matching tax increases with complementary interventions targeted specifically at at-risk individuals. Worries about the heightened potential for cigarette smuggling can be mitigated by balancing tax increases with (1) adequate funding and ample human resources to address tax evasion activities (especially large container shipments of tobacco), and (2) reliable access to cessation services to ensure that smokers quit in the face of tax increases, rather than seek out other means (e.g., non-taxed or low-taxed products) to satisfy their needs.

4.0 COMMUNICATIONS

4.1 Evidence Base

Effective communications and media engagement around tobacco control issues (prevention, protection and cessation) are critical elements in comprehensive tobacco control, given their role in deterring smoking uptake, stimulating quit attempts, reducing tobacco consumption and increasing cessation rates. Large-scale, jurisdiction-wide media campaigns delivered through high-profile channels (like television) across relatively long periods of time (e.g., two years), are likely to have the greatest effect on behaviour. Regional-level initiatives that provide consistent, ongoing, evidence-based messaging through multiple communications channels may also have the potential for success. Investing in campaign promotion through non-traditional channels such as earned media could result in a widespread, cost-effective impact on smoking-related harms.

Messaging about tobacco control delivered through multiple sources is the most efficacious and cost-effective means for lessening smoking-related harm, if delivered in the context of a comprehensive strategy. Clearly-defined, well-coordinated, long-running media-based initiatives are essential to tobacco reduction success in the same way that comparable initiatives have been critical to the success of the tobacco industry itself. A large number of studies have documented a clear association between media interventions and both reduced tobacco consumption and increased cessation (Hopkins et al. 2001). Specific statistics link such interventions to 11 per cent declines in consumption in Switzerland (World Bank 1999), 40 per cent reductions in smoking among middle school students in Florida (Farrelly, Neiderdeppe and Yarsevich 2003), 26 per cent increases in anti-tobacco attitudes among American youth (Farrelly et al. 2002); and 6 per cent to 12 per cent drops in smoking across various American states (Friend and Levy 2002). Much of the research on this topic is admittedly biased toward large-scale American initiatives; however, these initiatives do have much to teach tobacco control workers. In fact, Pechmann and Reibling's (2000) comparison of American and Canadian campaigns actually suggests that in the past Canada has performed poorly and cost-ineffectively compared to the United States, perhaps due to inconsistent and confused messaging.

It is important to note that communications campaigns can draw upon non-traditional channels to extend their effects. Indeed, while television advertisement has been central to many successful tobacco control communications campaigns, evidence also testifies to the significant effect of earned media¹ in reducing prevalence and saving millions in advertising fees (Chapman and Dominello 2001). Earned media has typically gone undervalued, but researchers estimate that a week-long local American newspaper feature on cessation had the same effect on quit rates as would have the formation of 380 dedicated clinics (Chapman and Dominello 2001; Chapman and Wakefield 2001). Considering that mass media initiatives are only likely to prove effective if audience exposure is substantial (Farrelly, Niederdeppe and Yarsevich 2003), the true potential of earned media rests in its ability to act as an additional and influential saturation device.

¹ "Earned media" is coverage in the media that you do not pay for.

Successful tobacco control communications need to take into account the research literature on effective messaging. Poorly-created media initiatives can give rise to positive feelings about tobacco industry practices (Farrelly et al. 2002). Meaningful communications strategies should aim to deliver messages through multiple channels (from television to websites to workplaces, pubs and “street teams”), given that more expansive approaches, including proactive local media attention (paid and earned) and direct community leader mobilization, have been linked to landmark changes in smoking policy.

4.2 Key Considerations

In terms of smoking prevention communications strategies, the research is clear that appropriate message content is vital to success. According to the evidence, messaging focused on long-term harms or scare tactics is not effective, but emphasis on the short-term consequences of tobacco use, the manipulations of the tobacco industry and the risks of second-hand smoke can prove meaningful (Goldman and Glantz 1998; Paglia and Room 1999). Evans, Price and Blahut (2005) note the efficacy of “truth-branding”² in anti-smoking initiatives, confirming the powerful impact that can be had via communications around the dubious tactics of tobacco companies. White et al.’s (2003) work demonstrates that Australian anti-smoking messages were just as effective among youth as adults (their intended audience). Although research on age-appropriate media initiatives differs (e.g., see Siegel and Biener 2000; Wakefield et al. 2003), White et al.’s findings are important in highlighting the potential transferability of communications strategies.

While some research hints that television as a medium for tobacco control communications is more influential than other media such as radio or billboards (Siegel and Biener 2000), these other media have been subject to little concerted exploration or testing in the scientific literature. In fact, understudied media like websites and email distribution lists (used to deliver tobacco control information in a form that can be forwarded by recipients through web/email applications to wider and wider audiences of co-workers, friends and family) appear to stand as innovative channels for mobilizing the community and buttressing cessation, protection and prevention programs (Grierson et al. 2006; Vickers et al. 2002).

Pentz, Sussman and Newman (1997) hint at other non-traditional venues for delivering cessation-specific messaging when they suggest that smoking pits on school grounds (and arguably other areas where smokers congregate) offer ideal areas for advertising quit information. In a similar fashion, Hunt et al.’s (2003; also Stoddard et al. 2005) study of tobacco reduction at the workplaces of young adults (grocery stores) implies that sites which retain youth for several months of stable work—including job corps programs and co-op programs—offer a context for tobacco reduction messaging and program delivery. As well, venues that have been routinely targeted by the tobacco industry for the recruitment of new smokers (e.g., bars and pubs) are logical places for media focussing (Sepe and Glantz 2002; Sepe et al. 2002). Interestingly, the apparent success of similar tactics sponsored by the tobacco industry itself, and the documented effect that direct human engagement can have in encouraging individuals to stop smoking (Serra et al. 2005), hint at the positive potential impact of such youth programs.

² Truth-branding is the practice of overtly branding your message as the “truth” in opposition to the misleading messages of industry promotions. This is more powerful than just putting out a truthful message to counter the misleading message.

It is important to recognize that the scientific literature has tended to have a very narrow view of tobacco control media initiatives—a view that has reinforced the perception that these initiatives are solely about major ad campaigns. As insinuated above, this narrow perspective has perhaps contributed to an underappreciation of the potential effects of interconnected tactics (including the use of earned media alongside traditional ads), and has neglected the fact that real human beings speaking to other humans about tobacco issues can have an impact on behaviour. Indeed, such mobilization in the context of proactive media engagement on smoke-free places appears to have proven vital to furthering protection work in jurisdictions from Calgary to Ireland (Grierson et al. 2006; Howell, personal communication, 2005). In fact, Irish officials partially attribute the remarkable passage of the country’s national smoke-free workplace legislation—the first of its kind in the world—to a well-crafted marketing campaign focused on workers’ rights. Guided by a multi-modal communications strategy, Ireland used publicity, media saturation and buy-in from unions and interest groups to frame smoke-free legislation not as a tobacco control issue, but as an issue of individual rights to safety and health protection (Howell, personal communication, 2005).

4.3 Cost-Effectiveness

Research on the cost-effectiveness of media-focused tobacco initiatives is biased toward larger-scale, higher-profile statewide and national campaigns. Nevertheless, findings offer a guiding frame for the implementation of smaller regional programs—so too do they highlight the clear cost utility of media promotions. Secker-Walker et al. (2002) estimate the cost per life-year saved from a prevention-related media campaign at \$696. Fishman et al. (2005) calculate that a \$0.97 US per capita population-wide mass media campaign (with regionally and culturally specific components) would result in societal savings of between \$1,913 and \$9,318 US per life-year gained. Goldman and Glantz (1998) cite evidence that California’s media campaign brought about a decline in consumption of 3.9 cigarette packs per capita per year for each dollar spent per capita. Importantly, Bridge and Turpin (2004) observe that for every \$1 invested in a media campaign in BC, \$17.5 in savings can be expected in return. As a point of comparison, the Centers for Disease Control and Prevention (CDC 2004) cites the 2001 statistic that the tobacco industry spends \$39 per person, or \$11.2 billion per year, on their own advertising and promotion campaigns.

The CDC (1999) contends that a minimum investment of \$1 to \$3 per capita per year is necessary to fund a moderately-sized, but compelling campaign. This minimum investment must be supplemented with more cash if particular audiences are to be reached. Mudde and De Vries (1999) estimate the cost per long-term quitter of a Dutch mass media campaign (including television shows, ads, posters, etc.), combined with a quitline and local group programs, at \$12 US. Other researchers put similar campaigns at \$27 to \$921 US per quitter—which is highly cost-effective, considering that some medical interventions can cost \$30,000 to \$150,000 US or more per life-year saved (Mudde and De Vries 1999). Glantz and Mandel (2005) mention Florida’s successful truth campaign, which reduced consumption rates on a budget of \$1.65 per capita per year. Farrelly et al. (2003) refer to research on Minnesota’s relatively poorly funded (\$0.35 per capita) anti-tobacco campaign, which failed to incite behavioural or attitudinal change on tobacco. These authors also refer to the United States truth campaign, the Florida campaign, a Norwegian campaign and a Kentuckian campaign as prime examples of programs whose ample

funding (along with good planning and well-targeted approaches) helped to change teen smoking behaviours.

4.4 Summary

- Other possibilities for broadening communication initiatives include engaging the media in advertising of the compliance successes and failures of individual tobacco retailers (Canadian Cancer Society 2002). The benefits of such advertising are realized by keeping both retailers and the general public aware of the presence of meaningful enforcement (and overall tobacco control) programs in the community. As well, Quitnow should be used as a vehicle to link activities (cessation, prevention and protection-related) across regions and populations, thereby generating wider recognition of tobacco control successes. As evidenced by statewide and national research, the greater the collaboration and consistency between partners, the more widespread and forceful the program effects will be.
- Media anti-smoking campaigns have been seen to reduce smoking and save life-years at an extremely low expense relative to other tobacco control measures (e.g., clinical approaches). The cost-effectiveness and potential benefits of mass media campaigns are substantial, when they are expanded broadly. However, evidence indicates that when funded inadequately (e.g., Minnesota's \$0.35 per capita media strategy), campaigns will have little or no impact. Unfortunately, local data on cost-utility are lacking, but estimates put a price of \$1 to \$3 US per capita per year as the minimum investment necessary to fund a moderately-sized but forceful media intervention.

5.0 BRIEF INTERVENTION

5.1 Evidence Base

Research is unequivocal about the efficacy of brief physician advice in increasing quit attempts among adult smokers, including among pregnant smokers (Lumley et al. 2005; Parrott et al. 1998). West, McNeill and Raw's (2000) guidelines argue that just five minutes or less of brief counselling from a general practitioner on smoking cessation leads 1 to 3 of every 100 smokers to quit, and 40 per cent of all smokers to attempt to quit. Lancaster et al.'s (2000) meta-analysis of smoking interventions also documents the success of brief advice from physicians in increasing cessation. And Hopkins et al. (2001) identify provider reminder + provider education systems (i.e., programs that educate providers on tobacco use and cessation options, and prompt providers to advise patients on quitting smoking) as effective in boosting quit rates. Combined with self-help educational resources, this multi-component strategy has been seen to positively affect cessation by a median of 5.7 per cent (Hopkins et al. 2001).

Brief intervention still appears to be underutilized in the medical system, and the scientific community, too, has been deficient in analysing the effects of repeated delivery of brief advice over time (Solberg et al. 2006). Solberg et al. (2006) suggest that if provided on a regular (yearly) basis, the collective effectiveness of brief screening plus support (including pharmacotherapy) could be comparable to annual flu shots or biennial mammogram screening in terms of proportion of the burden of disease prevented.

Note that the effectiveness of delivering brief advice on second-hand smoke exposure to adults without also delivering concurrent cessation-specific advice is questionable (Hovell et al. 2000; Stein et al. 2000). The research insinuates that meaningful tobacco control interventions integrate multiple components, meaning that attempts to encourage smoke-free environments will depend on associated (brief) attempts to heighten cessation rates.

5.2 Key Considerations

Brief advice delivered by health care providers to youth (as opposed to adults) has seen unclear scientific support. This lack of consistent impact is arguably related to the fact that providers (physicians in particular) have been (1) less likely to deliver cessation messages—as opposed to prevention messages—to adolescents; (2) less likely to intervene at times when smoking uptake is most probable; and (3) less firm in guaranteeing confidentiality and privacy to young people (Kaplan et al. 2004).

It is possible that the ambiguous outcomes associated with brief intervention among youth, and the often low rates of use of brief advice among adults (as noted in the previous section), is related to the excessive amount of research attention paid to physicians as the primary deliverers of these services. While physicians do indeed have a major role to play in effectively applying brief counselling, it is unclear why other professionals have been excluded from the system. In fact, brief interventions by pharmacists (offering both repeated advice and record keeping for their clients) have proven efficacious (Sinclair, Bond and Stead 2005). And Tomar (2001) recommends the engagement of dentists in brief advice: dental offices offer ideal spaces for delivering messages to youth, given that smoking manifests itself in oral cavities even at the

earliest stages of use. Researchers like Borrelli et al. (2005) have suggested expanding brief intervention even further—into the nursing community and beyond. While such contexts have not been the subject of extensive specific research, the evidence from primary care settings would seem easily transferable to other trusted professionals.

It is similarly possible that inadequate implementation of brief advice is related to anecdotal reports that various providers are suffering from “brief intervention overload” (i.e., exhaustion and uncertainty from delivering separate tobacco, alcohol, marijuana and other drug and health advice to the same individuals on the same occasions). The reality is that the greatest burden of substance-related harm and the greatest costs from substance use in BC communities (e.g., Caulkins et al. 2002; Rehm et al. 2006) are attributable to tobacco and alcohol use. This means that brief interventions that focus on smoking and drinking should have the most substantial effects on overall population health.

Uptake of brief advice by health care professionals is dependent, as Solberg et al. (2006) point out, on the development of integrated systems to prompt and monitor delivery. Such systems would include, among other things: identifying smokers in their medical records via, for example, reporting smoking status as a vital sign or screening individuals when they first present themselves at a medical facility; creating a means (e.g., computer-based) to remind professionals to advise about smoking; and ensuring that smokers are made aware of additional support services (e.g., telephone quitlines) alongside instances of brief intervention. Solberg et al. (2006) cite evidence that if some of these components are not integrated but are rather used in isolation, the chances of success in improving professionals’ delivery of brief intervention are slim.

In terms of actually teaching health professionals to deliver brief intervention, evidence suggests that training programs can enhance process outcomes (i.e., increasing the number of individual brief counselling episodes, instigating greater delivery of self-help materials and NRT products by professionals, and helping more smokers to set both quit dates and follow-up appointments), but do not generally appear to change smoking behaviour (Lancaster, Silagy and Fowler 2005). Those programs that improve health care providers’ brief intervention performance all appear to rely on single-session, face-to-face tutorials provided in a group or individual context. Moreover, the one program that has been linked to greater patient quit rates also compensated physicians according to the standard Canadian reimbursement plan (Wilson et al. 1988). Lancaster et al. (2005) insinuate that it was this compensation package that contributed to the program’s significant impact on cessation. They suggest that without attending to these types of major systemic/environmental considerations first (e.g., reimbursement schemes), training programs are not likely an effective area for investment.

5.3 Cost-Effectiveness

Among cessation service available to health care providers, cessation support focused on the delivery of brief advice by physicians produces the greatest health effects at the least cost. Indeed, Feenstra et al.’s (2005) cost-effectiveness computations for the Netherlands estimate minimal counselling by a GP (12 minutes total in one or two sessions) to be cost-saving. Bridge and Turpin (2004) calculate an approximate \$12 benefit for every \$1 invested in brief

intervention. And Woolacott et al. (2002) suggest that 3 minutes of brief physician advice would cost just £1.47 if integrated into regular doctor-patient consultation time.

In terms of life-years gained, Warner (1997) assigns a price of \$1,000 US per year saved to brief counselling by non-physician specialists accompanied by self-help resources. But other United Kingdom-based studies put the cost of brief physician counselling at just £174 per life-year saved (Parrott et al. 1998 cited in Woolacott et al. 2002).

5.4 Summary

- A few minutes of cessation-specific advice by physicians is a critical component to comprehensive tobacco control, and a key factor in increasing cessation rates and stimulating quit attempts among adult smokers. Problematically, brief intervention does not appear to be used on a consistent basis, suggesting that better systems to facilitate its delivery are essential for success.
- Use of brief intervention among youth shows mixed results, possibly owing to poor application by health care providers. Recruiting other members of the health community (pharmacists, dentists and nurses) to deliver brief advice has the potential to increase its application and broaden its effects across both younger and older audiences. Considering the burden of harm and its distribution by substance type, screening for tobacco and alcohol use should take priority among professionals. Ultimately though, sustainable brief intervention demands a coordinated system that (1) clearly identifies smoking status in client records; (2) prompts providers to check on client smoking behaviours; and (3) helps providers and administrators to monitor brief intervention usage over time, as well as individual client progress. Unfortunately, programs to train professionals in giving brief advice have not seen great impact on cessation rates.
- Brief intervention is one of the most cost-effective cessation services available to health care providers, with some evidence indicating that the costs per life-year saved via such support can fall under \$500 US. The application of brief intervention can be achieved at a relatively low expense, and its positive impacts can be felt at costs below other popular quit interventions, including the universal subsidization of nicotine replacement products.

6.0 PHARMACOTHERAPY

6.1 Evidence Base

The effectiveness of pharmacotherapy in reducing tobacco-related harms in adult populations is well-documented, with some researchers noting that nicotine replacement therapy (NRT) can double quit rates among users (Lancaster et al. 2000), and others reporting modest but positive absolute NRT effects (e.g., a 7 per cent absolute quit rate at 6 months) (Hughes et al. 2003). In combination with brief intervention and follow-up, NRT has been seen to increase quit rates around 33 per cent (United States Preventive Services Task Force 1996). And with telephone support, NRT has been associated with a greater than 30 per cent cessation rate (versus 6 per cent using telephone support alone) (Miller et al. 2005). Elsewhere, however, evidence suggests that telephone programs may do little to improve on the success of already effective brief advice + NRT + self-help support systems (Reid, Pipe and Dafoe 1999). Importantly, Pierce and Gilpin (2002) demonstrate that without attendant behavioural support, over-the-counter NRT is less successful in increasing quit rates over the long term.

In terms of effective non-nicotine pharmacotherapies, bupropion has strong support in the research literature (Woolacott et al. 2002). Little evidence is available to confirm whether bupropion is either less or more efficacious than NRT in facilitating cessation, although it is possible that NRT is a slightly safer option given the small risk of seizure associated with bupropion (Woolacott et al. 2002). Study of the impact of bupropion on young smokers speaks to the overall mixed and inconclusive nature of the evidence on pharmacotherapy use (NRT included) among youth. Some research suggests that bupropion is well-tolerated and can be effective in reducing smoking among adolescents (Niederhofer and Huber 2004). Upadhyaya, Deas and Brady (2005) cite pilot study findings that bupropion is correlated with abstinence rates among youth comparable to those reported in adult smokers. However, earlier work by Killen et al. (2004) found no significant difference in quit rates between youth who were given bupropion and nicotine patch therapy versus the nicotine patch and placebo. Foulds et al. (2006) wisely call for further investigation into the issue of successful pharmacotherapy use among young people, but Upadhyaya et al. (2005) predict that pharmacotherapy alongside behavioural therapy is “likely to be helpful” to adolescents. Miller et al.’s (2005) work, too, suggests that NRT might have a positive effect on 18- to 24-year-olds.

Research has linked subsidization of pharmacotherapies to higher cessation rates (Hopkins et al. 2001). In fact, Kaper et al. (2005) correlate reimbursement for various quit services (including NRT, bupropion and behavioural counselling) with a 2.3 times greater likelihood of smoking abstinence at six months. But Pierce and Gilpin (2002) imply that with greater accessibility, the effectiveness of NRT may actually decline or stagnate. However, questions about the appropriate audience for, and relative cost-effectiveness of, pharmacotherapy (see below), lend to the argument that subsidization of pharmacological products should be focused on those people for whom NRT/bupropion may have the most profound effects on harm; for instance, among individuals on lower incomes, or with mental health concerns or multiple dependencies, who are already supported by brief physician advice or behavioural counselling (see Johnson et al. 2006).

6.2 Key Considerations

Information on the most effective contexts for pharmacological cessation success is mixed and generally biased toward NRT usage. For instance, Lancaster et al. (2000) report that, at a minimum, nicotine replacement therapy should be offered in association with brief advice from physicians; the United States Preventive Services Task Force (1996) seems to echo this point, noting that nicotine replacements are most effective as add-ons to ongoing counselling (see also Cepeda-Benito, Reynoso and Erath 2004; Molyneux 2004). Somewhat divergently, Cepeda-Benito et al. (2004) report a correlation between NRT, high-intensity support and higher quit success among women only. And Hughes et al.'s (2003) meta-analysis complicates the matter even further, indicating that the effectiveness of NRT is not dependent on the presence of concurrent behavioural support. Perhaps Woolacott et al. (2002) put it best when they wrote that “information on how to maximise effectiveness in practice is still lacking, but motivational support is probably involved” (p. vii).

Laugesen et al. (2000) reflect on the paradoxical situation that often sees nicotine replacement therapy subject to regulation and restricted access, while tobacco products circulate in a largely unrestricted fashion. The authors note that the deregulation of nicotine replacement therapy products in the United States (i.e., the removal of prescription-only status from NRT products) led to a 150 per cent increase in NRT sales in the following 4 years, and an increase in NRT product advertisement. Similar effects have been witnessed in Australia, where changing regulations permitted wider advertising of NRT, leading possibly to a doubling in use of NRT products.

Miller et al. (2005) document the success of NRT in reaching immigrants, low-income earners, seniors and ethnic minorities. As noted above, research also hints at the potential for impacting on the overall burden of harm by supporting pharmacotherapy use among individuals with mental illness or multiple dependencies (Johnson et al. 2006). Interestingly though, research suggests that in the long-term, men see a greater effect from NRT than do women (Cepeda-Benito et al. 2004).

It should be noted that evidence of the effectiveness of NRT on light versus heavy smokers (those consuming, respectively, less than or more than 15 cigarettes per day) is mixed (e.g., Pierce and Gilpin 2002; Reid et al. 1999). West et al. (2000) contend that the beneficial impact of NRT is seen only in smokers of 10 or more cigarettes per day. Pierce and Gilpin (2002) say 15 or more cigarettes per day. Miller et al. (2005) say less than 20 per day. But Shiffman's (2005) study shows that NRT lozenges significantly increased quit rates among individuals smoking less than 15 cigarettes per day, and that these lozenges did not differ in efficacy between light and heavier smokers. Indeed, as Ahluwalia et al. (2006) report, no clinical trials have ever been conducted on light smokers specifically, so the issue clearly requires more study. Ahluwalia et al.'s own research did not find an impact from 2 mg nicotine gum on African-American light smokers, although the authors acknowledge that this possibly resulted from an under-dosing of the treatment groups.

Shiffman, DiMarino and Sweeney (2005) have also revealed that more dependent, long-term heavy smokers with significant potentials for relapse are self-selecting for NRT. A

“predisposition” to failure among these smokers (i.e., their lower probability of success) is argued by Shiffman et al. to be skewing effectiveness measures for NRT.

6.3 Cost-Effectiveness

Cost-utility studies have been more thoroughly articulated for nicotine replacement therapy than for bupropion, but overall the research is clear that pharmacotherapies are cost-effective relative to other common health care interventions. In fact, Solberg et al. (2006) rank smoking cessation counselling in conjunction with NRT/bupropion as one of the top three clinical preventive services available in medical practice.

Comparatively, though, there is room for debate about the economic benefits of NRT. Bridge and Turpin (2004) note that NRT alone ranks lower on cost analysis scales than other smoking interventions, due to its tendency to produce only one quitter for every 15 users. These authors quote a \$3 benefit for every \$1 invested in NRT, compared with a \$12 benefit for every \$1 invested in brief physician advice. Such findings hint at the fact that to achieve real impact, NRT should only be delivered within a larger cessation framework. Interestingly, the World Health Organization (2002) determined that while NRT is not especially cost-effective, it generally still falls within the maximum intervention expenditure point of three times the GDP per capita.

Specific measurements by Feenstra et al. (2005) place NRT plus minimal counselling at an estimated 1400€ (\$2,100 CAD) per QALY saved gained. Ong and Glantz (2005) assess the cost of a free NRT program for Minnesota at \$4,440 US per QALY saved. Warner’s (1997) interpretation puts a price of \$10,000+ US per life-year saved on nicotine gum/patches accompanied by physician advice. More moderately, Cornuz et al. (2006) put the incremental cost per life-year saved for a 45-year-old smoker in Canada using nicotine gum plus counselling at \$2,820 to \$4,260; while Woolacott et al. (2002) estimate the incremental cost per life-year saved with NRT at £1,000 to 2,400 (\$2,200 to \$5,300 CAD).³

In terms of expenses, Miller et al. (2005) attribute a \$464 US cost per quit to the free distribution of nicotine patches in New York City. Woolacott et al. (2002) estimate an incremental cost per quitter at under £1,000 (\$2,200 CAD). Parrott et al. (1998) put average cost per quitter at £267 (\$580 CAD) for brief intervention plus self-help resources plus NRT. And Ong and Glantz (2005) assess a statewide NRT program at \$7,020 US per quitter. In contrast, Martin (2002) reports a mean cost of \$146.12 per person for a Quebec program subsidizing bupropion, NRT patches and gum for eligible smokers.

Cost-effectiveness data on bupropion are lacking, but Woolacott et al. (2002) estimate its incremental cost per life-year saved at £640 to £1,500 (\$1,400 to \$3,300 CAD), and Cornuz et al. (2006) put it at \$792 to 1,196 (in conjunction with counselling). Hall et al. (2005) compare bupropion and nortriptyline for cost utility, ultimately finding no significant difference between the two. However, the authors do note the possibility that psychological intervention (in the form of group therapy) may be more cost-effective than either type of pharmacological aid. In contrast to Hall et al., Bolin, Lindgren and Willers (2006) Swedish research finds that when the indirect

³ Woolacott et al.’s (2002) review of the literature indicates that the number of life-years saved per quitter tends to range from 1.0 to 3.0.

effects (on human production and consumption) of saving life-years are considered, cost-utility analysis pinpoints bupropion as actually cost-saving, compared to both nicotine patches and nicotine gums. When only direct effects are considered, bupropion is still seen as cost-saving compared to nicotine gum. Bolin et al. determine the incremental direct cost per QALY gained for bupropion to be 6,600 Swedish kronas (roughly \$900 US) for men and 4,900 kronas (\$670 US) for women.

6.4 Summary

- There is no doubt about the efficacy of pharmacological treatments (nicotine replacement therapy [NRT] and bupropion) in increasing cessation success among adults, but the issue of universal subsidization of such treatments is more complicated. Considering related expenses and questions about who is most likely to benefit from pharmacotherapy, attention is perhaps best focused on assisting people who bear a heavier burden of smoking harm—for instance, individuals on lower incomes, or with mental illness or multiple dependencies, who are backed by existing behavioural support.
- Reflecting on related evidence, McDonald (Ministry of Health 2005) argues that pharmacotherapies (including NRT and bupropion) should be available at no cost to all heavy smokers and individuals with recognized medical conditions (e.g., psychiatric illness and multiple dependencies).
- Pharmacotherapy has been documented as successful among populations ranging from minorities to seniors to the mentally ill, although it is likely to have greater impact when offered alongside some form of behavioural support (brief or more intensive). In terms of impact on heavier versus lighter smokers, NRT effectiveness has most often been reported for individuals who smoke between 15 and 20 cigarettes per day. However, emerging work has begun to document its impact on lighter smokers (≤ 15 cigarettes) as well. It seems too early, then, to make a definitive statement about NRT efficacy, based solely on number of cigarettes smoked. On the other hand, knowing that certain populations bear an inordinate share of the burden of smoking harm and can benefit from pharmacotherapy means that targeting such therapy to these audiences could have meaningful outcomes.
- Pharmacotherapies appear to be cost-effective relative to other common health care interventions. Moreover, calculations find their cost to be far below the amount the public claims to be ready to pay for one quality-adjusted life-year (QALY) saved (i.e., far under \$17,700 to \$45,700 US, as cited by Bolin, Lindgren, and Willers 2006). Estimates set the expense per life-year saved via pharmacotherapy at anywhere between about \$600 US to over \$10,000 US, with several calculations falling between about \$2,000 to \$4,000 US. It is unclear whether bupropion is more cost-effective than NRT. However, it is clear that compared to other smoking interventions, pharmacotherapy tends to rank lower on cost-utility analyses because of its larger expense and smaller overall effect size. Given these findings, universal subsidization of pharmacological treatments is questionable, but targeted subsidization for vulnerable individuals who demonstrate good odds of success could prove valuable.

7.0 FORMAL COUNSELLING PROGRAMS

7.1 Evidence Base

In general, formal group therapy has strong support in the research literature, although group programs are not well used and thus require serious attention to their cost utility. Group-based cessation does not appear to be any less effective than intensive individual programs. However, there is a possibility that it is not more effective than health care provider advice alone (Lancaster and Stead 2005; Stead and Lancaster 2005a). Building on this research, Lancaster and Stead (2005) demonstrate that individual programs can be successful in changing smoking behaviour, but more intensive options are not necessarily more efficacious than brief options. There may exist a dose-response relationship between individual counselling contact and cessation rates (Lancaster and Stead 2005); however, the same relationship could probably be achieved at less cost through well-attended group sessions.

Therapeutic programs that address smoking cessation alongside treatment for other substance use are efficacious, can have a positive impact on relapse rates and can have a particularly profound effect on reducing harms among the vulnerable and mentally ill (Johnson et al. 2006). Mental health clients and individuals with multiple dependencies have higher smoking prevalence, which means that, from a population prevention standpoint, they need to be targeted in order to truly influence the burden of harm.

Evidence of useful cessation programs for adolescents (including Kick the Nic) has been scarce, meaning that younger audiences have often been left without effective programs for quitting or cutting back on smoking (Camenga and Klein 2004). However, Lipkus et al. (2004) find a small impact from a telephone counselling line (combined with video and self-help resources) on 15- to 18-year-old teens, and suggest that basic self-help materials for youth show just as much effect as similar materials for adults. Likewise Rabinus et al. (2004) demonstrate quit rates of up to 20 per cent among 18- to 25-year-olds, achieved via telephone counselling. Evolving research in New Zealand and the United States has also begun to link text-messaging cessation programs with increased quit rates (e.g., 28 per cent at 6 weeks) among young adults 16 to 18 years old (Obermayer et al. 2004; Rodgers et al. 2005). In fact, Bramley et al.'s (2005) work demonstrates that one such program was just as effective among New Zealand Aboriginal (Maori) youth as among non-Maori.

Work by Ramsay and Hoffmann (2004) on an American university campus hints that group cessation and relapse-prevention programs delivered by trained peer leaders to undergraduates can prove highly successful—achieving 88 per cent quit rates following 7 weeks of cessation support, and 63 per cent quit rates following a subsequent 6 months of basic relapse-prevention support. Such findings lend credence to Canadian programs like Leave the Pack Behind (LTPB), which appear to show positive impacts (Lawrance and Lawler n.d.), but have not yet been reported in the academic literature.

Pre-operative cessation programs (in the manner of Stop Smoking Before Surgery) have efficacy relative to short-term quit rates and reductions in tobacco use, although their direct impacts on lessening surgery-related complications are unclear (Moller and Villebro 2005). As per Moller

and Villebro (2005), the evidence suggests that effective programs typically incorporate face-to-face advice and counselling alongside written materials and other supplements (e.g., follow-up phone calls), and are offered to smokers at least six weeks before surgery.

Telephone-based and web-based interventions for adults seem well-supported by scientific research. For example, Stead, Lancaster and Perera (2005; also Zhu et al. 2002) observe that, in comparison to self-help materials alone, proactive telephone counselling can increase the likelihood of quitting by 50 per cent. Tomson, Helgason and Gilljam (2004) write of the impact of a Swedish quitline that saw its users achieve a 31 per cent quit rate. Borland et al. (2003) point to a 21 per cent short-term abstinence rate among users of the proactive Victoria Quitline, in comparison to the 12 per cent rates observed in control and other experimental groups. Smith et al.'s (2004) Ontario-based telephone counselling line has been credited with increasing abstinence rates by 5 per cent compared with the smaller effect of print-only interventions (1 per cent). And, while research on web-based support is limited, preliminary evidence suggests that tailored programs can have a significant impact on abstinence rates in the short term (particularly when combined with NRT)—reaching a large population at low cost (Strecher, Shiffman and West 2005).

7.2 Key Considerations

In terms of telephone-based cessation support, proactive systems have been observed to increase cessation rates by a median of 41 per cent (Hopkins et al. 2001). Zhu et al. (2002) also note the effectiveness of proactive counselling, and note that smokers are four times as likely to use quitlines as face-to-face clinical interaction. Smith et al. (2004) identify low-cost newspaper and word-of-mouth promotions, pamphlet distribution, and one 50-minute initial counselling session plus 2 follow-up calls, as critical elements to a successful telephone intervention. And Reid et al. (1999) cite that the optimal time frame in which to deliver telephone counselling may be during the first one to two weeks of a quit attempt. Borland et al. (2003) speak of the statistically significant impact of call-backs on heightening abstinence rates among users of the Victoria Quitline. The authors also note the lack of effect of computer-generated tailored advice in increasing cessation/enhancing the quitline.

However, review of the users of telephone and web cessation lines (including Quitnow) suggests that these interventions tend to attract fairly standard audiences, which do not necessarily conform with the characteristics of the general smoking population. In particular, research from Scotland, Hong Kong, London, New York state, Massachusetts and California variously indicates that quitline participants are more likely female, younger (20—or 25—to 45-years-old), Caucasian, smoke greater than 20 cigarettes per day, and/or hold some level of higher education (Abdullah et al. 2004; Gilbert, Sutton and Sutherland 2005; Jaen et al. 1993; Platt et al. 1997; Prout et al. 2002; Zhu et al. 2000). Minorities, the less educated and men are often under-represented, while—following Prout et al. (2002)—individuals with greater degrees of dependence and less probability of quitting success are apparently over-represented. Young adults (between 16- and 20-years-old) are not likely to access these services, and disappointingly, a recent survey of 3,660 young Ontario smokers suggests that current telephone- and web-based intervention options are generally unappealing to them (Leatherdale and McDonald 2005).

Effective cessation programs depend not only on the participation of the individual smoker, but on the support of that smoker's partner, too. Research speaks to the significant influence that partner's smoking status can have on quit success, and thus the need to interact with partners in the cessation process (Walsh et al. 2006). While interventions to enhance partner involvement in quit efforts have seen disappointing results (Park et al. 2005), there is a clear need to integrate partner support and positive, non-critical partner interaction into treatment programs. The same is true of involving parents (via, for example, parental education and concurrent parental treatment) in youth-oriented cessation programs (O'Connell et al. 2004). McGee, Williams and Reeder (2006) imply that consistently voiced objections by both parents to their children's smoking is significantly associated with increased quit attempts among these children, and with decreased likelihood of cigarette use among non-smoking youth.

7.3 Cost-Effectiveness

As noted earlier, group cessation programs can often be underutilized, which leads to questions about their cost-effectiveness. Stead and Lancaster (2005a) hint that group cessation should be cost-effective, given that more people have access to therapist contact, but a lack of data prohibits the drawing of any conclusions on this topic. Hall et al. (2005) also touch on issues of cost utility when they report that psychological smoking interventions (in the form of group sessions) are probably more cost-effective than drug therapy (via bupropion or nortriptyline).

In terms of telephone counselling—one of the few program types to be subject to any clear cost analysis—Feenstra et al. (2005) estimate a Netherlands-based telephone support line at 1,100€ (\$1,650 CAD) per QALY gained, while Tomson et al. (2004) assess a Swedish quitline (including pharmacotherapy) at a cost of \$1,052 to \$1,360 US (\$1,410 to \$1,822 CAD) per quitter and \$311 to \$401 US (\$417 to \$537 CAD) per life-year saved. McAlister et al. (2004) put the cost of 1 year of maintained cessation from telephone counselling at \$1,300 US (\$1,742 CAD).

Breaking the expenses apart, Strecher et al. (2005) assess the price of telephone counselling products at \$150 to \$250 per smoker, personalized print materials at \$5 to \$40 per smoker, and tailored web-based products at a minimum of \$1 per person. Smith et al. (2004) acknowledge the importance of advertising for callers to a Ontario quitline, pinpointing the “enrolment” cost at \$31.02 per person and recognizing the success of newspaper ads (as compared to radio) in attracting clients.

7.4 Summary

- Group counselling programs, pre-operative programs, cessation options for persons with mental illnesses or multiple dependencies (including pharmacotherapy coverage), and telephone- and web-based quitlines have all shown success in improving cessation rates among various populations. Intensive individual counselling can impact on smoking behaviour, but not necessarily with any more strength than can brief counselling or group options. Peer-led programs on university campuses appear to have promise, as do emerging text-messaging interventions for youth. In some cases, telephone support for

young people also seems to have boosted quit rates; however, meaningful options for youth are still far too rare.

- Proactive systems that ensure smokers have access to ongoing support are important elements to many counselling services. Telephone- and web-based programs have proven effective in scientific trials, but their usual audience appears to be overpopulated by certain users, suggesting they may not be appropriate (or may need tailoring) for various audiences. Cessation support options should be attentive to the role that smokers' partners play in enabling—or hindering—quit success. Integrating partners into these programs, and even integrating parents into youth-oriented programs, could enhance outcomes.
- Clear research on cessation expenses is relatively rare, meaning that conclusive statements about the cost-effectiveness of formal counselling are problematic. Group programs should prove cost-effective if uptake is strong—but little evidence is available to confirm or deny this presumption. Telephone systems demonstrate cost-efficacy; however, precise expenses and QALY estimations differ by country and program components. In the end, it is important to note that cessation support in general saves human life-years at costs far below those of other common health care interventions.

8.0 SMOKE-FREE POLICIES

8.1 Evidence Base

Laugesen et al. (2000) cite evidence that “clean air” policies decrease daily cigarette use by 20 per cent, and Bauer et al. (2005) document the long-term success of smoke-free work site policies in reducing tobacco consumption by 2.57-3.85 cigarettes per day, as well as in making quitting twice as likely. Sargent, Shepard and Glantz (2004) report on the positive relationship between a ban on smoking in public places in Helena, Montana, and a significant decrease in heart attack-related hospital admissions (admissions returned to previous levels when the ban was lifted six months later). Hopkins et al.’s (2001) meta-analysis of research on smoking bans and restrictions in public places confirms the strength of the link between lower levels of cigarette consumption and smoking restrictions, and between workplace smoking bans and greater cessation. Serra et al.’s (2005) meta-analysis on preventive approaches to tobacco use in public places supports the conclusion that workplace bans, in combination with comprehensive tobacco control strategies, are effective in reducing smoking. Of particular significance, Chaloupka and Wechsler (1997) make clear that strong restrictions on smoking in restaurants and schools reduce college students’ rates of tobacco consumption. However, in terms of prevention, Wakefield et al.’s (2000) comparative review suggests a hierarchy of effectiveness in smoking restrictions, with home-based bans being most efficacious in reducing uptake, public place bans proving slightly less effective, and school-based bans proving least effective unless strongly enforced.

Stephens et al. (2001) establish that smoking bylaws have more of an effect on adult women than adult men, correlated with diminished amounts of daily smoking amongst females and an increased chance of being a non-smoker. Goel and Nelson’s (2005) research suggests that indoor smoking restrictions are deterrents to tobacco use among male youth, and rank (along with price increases) as the most effective practice in reducing smoking.

8.2 Key Considerations

There is no reliable scientific evidence to support the popular argument that 100 per cent bans on smoking in public spaces have detrimental economic effects on the hospitality/entertainment industry. Scollo et al.’s (2003) review of 97 claims about purported economic hardship in the hospitality business stemming from smoke-free policies shows that such policies had no long-term impact or, indeed, had a positive impact on sales and employment, and that every claim about economic disadvantage was actually backed by the tobacco industry. Corroborating Scollo et al.’s meta-analysis, Luk and Ferrence’s (2005) assessment of 29 high-quality studies on the financial impacts of smoke-free legislation reveals that none of the studies proved economic loss at the hands of smoking restrictions (some, in fact, proved economic gain), and that all studies alleging negative effects were either funded by the tobacco industry, linked to the tobacco industry or of unacceptable academic quality. Evidence also indicates no effects on the profits of bingo and other charitable gaming halls (Glantz and Wilson-Loots 2003). Perhaps most interestingly, recent research from Ottawa demonstrates that even in cold northern climates among a diverse bilingual population (circumstances that some have argued would impact on the financial success of businesses in the wake of smoke-free reform), smoking bylaws did not affect restaurant or bar sales (Luk, Ferrence and Gmel 2006).

The successful implementation of the Capital Regional District's (CRD) 100 per cent smoke-free rules also confirms that neither decreased patronage nor diminished profits inevitably result from smoking restrictions. The CRD experience offers a general model for future policy development, demonstrating that strong bylaw writing, public education and enforcement are critical levers in overcoming resistance and in securing smoke-free environments (Drope and Glantz 2003).

Cains et al.'s (2004) study of "designated no-smoking" areas in licensed clubs in Sydney, Australia, concludes that these spaces offer only partial, if any, protection from second-hand smoke. In other words, there is no evidence that designated smoking areas are an adequate alternative to a complete no-smoking policy. There is, however, proof that no-smoking regulations (in restaurants specifically) tend to be skewed in their application, favouring towns with overall higher levels of education and income (Skeer et al. 2004). In this sense, the uneven enactment of bylaws is actually fostering socio-economic disparity in health protection, leaving some of the more vulnerable areas and individuals exposed to, and at risk of, harm.

The majority of research on smoke-free environments comes from the United States, where such policies have proven effective. Elsewhere (e.g., France), no-smoking legislation has often proven futile, as smokers have chosen to ignore the regulations and have then gone unpunished as a consequence of lax enforcement (Serra et al. 2005). This research reinforces related scientific findings highlighting the need for smoke-free policies to be well-enforced (i.e., achieve high compliance) to have any worth or real health impact on the community (Drope and Glantz 2003; Wakefield et al. 2000). Such evidence suggests that as bylaws are tightened to encompass more and more environments, enforcement efforts will need similar tightening to ensure that new regulations are truly respected. It is important to note that (1) compliance is often linked to perceptions of high levels of enforcement, and (2) symbolic policies that are not accompanied by active monitoring may prompt general public disregard for community laws (Hrywna et al. 2004). Designated smoking areas are deficient alternatives to complete no-smoking bans, and, in fact, polling has confirmed that a large majority of British Columbians favour smoking bans (CNW Group 2006). As per the World Bank (1999), this kind of strong public backing is a critical predictor of positive outcomes. Proactive media engagement is also key to engendering early and ongoing support for smoke-free policies. Moreover, studies demonstrate that comprehensive approaches to protection (which include education, signage and quit services) are particularly effective (Serra et al. 2005), meaning that more restrictive policies can be facilitated with such complementary support pieces.

Mobilizing respected leaders in the community to step forward and advocate for population-level policy change has been noted as a potentially powerful step in securing cross-province smoke-free regulations. Stein et al. (2000) suggest that some doctors are especially well-placed for such work. As well, Grierson et al.'s (2006) account of the Calgary Tobacco Reduction Action Coalition's (CTRAC) campaign to tighten smoking bylaws in Calgary offers insight on mobilizing the community to engage in the political process. Concerned that smoke-free places were of negligible interest to politicians due to low levels of public input on the matter, the CTRAC (a conglomeration of health workers and non-government organizations) established an interactive website and email distribution system, and advertised through posters, billboards, earned media and (of most significance) word-of-mouth. Visitors to the website registered for email notifications that reported on upcoming events and city council decisions, and gave clear

instructions on how to contact city council members, details of how members voted at meetings and suggestions for messages to communicate to politicians. The campaign likely influenced changes in Calgary's smoke-free bylaws, while contributing to social capital and capacity building in the community.

Workplace policies have often been coupled with workplace-specific smoking interventions. Such interventions have been associated with greater likelihood of quitting if accompanied by brief professional advice, formal counselling or pharmacotherapy (self-help materials are not well-validated in the scientific literature). Workplace quit smoking competitions have less evidence of effect, but strong smoke-free policies at work are linked with a decrease in immediate harms (Moher, Hey and Lancaster 2005). Engaging with working class employers/unions is particularly important, considering the substantial rates of smoking among blue-collar employees. Ringen et al.'s (2002) research suggests that solid cessation programs for trades workers can lessen smoking-related harm, while yielding companies a greater-than 25 per cent return on investment.

8.3 Cost-Effectiveness

Laugesen et al. (2000) cite smoke-free public place policy as the most cost-effective approach for realizing the United States' vision of a "smoke-free society." Ong and Glantz (2005) compare the cost of a free nicotine replacement therapy program with smoke-free workplace legislation, and conclude that smoke-free legislation is 9 times more cost-effective, generating 10,400 quitters at an expense of \$799 per person. Mudarri's (1994) cost-benefit analysis of proposed national restrictions on smoking in public places in the United States estimates a net annual social benefit of \$39 billion to \$72 billion, with annual costs of \$0.2 to \$0.5 billion for policy implementation and \$0.1 to \$0.4 billion for enforcement. The World Health Organization (2004) quotes an expenditure of \$358 US per DALY saved by clean air interventions in European countries; and Krueger and Associates (2005) propose that a comparable figure would apply in a Canadian context. Using American data, Bridge and Turpin (2004) predict a savings of \$48 to \$96 million per year in British Columbia resulting from smoke-free laws.

Health Canada (2002) cites evidence that the ill health of smokers results in severely weakened productivity (50 per cent more work days lost) and lost profits (\$600,000 annually; or \$2,000 to \$5,000 per year per person), and reports that \$32.2 million in smoke and property damage, health care costs, depreciation and maintenance could be averted by controlling for exposure to environmental tobacco smoke.

8.4 Summary

- Smoking bans in public places are a critical element to comprehensive tobacco control, standing as the most effective means for reducing second-hand smoke exposure, and as key tools in preventing tobacco use, decreasing consumption, reducing serious health-related hospital admissions, increasing quit attempts and boosting overall cessation rates. Smoke-free restrictions have proven beneficial to both adults and youth, and appear to have the most powerful effects when implemented on a voluntary basis by individuals in their own homes (see Section 9.0 for further details on home-based policies).

- Smoking bans do not negatively impact upon the profitability of public establishments—this is a myth perpetrated primarily by the tobacco industry. Clean air regulations have, at times, been seen to enhance sales and employment within the hospitality and entertainment industries, and the Capital Regional District’s experience offers a basic model for successful implementation of such regulations. Enforcement is a critical component in ensuring the effectiveness of smoking bans, particularly as these bans are extended to cover more and more environments.
- The cost-effectiveness of smoking bans is reflected not only in reduced health care costs, but in fewer expenses associated with smoker-related productivity shortfalls, profit losses, property damage, insurance premiums and maintenance and cleaning fees. Relative to the price of nicotine replacement therapy, smoke-free regulations are nine times more affordable. Estimates put the approximate cost of clean air laws at \$350 per DALY (disability-adjusted life-year) saved, and BC-specific calculations predict the overall savings from such laws to be \$49 to \$96 million per year.

9.0 SMOKE-FREE HOMES AND VEHICLES

9.1 Evidence Base

There is evidence to indicate that bans on tobacco use in households are the most effective protective restrictions (ahead of both public place bans and school bans) for reducing smoking uptake (Wakefield et al. 2000). In fact, Farkas et al.'s (2000) research demonstrates that adolescents living in completely smoke-free homes are half as likely to be smokers, and 1.8 times more likely to be pursuing cessation than youth living in homes without smoking restrictions. Pizacani et al. (2004) also reveal a relationship between 100 per cent bans on smoking in homes and more/longer attempts at quitting, as well as longer periods before relapse among certain smokers. Perhaps unsurprisingly, research also attests to the relationship between no-smoking household policies and reduced exposure to environmental tobacco smoke (Borland et al. 2006; Green et al. 2003); however, investigation into the effectiveness of programs to reduce infant exposure to smoke in the home has proven equivocal (Blackburn et al. 2003).

Goel and Nelson (2005) speak of the possibility for household bans to successfully deter teen tobacco use. Proescholdbell, Chassin and MacKinnon's (2000) study confirms this suggestion, showing that strong no-smoking policies in homes are linked to less experimentation among both middle and high school students. However, Proescholdbell et al. (2000) also determine that, for high school students, the relationship between such policies and less experimentation is specific to households with non-smoking parents. Szabo et al.'s (2006) research presents similar findings, which suggest that home smoking bans have their greatest impact on adolescents whose parents do not use cigarettes. Interestingly though, Szabo et al. also conclude that such bans can help to reduce experimentation, even when adolescents' friends are smokers.

Scientific examinations of the impacts of vehicle-based smoking bans do not seem to be available, although evidence implies that second-hand smoke can have an effect on adults and youth in vehicles (Jalleh et al. 2006). Support for such bans varies (e.g., Jalleh et al. 2006; Seo 2005), but appears to be more widespread for smoking bans specifically in vehicles carrying children under 18.

9.2 Key Considerations

There is evidence to show that (1) smoke-free regulations in public places facilitate smoke-free homes; (2) individuals subject to smoke-free workplace restrictions are more likely to report smoke-free homes (Borland et al. 2006); and (3) overall comprehensive tobacco control strategies are perhaps the key means to achieve home smoking bans (Thomson, Wilson and Howden-Chapman 2006). Indeed, as Thomson et al. (2006) put it, comprehensive strategies, including taxation, effective education, population-level cessation support and no-smoking restrictions in public places, are perhaps the most effective approach for increasing the number of smoke-free homes. Seen from this perspective, specific smoke-free home/vehicle campaigns are arguably not as meaningful as ensuring that a full and evidence-based tobacco program—including strong public place policy—is available to the population.

Methods to encourage smoke-free homes have typically focused on home-based interventions delivered by nurses to parents, or clinic-based (usually brief) interventions by physicians and

other health care professionals to parents (Wewers and Uno 2002). Home-based approaches, characterized by greater contact between families and providers, might have somewhat greater effect (Gehrman and Hovell 2003), but in general community-based programs have demonstrated inconsistent results (Ashley and Ferrence 1998). Indeed, even programs recommended by Ontario's Program Training and Consultation Centre as a means to protect individuals in their homes (e.g., Breathing Space) show no impact on home smoking behaviour (Loppe and Thibault n.d.).⁴

It is quite likely that ethical concerns about impinging on human rights in the home are negatively affecting the development of strong household/vehicle-oriented strategies (e.g., Ashley and Ferrence 1998). However, Yiow's (2005) review of the media marketing of New South Wales's (Australia) smoke-free home/vehicle campaign, and the translation of this initiative to different cultural groups through community grants, hints at useful opportunities for engendering support. Specifically, the "Car and Home: Smoke Free Zone" campaign offered money to communities to tailor smoke-free messages to at-risk and other populations (including Aboriginal audiences), and worked through both earned media and formal advertising to spread information about the initiative across the state. This use of the media as a means to encourage vehicle and household smoking bans is recommended in the scientific literature, and has been at the core of several community campaigns in Canada (e.g., Ontario's Smoke-Free Homes and Asthma pilot [NRC+Picker Group Canada 2004]). Perhaps more significantly though, is the research recommendation to link smoke-free home initiatives to cessation interventions (Thomson et al. 2006). In fact, evidence suggests that second-hand smoke information delivered without cessation support or health care provider support can be ineffective (Hovell et al. 2000; Stein et al. 2000). Unless clearly linked to these forms of support, it is unlikely that the dissemination of second-hand smoke information alone will manifest itself in reduced harm.

Borland et al. (2006) also address the importance of connecting cessation programming with smoke-free household initiatives, as they show that across Australia, Canada, the United States and the United Kingdom, lower implementation of home smoking bans among individuals of lower socio-economic means is not an inevitability, but is associated with these individuals' greater dependency levels and exposure to pro-smoking environments. Put differently, less socio-economically advantaged groups are not unmotivated to live smoke-free, but do need more supports to make such a lifestyle possible. Stronger tobacco control strategies—in particular, dedicated cessation services—for underprivileged groups are a necessity to dismantling currently-existing inequalities.

Concern over the impact of partial bans in homes is warranted given the mixed findings on this topic. While Proescholdbell et al. (2000) demonstrate that even permissive household smoking policies are associated with reduced youth experimentation, Wewers and Uno (2002), Klerman (2004), and Thomson et al. (2006) all cite evidence that less-than-complete policies undermine the benefits of home-based restrictions. Indeed, Blackburn et al.'s (2003) research suggests that typical harm reduction activities adopted by parents to lessen their child's contact with smoke (opening windows, using fans) are futile—a finding which testifies to the need for clear messaging about tactics that will truly have an impact on reducing smoking-related harms.⁵

⁴ Although effects on awareness and attitudes are more prominent.

⁵ Information pamphlets alone are not sufficient (Blackburn et al. 2003; Hovell et al. 2000).

The work of Green et al. (2003) and Farkas et al. (2000) also speaks to the need to ensure that even non-smokers implement clear no-smoking bans in their homes. Evidence suggests that youth in households where no occupants have ever smoked, but where complete smoke-free policies are not established, are almost as likely to be current smokers as youth who live in households with current smokers but who are subject to some form of smoke-free policy (Farkas et al. 2000). This research confirms that strong no-smoking restrictions in all homes are key to prevention; moreover, generating increased support for such restrictions across populations of both smokers and non-smokers has the potential to further solidify smoking bans as social norms.

9.3 Cost-Effectiveness

Information on the cost-benefit of investing in efforts to increase smoke-free homes and vehicles is not substantial, and, in fact, Thomson et al.'s (2006) report on the cost-effectiveness of using comprehensive tobacco control strategies to increase the prevalence of home smoking bans could not locate enough evidence to draw any conclusions.

9.4 Summary

- Home smoking policies are effective as tools of protection, prevention and cessation. They are linked to decreased exposure to second-hand smoke, decreased experimentation, increased quit attempts and longer intervals between relapse. Such policies can perhaps even counteract the effects of peer influence; however, their overall impact is debatable given that they are usually unequally applied (meaning they are prevalent in homes that are occupied by individuals from higher socio-economic brackets, by adult non-smokers or by children) (Green, Courage and Rushton 2003). Unfortunately, restrictions on smoking in vehicles appear not to have been subject to rigorous scientific evaluation, and evidence of the impact of partial bans in homes is mixed (cf. Farkas et al. 2000; Szabo et al. 2006).
- However, Proescholdbell et al. (2000) also determine that, for high school students, the relationship between such policies and less experimentation is specific to households with non-smoking parents. Szabo et al.'s (2006) research presents similar findings that suggest that home smoking bans have their greatest impact on adolescents whose parents do not use cigarettes.
- Smoke-free homes and vehicles are arguably better facilitated by jurisdiction-wide policies regulating smoking in public places, than by specific smoke-free home/vehicle initiatives. Information pamphlets alone are not sufficient to influence home smoking behaviour. Rather, cessation support and brief intervention by health care providers are essential to increasing the proportion of home/vehicle no-smoking policies, as well as increasing the participation of socio-economically underprivileged groups in the implementation of such policies. Media engagement, following the tailored approach of New South Wales, Australia, could also prove effective, but both smokers and non-smokers need to be targeted to support smoke-free home/vehicle bans.

10.0 ENFORCEMENT OF SALES TO MINORS LAWS

10.1 Evidence Base

Relative to other tobacco control initiatives, enforcement programs have seen mixed support in the scientific literature. Two major meta-reviews of enforcement interventions have demonstrated no significant effect on youth smoking; i.e., there have been no links made between increased retailer compliance and decreased prevalence (Fichtenberg and Glantz 2002; Stead and Lancaster 2005b). A majority of the studies that correlate enforcement with positive outcomes appear to be methodologically flawed (DiFranza et al. 2001), and Gallet's (2004) economic analysis suggests that youth access laws, enforcement and associated penalties cannot be associated in any significant way with an overall decrease in cigarette demand. Ross and Chaloupka (2004) are not so pessimistic, finding that retailer compliance and access policies can have an effect on youth smoking—particularly adolescents' decisions to smoke. Levy and Friend (2000), however, note that while research indicates that these access policies have general (but somewhat varied) success at increasing compliance, their impact on actual use rates is inconclusive.

Some professionals have gone so far as to propose that youth access programs are a waste of limited resources, and therefore should be abandoned in favour of interventions that truly have an effect on youth smoking (e.g., taxation, smoke-free places, media campaigns and specific forms of education) (Fichtenberg and Glantz 2002). Others argue that retailers must achieve a near 100 per cent compliance rate to have any chance of reducing accessibility to tobacco products by youth (Canadian Cancer Society 2002). Debate on this issue of compliance “thresholds” (i.e., minimum compliance rates that need to be reached to impact on commercial tobacco access) is confused, with certain experts contending that rates of 90 per cent or 95 per cent are satisfactory (e.g., Levy, Chaloupka and Slater 2000), and others maintaining that the “threshold effect” does not even exist (Fichtenberg and Glantz 2002).

Perhaps the greatest contradiction in enforcement programs is the fact that while official measured rates of youth access to tobacco show major decreases over time, adolescents' perceived rates of access remain high, far exceeding officially reported numbers. This contradiction is echoed in BC's own data, which suggest that 92 per cent of retailers in the province are compliant with access laws (Corporate Research Group 2006), and yet 90 per cent of a sample of BC youth believe that tobacco is still easy to get, 23 per cent rely on retail outlets as their usual source of cigarettes,⁶ 84 per cent have acquired cigarettes from a retail store in the past 30 days, and (also in the past 30 days) 24 per cent have not been asked for their age when purchasing cigarettes (Context Research 2005).

While social sourcing will account for a portion of adolescents' perceived ease of access to tobacco products, Landrine and Klonoff (2003) argue that it is not surprising that a large subset of youth still obtain their cigarettes commercially, since most official measurements of compliance are dubious—obtained through research of low ecological validity (i.e., it does not

⁶ Note that this figure corresponds with American data, which found that 23.5 per cent of American high school students used retail stores as their usual source of cigarettes (Everett Jones et al. 2002).

reflect reality). In other words, “official” access rates are typically based on the use of minor test shoppers, who attempt to purchase tobacco in a fashion that does not approximate actual youth behaviour. For example, minors walk into random stores, buy from random clerks, do not lie, are not permitted to show ID, are not typically permitted to be smokers, and are often not allowed to wear make-up or other accoutrements to heighten their appearance. In contrast, and of especial importance, ordinary youth looking for tobacco tend to frequent familiar stores with familiar clerks. Landrine and Klonoff (2003) demonstrate that if (over a period of 8 days or less) minor test shoppers are made to buy non-tobacco products four times from the same store with the same clerk, and then return on their fifth visit to attempt to purchase tobacco, they are 5.5 times more likely to be successful than “standard” (unfamiliar) minor test shoppers. Similarly, DiFranza et al. (2001) demonstrate that using minor test shoppers who actually smoke (as opposed to non-smokers) increases the likelihood that they will be sold tobacco by 6 times, and that minor test shoppers who show ID are significantly more likely to acquire tobacco than those who do not. Elsewhere, Klonoff and Landrine (2004) show that minor test shoppers who lie about their age are 4 times more likely to successfully buy cigarettes than those who speak truthfully. And Croghan, Aveyard and Johnson (2005) show that youth who lie in test shopping situations with retailers they know to be non-compliant are able to purchase cigarettes at rates twice as high as official reports.

Interestingly, Siegel, Biener and Rigotti (1999) find that enforcement laws and activities in Massachusetts had no effect on reducing youth access to cigarettes, as adolescents in towns with enforcement programming were just as likely as those without to attempt to purchase tobacco, to be asked for ID, to be refused sales, to perceive easy access to tobacco and to assume there were (or were not) penalties for stores selling to minors. On the other hand, those towns in Massachusetts *with* enforcement programs did seem to show decreased rates of smoking initiation among youth, possibly owing to (1) changes in smoking-related attitudes/social norms following the implementation of enforcement laws; or (2) pre-existing attitudes/social norms that enabled the passing of such laws. Gilpin, Lee and Pierce’s (2004) research in California reinforces these findings, suggesting that access laws might simply intensify anti-tobacco norms, leading to decreased youth experimentation.

10.2 Key Considerations

Valid measurements of compliance are critical to the application of meaningful access laws. Without legitimate information or test scenarios to provide realistic input for the maintenance of enforcement programs, it is unclear how these programs could be justified. Among other points, several researchers have suggested that even the most commonplace measures of enforcement programs are questionable and need to be rethought. Indeed, Croghan et al.’s (2005) United Kingdom-based study proposes that surveying youth about their retail experiences with tobacco is liable to be more accurate than performing traditional test purchases, since survey numbers are closer to realistic rates of adolescent access than are official compliance reports. Moreover, Pokorny, Jason and Schoeny (2003) make clear that measuring the proportion of tobacco retailers in compliance with legislation (as done in BC) is misleading, given that it ignores the relative density of stores in each community, and therefore the greater likelihood for youth in highly saturated neighbourhoods to encounter non-compliant sellers. Instead, Pokorny et al.

(2003) advocate for more realistic measures of “risk exposure”: the number of retailers who make illegal sales per 1,000 youth in each community.

Numerous studies hint at ways that enforcement programs can be tailored to better affect compliance rates. Evidence is clear that enforcement checks (equivalent to administrative checks in BC, where minor test shoppers attempt to purchase tobacco from retailers) should take place no less than four to six times per year to be effective (Stead and Lancaster 2005). Evidence also suggests that certain places, situations and people are more likely to distribute, or facilitate the distribution of, tobacco to youth. Male clerks, younger clerks, gas stations and convenience stores,⁷ outlets operated by recent immigrants, and those in urban, low-income and minority neighbourhoods have repeatedly been associated with greater non-compliance than have female clerks, older clerks and other retail outlets (Cummings et al. 1998; DiFranza and Coleman 2001; Klonoff and Landrine 2004; Ma, Shive and Tracy 2001; but see Curie et al. 2002). Test purchases made on afternoons and weekdays, by female minors, and in circumstances where multiple individuals are standing in line behind the minor (thus creating a more rushed atmosphere) have also been correlated with higher rates of non-compliance (Curie et al. 2002; Klonoff and Landrine 2004; Levinson, Hendershott and Byers 2002; Ma et al. 2001). These findings speak to the need to target test-shopping events at those places and individuals that are most apt to break the law. Moreover, they confirm that test shopping scenarios themselves could be better set up to emulate circumstances conducive to non-compliance. Importantly, Health Canada, through the work of Goss Gilroy (1997), argues that—particularly where resources are tight—enforcement should be directed at “high-risk retailers.” Context Research (2005), writing for the BC Ministry of Health and Health Canada, also calls for focusing enforcement and education efforts on outlets most likely to sell to minors.

Age and ethnicity of young smokers plays a significant and complicated role in commercial access to cigarettes. Interestingly, Landrine et al. (2000) write that retailers “make complex decisions when they sell versus do not sell cigarettes to a child.” These decisions often have weak or no links to actually earning a profit, as implied by the fact that retailers are 2.5 times more likely to sell to ethnic minorities than to Caucasian youth. Such ethnic bias suggests that the outcomes of youth access programs have probably been skewed (showing a greater impact on white adolescents), and thus that retailer education and test shopping events should pay obvious attention to issues of ethnicity (Landrine et al. 2000). Research has also demonstrated the greater success of older youth (16- to 17-years-old) in purchasing cigarettes (DiFranza and Coleman 2001), which has led some professionals to advocate for better use of older minor test shoppers (i.e., older than 15) (Landrine and Klonoff 2003). Using young adults is especially important given that it is this age group that tends to acquire cigarettes from retail sources (versus younger people who usually secure them from social sources), and so it is this group that should be most influenced by enforcement policies. Moreover, this group tends to supply young adolescents with cigarettes, thereby fostering social exchange. Indeed, youth who buy cigarettes are the most likely to report sharing those cigarettes with other youth (Forster et al. 2003; Landrine and Klonoff 2003), which speaks to the intimate relationship between commercial access and social

⁷ The suggestion that retailers close to schools are more likely to sell tobacco to youth is not based on clear evidence. In fact, Canadian data indicate that outlets near schools are actually slightly more compliant than outlets elsewhere (Corporate Research Group 2006).

access to tobacco. Forster et al.'s (2003) work shows that the use of retail outlets for cigarettes by teens is the strongest predictor of participating in social exchange of cigarettes. Impacting on social access thus demands tightened enforcement measures.

Enhanced enforcement, however, depends on approaches that aim to realistically improve compliance rates. The evidence frequently cites the need to employ smokers as minor test shoppers in light of their experience in actually handling tobacco products (DiFranza and Coleman 2001; DiFranza, Savageau and Bouchard 2001; Levy et al. 2000). In fact, DiFranza et al. (2001) demonstrate that young smokers in minor test shopping scenarios who are allowed to behave normally (i.e., to present valid ID, to purchase other items alongside tobacco, to dress as they choose without aiming to look older, etc.) are six times more likely to acquire cigarettes than non-smokers. Discomfort with the prospect of employing youth (ex)smokers cannot be justified via the research literature. Indeed, the argument has been made that smoker involvement in compliance testing could help to precipitate cessation (Levy et al. 2000). Indirect evidence to support the use of (ex)smokers is also offered by Ji et al. (2002), who observe that minor test shopping experiences do not appear to cause smoking, nor hasten adolescents' intentions to smoke, nor stifle discussions about smoking dangers between minor test shoppers, adults and other youth, nor skew perceptions of the ease of access of tobacco (in fact, non-smokers, whether employed as minor test shoppers or not, all appear to recognize tobacco products as easily purchasable).

Checking of minors' ID by retailers is critical, as clerks have very little capacity for determining their customers' ages without identification (Jason, Porkorny and Schoeny 2003), and clerks who do not check ID appear 173 times more likely to sell to youth (Klonoff and Landrine 2004). Interestingly though, research confirms that when minors do show ID they are six times more likely to successfully buy cigarettes (Levinson et al. 2002). This "ID effect" highlights the need, firstly, to ensure that minor test shoppers are allowed to show valid identification when asked by clerks,⁸ and, secondly, to ensure that retailers are properly trained to read identification. Use of electronic age verification (EAV) devices⁹ has been understood as a means to improve retailer accuracy in checking identification. However, in the only apparent study to date on EAVs (Krevor et al. 2003), they did not prove effective in heightening rates of age verification or compliance, because stores continued to fail to ask for ID in the first place, and, over time, utilized EAVs less and less. This inconsistent use of EAVs calls into question their overall value.

In terms of other measures to impact on compliance, warning signs and merchant education alone are not efficacious (although see Ma et al. 2001), but good education in particular—especially when combined with negative publicity in newspapers—is recognized as an essential component to enforcement (DiFranza 2005). Interestingly, publicity and media attention to enforcement measures have been linked to short-term decreases in sales to minors (Jason et al. 1996), and evidence speaks to the effectiveness of engaging the media in advertising the compliance successes and failures of individual tobacco retailers (Canadian Cancer Society 2002). Goss Gilpin (1997) also speaks of the cost-effectiveness of enforcement-related media

⁸ Multiple researchers call for IDs to be an integral part of test purchase attempts (e.g., DiFranza and Coleman 2001).

⁹ Electronic age verification devices determine, via swiping of a customer's ID card, whether that customer is legally old enough to purchase tobacco.

usage. Such advertising works to keep both retailers and the general public awake to the presence of meaningful enforcement laws in the community.

Fining minors through possession laws has mixed support in the literature. Livingood et al. (2001) note a correlation between Floridian possession laws, comprehensive tobacco control and decreased tobacco use among young people. Jason et al. (2003) find that, when strongly combined with retail enforcement, fines for minors reduce smoking rates—although only among Caucasian youth. However, others have shown that such fines are abused by officials in the sense that they are applied to youth not to discourage smoking, but to reprimand them for disorderly behaviour (Hrywna et al. 2004). Gottlieb et al. (2004) also observe a possible discriminatory application of possession laws on minority youth. Others suggest that the real impact is felt only by parents who end up paying the fine (cf. Merrill et al. 2000). And still others theorize that possession laws are difficult to detect, easy to avoid, useless in practically helping youth to quit, agreeable to the tobacco industry, and hard to make relevant to youth both because “punishment” often does not present itself until long after the offence has occurred, and because it is delivered by unknown agents rather than close relatives or family (Ross and Chaloupka 2004; Wakefield and Giovino 2003).

Licensing of tobacco retailers has also been seen as a potentially constructive method to enhance enforcement efforts in the community. DiFranza (2005) could not correlate licensing requirements with increased compliance rates in American states. Nevertheless, he recommends them as a cost-effective means to track tobacco retailers. Stead and Lancaster (2005; also Canadian Cancer Society 2002) suggest that the threat of licence removal for illegally selling to minors could be more effective in achieving retailer compliance than the typical process of distributing fines/warnings (because the overall financial success of the vendor would be at stake). However, for such a threat to work properly, the licensing system would demand vigilant monitoring. Importantly, annual licence fees would cover the costs of enforcement programming (Woollery, Asma and Sharp 2000), and any leftover dollars would allow further funding of cessation supports. The irony, of course, is that tobacco licensing is often still a rarity, despite the fact that sales of many other (potentially less harmful) products and services are strictly regulated.

10.3 Cost-Effectiveness

Research on the cost-benefit of enforcing youth access laws is scant. The review by Brownson, Zweig and Gardner (1998) of environmental and policy approaches to the prevention of chronic disease suggests that tobacco enforcement interventions are not cost-effective enough to merit investment. Gallet (2004) also argues that restrictions on youth access show little return, and that related funding should thus be redirected to programs with greater potential for effecting change.

However, in one of the more rigorous economic assessments of enforcement programs available, DiFranza et al. (2001) indicate that even an inefficient program can be estimated at a cost-effectiveness of \$8,200 per life-year saved—4 times more than mammography. And, indeed, at their strongest, enforcement interventions might save 10 times as many lives as mammography or colorectal cancer screening, at a comparable price (DiFranza et al. 2001). But to compete in terms of cost-efficiency with, for instance, smoking cessation activities, enforcement programs

would need to reduce youth smoking by 5 per cent at an expense of no more than \$250 per retailer. In fact, the Canadian Cancer Society (2002) argues that to equal the cost-benefit of a provincial telephone quitline, enforcement programs would need to reduce youth smoking by 15 per cent at an expense of just \$150 US per retailer per year. Given that a 10 per cent tax increase would save 60 times more lives, and given that links between enforcement and reduced prevalence are tenuous at best, return on investment for enforcement programming is debatable. Nevertheless, the Centers for Disease Control and Prevention (CDC 1999) recommends that enforcement measures be funded at a rate of \$0.43 to \$0.80 per capita per year.

10.4 Summary

- Tobacco sales to minors are informed by a variety of factors, from youth behaviour to type of retail outlet to the characteristics of clerks themselves. The complicated nature of smoking regulation means that enforcement programs have to be well-supported and well-tracked to adapt to changing and complex circumstances. In particular, these programs need to be responsive to the real, on-the-ground conduct of young smokers. The best research on this topic suggests that enforcement efforts should work to:
 - Supplement or substitute official enforcement data with youth survey data or more faithful measurements of “risk exposure.”
 - Target high-risk retail outlets and high-risk clerks.
 - Employ realistic minor test shoppers, including actual smokers and older youth (16 to 17 years old).
 - Ensure that clerks are properly trained in checking identification—and that they apply this knowledge effectively and consistently (note that electronic devices to facilitate ID readings have little, if any, evidence of effect).
 - Engage the media in advertising the compliance histories of individual retailers.
 - Consider implementation of a licensing system to track retailers.
- Enforcement programs have typically not been subject to careful cost-benefit analysis, but research suggests that even inefficient programs can be pegged at a cost-effectiveness of \$8,200 per life-year saved. The pressing question is: how much should be invested in enforcement when other interventions (e.g., tax increases, smoke-free policies) require less subsidization while yielding greater returns?

11.0 RESTRICTING POINT-OF-PURCHASE TOBACCO PROMOTIONS

11.1 Evidence Base

The correlation between tobacco advertising/promotions and both an increased likelihood of smoking by youth and increased sales of cigarettes to the public, is well-established in the academic literature (e.g., Lovato et al. 2003; see references in Snell and Bailey 2005). Such research has prompted major national restrictions or bans on various forms of tobacco advertisements, and these restrictions appear, when especially comprehensive,¹⁰ to reduce smokers' exposure to pro-tobacco influences (Harris et al. 2006). Importantly, the effectiveness of regulations on tobacco promotions seems to be directly proportional to the strictness/inclusivity of these regulations.

Unfortunately, research and restrictions on tobacco ads in the retail environment—at the point-of-purchase (POP) or point of sale (POS)—have seen less investment, despite the fact that tobacco companies have been observed to devote 80 per cent of their marketing budgets (or \$100 million in Canada alone in 2005) to point-of-purchase-related activities (Smoke-Free Nova Scotia n.d.). Analyses of the effects of retail tobacco marketing on smoking behaviour are limited and often—as some have noted—poorly devised (Carter 2005), indicating that the POP literature should be interpreted with caution. Keeping in mind this lack of rigour and an occasional lack of generalizability to real-life scenarios, available research suggests that POP ads/displays can potentially increase tobacco sales by 12 per cent to 28 per cent (Feighery et al. 2001), and that exposure to in-store tobacco advertising may be linked to a significantly greater likelihood of smoking experimentation by adolescents (Schooler, Feighery and Flora 1996). Donovan, Jancey and Jones (2002) cite work indicating that point-of-purchase displays may increase impulse buys of tobacco products by 28 per cent; their own study of POP posters and cigarette packs hints that such materials boost adolescents' positive perceptions of smokers of certain cigarette brands, thereby potentially stimulating impulse purchases at the sales counter.

Furthermore, Henriksen et al. (2002) show that youths exposed to a photograph of a retail outlet saturated with tobacco advertising are more likely to perceive easier access to tobacco products from that store and from stores in their own communities, are more likely to overestimate the prevalence of smoking among their peers and are less likely to support tobacco control policies, than youths exposed to a photograph devoid of such advertising. Elsewhere, Henriksen et al. (2004b) reveal a correlation between weekly (or greater) exposure by adolescents to tobacco marketing in convenience, liquor or small grocery stores, and a 50 per cent increase in the likelihood of ever smoking. Wakefield et al.'s (2001) study of Camel and Marlboro cigarette consumption among high school smokers finds that use of these brands is significantly associated with their in-store promotion and advertising. Elsewhere, Wakefield et al. (2006) demonstrate that ninth-graders exposed to a photograph of a retail POP cigarette pack display are more likely than ninth-graders not exposed to the display to recall brand names and to perceive easier access to tobacco at this outlet—both of which are predictors of increased risk for smoking uptake. Similarly, Wakefield et al. (2006) show that ninth-graders exposed to a photograph of

¹⁰ For example, in the United Kingdom and Australia, where they encompass print and broadcast media, billboards, internet, mail, free gifts, product placement, coupons, promotions, sponsorships, etc.

retail POP cigarette ads are more likely to (1) perceive easier access to tobacco at this outlet, (2) believe they will not be asked for identification, (3) perceive access to tobacco at a variety of other stores, (4) believe they might smoke in the upcoming year, and (5) accept a cigarette from their close friends, than those not exposed to the ads. As Wakefield et al. (2006) state, POP advertising tends to “weaken students’ resolve not to smoke in the following year.” Voorhees et al. (1998) suggest a positive correlation between youthful-seeming tobacco ads on the exterior of stores and greater (illegal) cigarette sales attempts by minors.

Feighery et al.’s (2001) California-based analysis demonstrates that 85 per cent of retail outlets display tobacco advertising materials within 4 feet of the counter; 50 per cent at heights below 3 feet (i.e., at the eye level of children); and 23 per cent within 6 inches of candy—suggesting that avoidance of tobacco POP displays is virtually impossible in stores (especially for youth). Indeed, Ontario-based research actually reports that 80 per cent of tobacco products are located within 1 foot of the cash register, and 85 per cent within 1 foot of candy, snacks or toys (Cohen et al. 2006). Moreover, Slater, Chaloupka and Wakefield’s (2001) cross-sectional United States-based survey warns that POP promotions are more common in jurisdictions with comprehensive tobacco control strategies—suggesting that the tobacco industry is targeting its advertising efforts in a purposeful attempt to disrupt strong statewide campaigns.

Reliable scientific research on effective interventions to curtail or eliminate such POP activity in stores is lacking, and no rigorous analyses have yet been published that directly link regulatory action at the retail level to decreased smoking uptake or consumption or to changes in tobacco-related beliefs or intentions. Woodruff et al.’s (1995) study of a brief intervention program to educate tobacco retailers and encourage removal or reduction of tobacco ads from retail outlets finds no program impact on the number of POP advertisements on display. Letcher et al.’s (2003) review of retailer compliance with a ban on POP advertising in the Australian state of Victoria demonstrates generally high compliance with strict branding, promotional and display reforms, yet research elsewhere in Australia reports that brand variation (and, hence, brand visibility) actually increased following certain POP restrictions (Cook and Edwards 2000).

Tilson (2004) notes six options for restricting POP tobacco promotions in the retail environment, including

- Banning the complete visual display of tobacco products.
- Regulating the size and number of tobacco displays.
- Eliminating promotional allowances to retailers for tobacco products
- Banning tobacco sales from particular categories of stores (notably, pharmacies).
- Limiting tobacco sales to tobacco-only stores.
- Limiting tobacco sales to government-run stores.

Multiple Canadian provinces (with Saskatchewan as the pioneer) have already invested in the first of these. Currently there is no research base to on which to evaluate the efficacy of any of the options in achieving direct changes in smoking behaviours. Additionally, in the academic literature, very few rigorous scientific studies appear to be underway comparing levels of

tobacco promotions in Canadian jurisdictions before POP restriction implementation to levels post-implementation (cf. Cohen 2006), despite the fact that it has been argued that complete bans on visual displays of tobacco could reduce retail exposure to brand influence among American youth by 83 per cent (cited in Henriksen et al. 2004a). The banning of tobacco sales in pharmacies has already moved forward in several provinces in Canada (National Association of Pharmacy Regulatory Authorities 2005), motivated by professional ethics, the personal beliefs of pharmacists and evidence that the tobacco industry has actively worked to solicit the support of pharmacies (e.g., Bentley et al. 1998; Hudmon et al. 2006; Le, Shamasunder and Bero 2001). But, again, no research has yet attempted to isolate the actual impact of such bans on tobacco-using intentions or behaviours.

The evidence is mixed concerning even the effectiveness of general (as opposed to POP-specific) tobacco ad restrictions on behaviour and intentions (e.g., Goel and Nelson 2005; Jha and Chaloupka 2000; World Bank 1999). Research indicates that if regulations do not cover every possible form of promotion, the tobacco industry will simply reshape its advertisements to fit other unregulated forms (Hoek 2004). Such findings, in the end, strengthen the argument for extending regulations to cover all areas, including the retail outlet itself. As Hoek (2004) states, in neglecting the POP environment, tobacco control policies may actually have enabled the industry to redirect its efforts toward a context (i.e., the retail outlet) that provides possibly the greatest and most direct/personal access to youth. Without truly comprehensive ad/POP bans, then, major reductions in tobacco marketing efforts seem unlikely (Wakefield et al. 2002).

11.2 Key Considerations

There is ample evidence confirming that tobacco promotions inside and outside of retail outlets have increased in the wake of the tightening of regulations on advertising in other environments (e.g., television, magazines, etc.), and that individuals (particularly youth) are no more shielded from tobacco ads than they were 10 or more years ago (Celebucki and Diskin 2002; Jason et al. 2004; Loomis et al. 2006; Pierce and Gilpin 2004; Wakefield et al. 2002). Indeed, there is evidence, specifically in stores preferred by youth (e.g., gas stations, convenience stores), of a substantial increase in promotions following the Master Settlement Agreement (MSA) in the United States, and of a potential relationship between promotions and greater levels of illegal sales to minors (Celebucki and Diskin 2002; but cf. Jason et al. 2004; see also Voorhees et al. 1998).

Snell and Bailey (2005) highlight the irony of a situation which saw the tobacco industry in the United States pledging, in conformance with the MSA, to avoid advertising to youth, then promptly investing in a 42 per cent (96 per cent between 1995 and 2001, as per Pierce and Gilpin 2004) increase in marketing—a majority directed at retail outlets, especially convenience stores, which have been shown to be frequented by 75 per cent of youth on a weekly basis. Henriksen et al.'s (2004a) California-based study also attests to a correlation between retail outlets popular among adolescents (e.g., convenience stores) and a significantly greater number (by more than 3 times) of store-window ads for cigarettes, as well as double the amount of shelf space for well-liked cigarette brands. Evidence suggests that young people are more likely than adults to be impacted by POP promotions in convenience stores, and that, in both Canada and the United States, adolescents recognize POP displays as being influential on youth smoking behaviour

(Campaign for Tobacco-Free Kids 2003; J Gottheil Marketing Communications 2005). Canadian research testifies to the fact that more than 40 per cent of retail outlets still display tobacco ads, and that, as per international data, chain convenience stores and gas stores/kiosks account for the greatest part of this advertising (Health Canada 2005). Canadian chain and independent convenience stores, gas stores/kiosks and pharmacies demonstrate a trend of having greater ad presence near schools and malls. Taken together, the evidence indicates that youth are particularly at risk because

- Adolescents are more likely than adults to be influenced by POP promotions.
- POP promotions are often placed in child-accessible, in-store locations.
- Youth shop frequently at convenience stores.
- Convenience stores are more likely than several other types of outlets to advertise tobacco products (especially brands that appeal to youth).
- Convenience stores display more tobacco ads near schools and malls.
- The more ad-rich the environment, the greater the potential chance that youth will perceive easy access to tobacco and attempt to purchase tobacco.

These findings are reminiscent of other North American studies that specifically associate POP tobacco promotions with vulnerable individuals who show greater smoking prevalence or potential for smoking. Ruel et al. (2004) have linked POP promotions to stores in rural areas, Hammond et al. (2005) to university campuses, Joseph et al. (2005) to military retail outlets and Laws et al. (2002) to minority, low-income communities. Similarly, work by Snell and Bailey (2005) in Texas demonstrates that POP tobacco ads reflect the brand preferences of youth, and are more pervasive in minority neighbourhoods, poor communities and areas with greater concentrations of youth.

POP marketing focuses not only on customers in the retail environment but also on the retailer him/herself (Carter 2003; Pierce and Gilpin 2004). Point-of-purchase promotions extend from in-store displays, to electronic ordering systems for businesses, to incentive programs for store owners (Carter 2005), and research indicates that, between 2001 and 2004 in Canada, tobacco industry payments to retailers for in-store promotional rights rose over 50 per cent (Physicians for a Smoke-Free Canada 2005). Such payments have been seen to obligate retailers to position tobacco products and ads in the most visible locations, and to conform to other industry demands regarding in-store “dominance” (Feighery et al. 2003; Lavack and Toth 2006). Moreover, retailer participation in incentive programs has been correlated with the presence of a greater number of tobacco marketing materials in stores and, in certain cases, lower prices for cigarettes (Feighery et al. 2004). It is a testament to the apparent success of these programs that tobacco companies themselves have wrestled over their various components/powers in American courts (Dewhirst 2004; Tilson 2004). It is also worth recognizing, as per Carter (2003, 2005), that these programs facilitate intimate relationships between the industry and retailers—relationships that will necessitate careful handling by tobacco control specialists. As Carter (2005, p. iii, 100) states, the dismantling of such programs demand a cultural shift among retailers: “it may be necessary for health groups to begin...alliance building activities with the retail sector...[and] to commit some

proportion of public monies to support the movement of small businesses away from dependence on tobacco and into other categories.” Research concerning the potential impacts on retail outlets of restricting/banning POP promotions is neither rigorous nor readily available, but is nevertheless imperative to understanding risks and to properly equipping and supporting retailers in managing change.

11.3 Cost-Effectiveness

Studies of the cost-effectiveness of restrictions on POP tobacco promotions do not yet appear to exist. VicHealth (2003) suggests that such restrictions could be achieved at no cost to the public, although it seems likely that, to ensure compliance, monitoring and enforcement of POP laws would require investment.

11.4 Summary

- Strict restrictions on point-of-purchase (POP) tobacco promotions have seen relatively little testing in the academic literature, and, as of yet, have demonstrated no clear association with changes in smoking behaviours or intentions. Studies of tobacco-related advertising in the retail environment, while occasionally lacking rigour, imply that point-of-purchase promotions may increase, among other things, tobacco sales, impulse purchases of tobacco products, smoking experimentation by youth, adolescents’ perceptions of ease of access to cigarettes and the likelihood that youth will consider both accepting cigarettes offered to them by their friends and smoking in the upcoming year. Ultimately, comprehensive advertising bans that include POP restrictions appear to be correlated with lower potential exposure to tobacco influences than bans without such restrictions.
- Tobacco POP promotions have increased considerably in recent years, and have been significantly and repeatedly associated with outlets utilized by youth, minorities, the poor and rural populations. Given such associations, comprehensive restrictions on POP materials will likely have their greatest effect on reducing risks among already vulnerable individuals. Implementation of these restrictions, however, necessitates a solid understanding of their potential impact on retailers. Research testifies to the strong bonds between storeowners and tobacco companies, but few studies speak to the challenges faced by retailers in transitioning to POP-free environments, or to appropriate means by which tobacco control workers can facilitate such a transition.

12.0 PARENT AND YOUTH EDUCATION

12.1 Evidence Base

School-based educational programs for youth have tended to be the primary focus of prevention activities in North American communities. Such programs have shown contradictory research outcomes, leading to questions about precisely how much investment and resourcing they should see. Work by Skara and Sussman (2003) correlates substance use prevention programs for adolescents with a mean 11.4 per cent long-term (lasting up to 15 years) reduction in smoking initiation rates. And the United States Department of Health and Human Services (2000) indicates that in tandem with mass media and community-based strategies, educational approaches to tobacco control may prevent or delay use among 20 per cent to 40 per cent of American youth. However, the World Bank (1999) contends that school programs are generally less effective than other tobacco control measures, tending to show only temporary effects that delay, but do not prevent, smoking uptake. Glantz and Mandel (2005) suggest that the tobacco industry itself has tended to be welcoming of youth-oriented (e.g., school-based) education, because it has generally proven to be ineffective, yet at once publicly and politically appealing.

The back-and-forth nature of this evidence has seen some researchers documenting the inefficacy of programs like DARE and others in both the United States and abroad (Lantz et al. 2000; Share, Quinn and Ryan 2005), while their colleagues report up to 70 per cent reductions in short-term smoking-related harms at the hands of a different set of school-based programs (Wiehe et al. 2005). Baska et al. (2004) write that the general lack of long-term impact of school initiatives is not necessarily a reason to discredit them. Indeed, the short-term reductions in use common to school-based programs are meaningful, given that they result in less (albeit temporary) lifetime exposure to smoking.

Irrespective of the beliefs of some commentators, the important issue here is not the need to dismantle adolescent educational efforts entirely, but to find an appropriate balance between school initiatives and other proven or highly promising interventions. Comprehensive school strategies that integrate health (including tobacco and other drug) education across the curriculum—into math, social sciences, science, etc.—and that implement effective policy in the school environment, show potential in improving overall student well-being (Bond et al. 2004; Lister-Sharp et al. 1999). Indeed, multi-drug-oriented education (as opposed to tobacco-specific education) has some support in the research base (Cuijpers 2002; United States Department of Health and Human Services 2000), and certain programs focused on promoting healthy contexts and overall healthy living have variously shown impact on eating habits, fitness, aggressive behaviours and some substance use (e.g., Elias and Kress 1994; Gabhainn and Kelleher 2000; Kalke and Raschke 2004; Lister-Sharp et al. 1999).

Perhaps the important issue here is the need to find an appropriate balance between school initiatives and other proven or highly promising interventions. Research suggests, though, that young people in schools are but one of several audiences that should be targeted with prevention efforts (Krainuwat 2005). Too great a focus on a single audience (e.g., young people) or a single tactic (e.g., in-school lesson delivery) may hamper the achievement of long-term, whole-population tobacco control objectives (Hoffman and Jackson 2003). Intervention across the

lifespan (especially at key developmental transition points: entering school, entering the workforce, entering legal age to visit bars/pubs, entering parenthood, entering the hospital for surgery or treatment) and through various milieus can be associated with reduced harms. Parenting programs that aim to develop parents' skills in setting and enforcing appropriate rules, in monitoring their child's behaviour, in modelling their own appropriate behaviour and in communicating well with their child, have research support (Dusenbury 2000; Kumpfer, Alvarado and Whiteside 2003; Stephenson et al. 2005; Velleman, Templeton and Copello 2005). Consistent disapproval of smoking voiced by parents has been linked both to preventing smoking and to increasing quit attempts among older children (McGee et al. 2006). Parental discussion of tobacco use has been associated with greater youth participation in anti-tobacco programs (Lee et al. 2001).

In terms of connecting parent-oriented activities with school-based efforts, evidence shows that many parents want to be involved in the school-based prevention and cessation programs of their children (Wyman et al. 2006). And, in fact, programs that go as far as to link a child's cigarette-smoking parents to cessation support can motivate these parents to quit (Tingen et al. 2006).

12.2 Key Considerations

While school-based programs and parent programs may have greater presence in the scientific literature, they are not the only options available for disseminating prevention education. For example, peer programs, in general, can be effective if done well. This means that they should follow best practice in peer leadership/role modelling, including guaranteeing high-fidelity, high-integrity, consistent messaging delivered by trained and well-supported individuals (Goren and Wright 2006; MacCallum and Beltman 2002; Payne et al. 2002).

Workplace prevention and cessation support programs could also have significance, given that transitioning into the labour force has been recognized as a potentially risky period for youth, with some research documenting that 33 per cent of young people first use cigarettes at work (Backinger et al. 2003). Sepe et al.'s (2002) study of tobacco industry promotions targeted directly at young adults in bar and nightclubs hints at another audience/environment that has often seen less (or no) prevention-oriented investment.

In the end, prevention efforts delivered in the community have not received great support in the scientific literature, but truly comprehensive tobacco reduction strategies cannot limit themselves to the school setting, nor avoid a community approach (Gates et al. 2005; Secker-Walker et al. 2002; Sowden et al. 2003). Research suggests that mentoring programs, in the vein of Big Brothers/Big Sisters and the United States' Across Ages Program, can nurture healthy lifestyles, reducing problematic behaviour among young people and increasing confidence and attachment (Aseltine, Dupre and Lamlein 2000; Hawkins, Catalano and Arthur 2002). Similarly, involving youth in constructive alternative recreational or cultural activities has been reported as successful in decreasing substance use (Brounstein, Zweig and Gardner 1998). Sowden, Arblaster and Stead (2003) speak to the potential effectiveness of multi-component programs that combine media, school, community and policy efforts. Secker-Walker et al. (2002) highlight the need to champion tobacco use as a real problem within the community in order to secure the support and co-operation of the public and community officials.

In terms of specific elements of school-based programs, Wiehe et al. (2005; see also Cuijpers 2003; Reid 1999) propose that highly interactive and participatory teaching methods may be most effective in controlling tobacco use among youth. And Botvin et al. (2003) cite evidence that drug prevention programs have longer and more powerful effects when delivered during earlier adolescence. Reinforcing Botvin et al.'s point is Wagner, Tubman and Gil's (2004) note that early exposure to intervention measures predicts greater success in terms of prevention than does exposure following uptake. As well, the United States Department of Health and Human Services (2000) suggests a dose-response relationship between exposure to school-based programs and deterrence from smoking, meaning that more contact with students made over longer periods of time predicts more effectiveness in smoking prevention. Importantly, Skara and Sussman (2003) and Wagner et al. (2004) recognize implementation fidelity (made possible by well-trained teachers) as a critical factor in the long-term success of smoking prevention programs. While individual teachers might resist training programs that limit instructional flexibility and demand fidelity, the research shows that school-based anti-smoking strategies that deviate from the approved approach are less likely to have the intended effect.

12.3 Cost-Effectiveness

Information on the cost-effectiveness of educational initiatives delivered outside the school context to youth or other audiences is not abundant. However, a couple of studies of family/parent-oriented projects have reported benefits of \$4 to \$19.64 for every \$1 invested (Swisher, Scherer and Yin 2004), and one review of peer education strategies cites evidence that peer programs can be more cost-effective than other activities necessitating health provider participation (Goren and Wright 2006).

In comparison, school-based programs have been subject to a variety of cost-utility analyses, and findings suggest that effective programs can achieve a meaningful return on investment. Admittedly, these analyses are biased toward bigger initiatives implemented across major jurisdictions, but the data offer some of the only details available on cost-effective practice, and thus should be understood as a frame for guiding regional-level decision-making. As an example, Stephens et al.'s (2000) cost analysis estimates that a national school-based smoking prevention program that reduces tobacco use by 6 per cent initially, decaying to 4 per cent indefinitely, would produce a return of \$15.40 for every \$1 spent, costing \$67 per student and netting an annual \$619 million in savings. Stephens et al. observe that even in the worst-case scenario, where an expensive program effects just a 1 per cent decline in smoking harms, a return of \$2 for every \$1 spent could still be achieved. Bridge and Turpin (2004) are more optimistic, reporting that, for every \$1 inputted into a school-based program, an \$11 return can be expected. Swisher et al. (2004) cite evidence that a smoking prevention school program would cost \$2,850 per affected person, with a return of \$19.65 on every dollar. Bridge and Turpin (2004) point to a Health Canada study, which estimates that \$19.41 per student would need to be spent to support a minimal prevention program.

In one of the only apparent QALY-focused studies available, Tengs, Osgood and Chen (2001) determine that an intensive national school-based program would not be cost-saving, but would, over 50 years, fall between a cost-effectiveness estimate of \$4,900 and \$340,000 per QALY. If

the program achieved a 30 per cent effectiveness rate, where the effects dissolved within 4 years, its costs would sit at \$20,000 per QALY gained.

Given the larger expense of school programs relative to various other tobacco control interventions, it is not surprising that some researchers have expressed concern over their implementation. Caulkins et al. (2002) articulate the complexity of the matter when they state “there is very strong empirical support for the belief that these [school] programs reduce drug use, but there is even stronger support for the belief that they leave an even greater proportion of baseline users unaffected.” Reid (1999) actually implies that tobacco control funds should be directed toward publicity and clinical interventions, not to school-based approaches whose impacts are comparatively deficient and whose components demand unsustainable investments of teacher and class time. Ultimately, perhaps the most critical point to emerge from this debate is the recognition that current school-based programs—and prevention initiatives in general—can only achieve so much without being integrated into a much larger, multi-sided strategy.

12.4 Summary

- There is ongoing debate over the value of school-based youth tobacco education, but, if done well, such education has the potential to bring about small, likely short-term, yet beneficial changes in smoking initiation rates and smoking-related harm. Effective education programs do not have to be tobacco-specific—since multi-drug-focused and general healthy living-centred interventions also have potential for success—or concentrate solely on adolescents. Indeed, education across the lifespan is important, and parent programs that aim to enhance parenting skills (especially communication skills), and link parents to youth-oriented initiatives, can have an especially meaningful impact on well-being.
- Smoking-related education does not have to be limited to programs delivered in the school environment. Peer-led programs, workplace programs, mentoring programs and alternative community activities (e.g., after-school or late-night programs) can be used to broaden the reach and reinforce the effects of prevention messages. In schools, though, evidence indicates that effective education initiatives tend to depend on:
 - Intervention during early adolescence (as opposed to during later youth).
 - High-quality teacher training.
 - High-fidelity implementation (meaning standardized program delivery; little to no deviation from the ideal; and monitoring of program deliverers—staff, teachers, peer leaders—to ensure adherence and exposure to the program).
- The only substantial cost-effectiveness data on smoking-related education appears to come from studies of strictly school-based, youth-oriented programs. While some continue to question the investment of any money at all in school-based activities, the data suggest that every \$1 expended on school programs should yield between \$2 and \$15 in beneficial returns. Estimates put the cost-effectiveness of a national American program at about \$20,000 per QALY saved.

13.0 RESEARCH, EVALUATION AND KNOWLEDGE EXCHANGE

The need for strong data management, research and evaluation systems to complement regional tobacco strategies cannot be stressed enough. It is not possible to assess the effectiveness of tobacco activities, nor to be certain that the appropriate individuals have access to these activities (especially at-risk populations), without a means for monitoring them. Likewise, it is not possible to rationalize program decisions or determine staff training needs without records of what has worked in the past. Indeed, it is hard to justify tobacco control spending at all if clear systems are not available to track the influence of that spending and inform future investment.

It is not possible in this document to anticipate the research and evaluation needs of all tobacco control teams in British Columbia, nor to review the massive literature on research theory and practice. Data and evaluation requirements will differ by region (based on demographics, available programs, organizational infrastructure, special concerns, etc.), and individuals will need to collaborate both intra- and inter-regionally to set priorities. Setting in motion a chain of decisions related to research and evaluation frameworks depends on clear prioritization at the local, provincial and federal levels.

In the end, these types of frameworks need to serve the knowledge needs of the system. This can be achieved by ensuring they are:

- (1) **Adaptive** (respond regularly to new external and internal inputs).
- (2) **Goal-driven** (knowledge systems support decision-making relative to program goals).
- (3) **Integrated** (ownership of the knowledge is diffused throughout the system).
- (4) **Centred on pattern maintenance** (research and evaluation output is utilized through deliberate strategies in knowledge exchange to evolve best practices and ensure fidelity to effective program elements).

To facilitate an adaptive, goal-driven, integrated and well-maintained tobacco control strategy, systems need to be available to manage best practice data (i.e., to collect relevant research information), to monitor the process of service delivery and to collect final outcome data. These systems can be better realized if key partners at the regional and provincial levels start by agreeing on a clear core set of data to both guide their overall practice and policy, and to stand as the foundation for future region-specific research/evaluation decision-making.

With respect to research priorities, the lack of information on effective interventions to reduce or prevent smoking among especially at-risk populations severely restricts the ability of tobacco control programs to impact on the burden of harm. Reducing this gap in knowledge should be of paramount interest to policy-makers and practitioners. Exploring opportunities to engage, for example, faith communities in tobacco control has the potential for promising results, as not only do faith-oriented interventions prove less costly and quicker to implement than large-scale, cross-population efforts (Awa 2004), but they offer direct access to vulnerable audiences (e.g., rural populations, minority groups and individuals with low levels of income and education) who might otherwise be un-exposed (or under-exposed) to tobacco control measures (Brooks and Koenig 2002; Reinert et al. 2003; Winett et al. 1999). DeHaven et al. (2004) cite the potential for faith communities to succeed with smoking cessation (given their capacity to interact with individuals on a familiar and personal level) where outsiders like the government or academics

may not; and Brooks and Koenig (2002) reinforce this argument, implying that the local presence of faith communities, along with their ability to cultivate multiple client encounters, makes close support and monitoring of cessation activities far more likely. As per Winett et al. (1999), to focus tobacco control measures (specifically cessation programs) on individual smokers alone, is to fail to take advantage of the extensive and powerful system of social and environmental scaffoldings that are maintained by collectives like faith-based organizations.

Such scaffolding might also be offered by workplaces, and, indeed, recent research in BC testifies to the potentially widespread impacts that the nurturing of healthy working environments can have on the well-being of employees (in the health care sector specifically) and on their overall workplace culture (Lowe 2006). Evidence indicates that workplace initiatives can be inclusive of tobacco control (especially smoking cessation) efforts, and that such efforts may even have positive impacts on hard-to-reach populations, such as travelling trades workers (e.g., Ringen et al. 2002). The potential to integrate (or work primarily) with unions on these initiatives has also been noted (Barbeau et al. 2004; Lowe 2006), but dedicated investment into developing and testing such interventions has been rare.

Research into effective tobacco prevention, protection, reduction and cessation for Aboriginal communities is of especial importance, not the least because of disproportionately higher smoking rates among indigenous individuals. Literature reviews have consistently shown a dearth of sound evaluations of tailored tobacco control programs for Aboriginal peoples, and, in fact, separate analyses of four interventions in Australia and three in America found none that reported significant effects on cessation (Ivers 2004; Lawrence et al. 2003). Moreover, Johnson et al.'s (1997) clinic-based cessation initiative for urban Native Americans has demonstrated no meaningful effects on intervention group abstinence, and Schinke, Tepavac and Cole (2000) substance use prevention research among Native American youth has indicated that levels of tobacco use were actually unaffected. Bramley et al.'s (2005) work with Maori youth (on text messaging-based cessation) is one of the few to offer some (albeit small) hint of success in reducing smoking-related harms among indigenous populations.

The lack of research is similarly apparent among smokers with mental illnesses, despite the fact that some of these individuals have been traced to nearly 50 per cent of all cigarette sales, have been seen to spend significant amounts of their monthly income on cigarettes (derived, in most cases, from public assistance) and have been documented as being almost twice as likely to smoke as those without mental health concerns (Apollonio and Malone 2005; Lasser et al. 2000; Steinberg, Williams and Ziedonis 2004). Indeed, the mentally ill bear an inordinate share of the burden of harm, yet they have typically been excluded from clinical cessation trials (Doolan and Froelicher 2006). Perhaps most alarmingly, they appear to be regularly excluded from local or community programs too; for instance, quitlines have turned them away even though, in some cases, 30 per cent of callers to certain lines have disclosed past or current mental illness (e.g., Harper 2006).

In the end, the aforementioned populations and settings are not inclusive of all those peoples and environments that require clear research investment. Population-wide tobacco control efforts can achieve much success, but they also demand buttressing by targeted initiatives for individuals who are especially at-risk. Indeed, significant future reductions in smoking-related harms are dependent on such a balanced and attentive approach.

REFERENCES

- Abdullah, A., Lam, T.-H., Chan, S., and Hedley, A. 2004. Which smokers use the smoking cessation Quitline in Hong Kong, and how effective is the Quitline? *Tobacco Control* 13:415-421.
- Ahluwalia, J.S., Okuyemi, K., Nollen, N., Choi, W.S., Kaur, H., Pulvers, K., and Mayo, M.S. 2006. The effects of nicotine gum and counselling among African American light smokers: A 2x2 factorial design. *Addiction* 101:883-891.
- Apollonio, D.E., and Malone, R.E. 2005. Marketing to the marginalised: Tobacco industry targeting of the homeless and mentally ill. *Tobacco Control* 14:409-415.
- Aseltine, R.H., Dupre, M., and Lamlein, P. 2000. Mentoring as a drug prevention strategy: An evaluation of Across Ages. *Adolescent and Family Health* 1:11-20.
- Ashley, M.J., and Ferrence, R. 1998. Reducing children's exposure to environmental tobacco smoke in homes: Issues and strategies. *Tobacco Control* 7:61-65.
- Awa, F.E. 2004. The role of religion in tobacco control interventions. *Bulletin of the World Health Organization* 82 (12):894.
- Backinger, C.L., Fagan, P., Matthews, E., and Grana, R. 2003. Adolescent and young adult tobacco prevention and cessation: Current status and future directions. *Tobacco Control* 12 (Suppl. 4):iv46-iv53.
- Barbeau, E.M., McLellan, D., Levenstein, C., DeLaurier, G.F., Kelder, G., and Sorensen, G. 2004. Reducing occupation-based disparities related to tobacco: Roles for occupational health and organized labor. *American Journal of Industrial Medicine* 46:170-179.
- Baska, T., Straka, S., Baskova, M., and Mad'ar, R. 2004. Effectiveness of school programs in tobacco control. *Central European Journal of Public Health* 12:184-186.
- Bauer, J.E., Hyland, A., Li, Q., Steger, C., and Cummings, K.M. 2005. A longitudinal assessment of the impact of smoke-free worksite policies on tobacco use. *American Journal of Public Health* 95:1024-1029.
- Beare, Margaret. 2002. Organized corporate criminality—Tobacco smuggling between Canada and the US. *Crime, Law and Social Change* 37:225-243.
- Beck, F., Legleye, S., and Peretti-Watel, P. 2000. *Regards sur la fin de l'adolescence: Consommations de produits psychoactifs dans l'enquete ESCAPAD 2000*. Paris: Observatoire francais des drogues et des toxicomanies.
- Bentley, J.P., Banahan, B.F., McCaffrey, D.J., Garner, D.D., and Smith, M.C. 1998. Sale of tobacco products in pharmacies: Results and implications of an empirical study. *Journal of the American Pharmaceutical Association* 38 (6):703-709.

- Blackburn, C., Spencer, N., Bonas, S., Coe, C., Dolan, A., and Moy, R. 2003. Effect of strategies to reduce exposure of infants to environmental tobacco smoke in the home: Cross sectional survey. *British Medical Journal* 327:257-261.
- Bolin, K., Lindgren, B., and Willers, S. 2006. The cost utility of bupropion in smoking cessation health programs: Simulation model results for Sweden. *Chest* 129:651-660.
- Bond, L., Patton, G., Glover, S., Carlin, J.B., Butler, H., Thomas, L., and Bowes, G. 2004. The Gatehouse Project: Can a multilevel school intervention affect emotional well-being and health risk behaviours? *Journal of Epidemiology and Community Health* 58:997-1003.
- Borland, R. 2005. *Reducing the harm from tobacco use: The case for systemic change*. Paper presented at the 16th International Conference on the Reduction of Drug Related Harm, Belfast, Ireland, March, 2005.
- Borland, R., Balmford, J., Segan, C., Livingston, P., and Owen, N. 2003. The effectiveness of personalized smoking cessation strategies for callers to a Quitline service. *Addiction* 98:837-846.
- Borland, R., Yong, H.-H., Cummings, K.M., Hyland, A., Anderson, S., and Fong, G.T. 2006. Determinants and consequences of smoke-free homes: Findings from the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control* 15(Suppl. III):iii42-iii50.
- Borrelli, B., Novak, S., Hecht, J., Emmons, K., Papandonatos, G., and Abrams, D. 2005. Home health care nurses as a new channel for smoking cessation treatment: Outcomes from project CARES (Community-nurse Assisted Research and Education on Smoking). *Preventive Medicine* 41:815-821.
- Botvin, G.J., Griffin, K.W., Paul, E., and Macaulay, A.P. 2003. Preventing tobacco and alcohol use among elementary school students through Life Skills Training. *Journal of Child and Adolescent Substance Abuse* 12:1-17.
- Bramley, D., Riddell, T., Whittaker, R., Corbett, T., Lin, R.-B., Wills, M., Jones, M., and Rodgers, A. 2005. Smoking cessation using mobile phone text messaging is as effective in Maori as non-Maori. *New Zealand Medical Journal* 118:U1494.
- Bridge, J., and Turpin, B. 2004. *The cost of smoking in British Columbia and the economics of tobacco control*. Glen Haven: GPI Atlantic.
- Brooks, R.G., and Koenig, H.G. 2002. Crossing the secular divide: Government and faith-based organizations as partners in health. *International Journal of Psychiatry in Medicine* 32 (3):223-234.
- Brounstein, P.J., Zweig, J.M., and Gardner, S.E. 1998. *Science-based practices in substance abuse prevention: A guide*. Maryland: Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention.

- Brownson, R.C., Haire-Joshu, D., and Luke, D.A. 2006. Shaping the context of health: A review of environmental and policy approaches in the prevention of chronic diseases. *Annual Review of Public Health* 27:341-370.
- Cains, T., Cannata, S., Poulos, R., Ferson, M.J., and Stewart, B.W. 2004. Designated 'no smoking' areas provide from partial to no protection from environmental tobacco smoke. *Tobacco Control* 13:17-22.
- Camenga, D.R., and Klein, J.D. 2004. Adolescent smoking cessation. *Current Opinion in Pediatrics* 16:368-372.
- Campaign for Tobacco-Free Kids 2003. Tobacco marketing that reaches kids: Point-of-purchase advertising and promotions. Washington, DC: National Center for Tobacco-Free Kids.
- Canadian Cancer Society. 2002. *A critical analysis of youth access laws*. Ottawa, ON: Canadian Cancer Society.
- Carter, S. 2003. New frontier, new power: The retail environment in Australia's dark market. *Tobacco Control* 12 (Suppl. 3):iii95-iii101.
- Carter, S. 2005. *Point of sale cigarette marketing: An important tobacco industry strategy*. Retrieved November 2006, from <http://www.inspq.qc.ca/pdf/evenements/EnjeuxActuelsTabagisme/20050518-Carter-CigaretteMarketing.pdf>.
- Caulkins, J., Pacula, R., Paddock, S., and Chiesa, J.R. 2002. *School-based drug prevention: What kind of drug use does it prevent?* Santa Monica: RAND.
- Celebucki, C.C., and Diskin, K. 2002. A longitudinal study of externally visible cigarette advertising on retail storefronts in Massachusetts before and after the Master Settlement Agreement. *Tobacco Control* 11 (Suppl 2):ii47-ii53.
- Centers for Disease Control and Prevention. 1999. *Best practices for comprehensive tobacco control programs--August 1999*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.
- Centers for Disease Control and Prevention. 2004. Effect of ending an antitobacco youth campaign on susceptibility to cigarette smoking--Minnesota, 2002-2003. *Morbidity and Mortality Weekly Report* 53:301-304.
- Cepeda-Benito, A., Reynoso, J.T., and Erath, S. 2004. Meta-analysis of the efficacy of nicotine replacement therapy for smoking cessation: Differences between men and women. *Journal of Consulting and Clinical Psychology* 72:712-722.
- Chaloupka, F.J., Hu, T., Warner, K.E., Jacobs, R., and Yurekli, A. 2000. The taxation of tobacco products. In *Tobacco Control in Developing Countries*, edited by P. Jha and F. Chaloupka. Oxford: Oxford University Press.

- Chaloupka, F.J., and Wechsler, H. 1997. Price, tobacco control policies and smoking among young adults. *Journal of Health Economics* 16:359-373.
- Chapman, S., and Dominello, A. 2001. A strategy for increasing news media coverage of tobacco and health in Australia. *Health Promotion International* 16:137-143.
- Chapman, S., and Wakefield, M. 2001. Tobacco control advocacy in Australia: Reflections on 30 years of progress. *Health Education and Behavior* 28:274-289.
- Chesterman, J., Judge, K., Bauld, L., and Ferguson, J. 2005. How effective are the English smoking treatment services in reaching disadvantaged smokers? *Addiction* 100 (Suppl. 2):36-45.
- CNW Group. 2006. *Almost all British Columbians support smoking restrictions in public places*. Vancouver, BC: Author.
- Cohen, J. 2006. *Evaluating tobacco control policies: Some methodological challenges*. Abstract of paper presented at Methodological Challenges in Public Health Research Workshop, Toronto, ON, September 29, 2006.
- Cohen, J., Griffin, K., Robinson, D., Lavack, A.M., O'Connor, S., Thompson, F., and DiNardo, J. 2006. *Tobacco marketing at point-of-sale: The last hoorah*. Abstract of paper presented at the 13th World Conference on Tobacco or Health, Washington, DC, July 12-15, 2006.
- Context Research. 2005. *Youth Access to Tobacco Project: Final report*. Victoria, BC: Ministry of Health, Tobacco Control Program.
- Cook, D., and Edwards, C.A. 2000. Cigarette brand variation increases since legislation reduces point-of-sale promotion [Abstract]. *Health Promotion Journal of Australia* 10 (2):154-155.
- Cornuz, J., Gilbert, A., Pinget, C., McDonald, P., Slama, K., Salto, E., and Paccaud, F. 2006. Cost-effectiveness of pharmacotherapies for nicotine dependence in primary care settings: A multinational comparison. *Tobacco Control* 15:152-159.
- Corporate Research Group. 2006. *Evaluation of retailers' behaviour towards certain youth access-to-tobacco restrictions. Final report findings: 2005*. Ottawa, ON: Health Canada, Tobacco Control Program.
- Corti, B., Donovan, R., Holman, C., Coten, N., and Jones, S.J. 1997. Using sponsorship to promote health messages to children. *Health Education and Behavior* 24:276-286.
- Coulson, N.S., Eiser, C., and Eiser, J.R. 1997. Diet, smoking and exercise: Interrelationships between adolescent health behaviours. *Child Care Health and Development* 23:207-216.
- Croghan, E., Aveyard, P., and Johnson, C. 2005. Is it as easy as young people claim for them to buy cigarettes? Comparing the results of realistic test purchases with those from trading standards test purchases. *Health Education* 105:103-108.

- Cuijpers, P. 2002. Effective ingredients of school-based drug prevention programs: A systematic review. *Addictive Behaviors* 27:1009-1023.
- Cuijpers, P. 2003. Three decades of drug prevention research. *Drugs: Education, Prevention and Policy* 10:7-20.
- Cummings, K.M., Hyland, A., Saunders-Martin, T., Perla, J., Coppola, P.R., and Pechacek, T.F. 1998. Evaluation of an enforcement program to reduce tobacco sales to minors. *American Journal of Public Health* 88:932-936.
- Curie, C.J., Pokorny, S.B., Jason, L.A., Schoeny, M.E., and Townsend, S.M. 2002. An examination of factors influencing illegal tobacco sales to minors. *Journal of Prevention and Intervention in the Community* 24:61-74.
- DeHaven, M.J., Hunter, I.B., Wilder, L., Walton, J.W., and Berry, J. 2004. Health programs in faith-based organizations: Are they effective? *American Journal of Public Health* 94 (6):1030-1036.
- DeJong, W., and Winsten, J.A. 1990. The use of mass media in substance abuse prevention. *Health Affairs* 9:30-46.
- Dewhirst, T. 2004. POP goes the power wall? Taking aim at tobacco promotional strategies utilised at retail. *Tobacco Control* 13:209-210.
- DiFranza, J.R. 2005. Best practices for enforcing state laws prohibiting the sale of tobacco to minors. *Journal of Public Health Management and Practice* 11:559-565.
- DiFranza, J.R., and Coleman, M. 2001. Sources of tobacco for youths in communities with strong enforcement of youth access laws. *Tobacco Control* 10:323-328.
- DiFranza, J.R., Peck, R.M., Radecki, T.E., and Savageau, J.A. 2001. What is the potential cost-effectiveness of enforcing a prohibition on the sale of tobacco to minors? *Preventive Medicine* 32:168-174.
- DiFranza, J.R., Savageau, J.A., and Bouchard, J. 2001. Is the standard compliance check protocol a valid measure of the accessibility of tobacco to underage smokers? *Tobacco Control* 10:227-232.
- Donovan, R.J., Jancey, J., and Jones, S. 2002. Tobacco point of sale advertising increases positive brand user imagery. *Tobacco Control* 11:191-194.
- Doolan, D.M., and Froelicher, E.S. 2006. Efficacy of smoking cessation intervention among special populations: Review of the literature from 2000 to 2005. *Nursing Research* 55 (4S):S29-S37.
- Drope, J., and Glantz, S. 2003. British Columbia Capital Regional District 100 per cent smokefree bylaw: A successful public health campaign despite industry opposition. *Tobacco Control* 12:264-268.

- Dusenbury, L. 2000. Family-based drug abuse prevention programs: A review. *Journal of Primary Prevention* 20:337-352.
- Egger, G., Donovan, R.J., and Spark, R. 1993. *Health and the media*. Sydney: McGraw-Hill.
- Elias, M.J., and Kress, J.S. 1994. Social decision-making and life-skills development: A critical thinking approach to health promotion in the middle school. *Journal of School Health* 64:62-66.
- Eureka Strategic Research 2005. *Youth tobacco prevention literature review*. Canberra: Australian Government Department of Health and Ageing.
- Evans, W.D., Price, S., and Blahut, S. 2005. Evaluating the truth brand. *Journal of Health Communication* 10:181-192.
- Everett Jones, S., Sharp, D.J., Husten, C.G., and Crossett, L.S. 2002. Cigarette acquisition and proof of age among US high school students who smoke. *Tobacco Control* 11:20-25.
- Farkas, A.J., Gilpin, E.A., White, M.M., and Pierce, J.P. 2000. Association between household and workplace smoking restrictions and adolescent smoking. *Journal of the American Medical Association* 284:717-722.
- Farrelly, M.C., Heaton, C.G., Davis, K.C., Messeri, P., Hersey, J.C., and Haviland, M.L. 2002. Getting to the truth: Evaluating national tobacco countermarketing campaigns. *American Journal of Public Health* 92:901-907.
- Farrelly, M.C., Niederdeppe, J., and Yarsevich, J. 2003. Youth tobacco prevention mass media campaigns: Past, present, and future directions. *Tobacco Control* 12 (Supp. 1):35-47.
- Feenstra, T.L., Hamberg-van Reenen, H.H., Hoogenveen, R.T., and Rutten-van Molken, M.P.M.H. 2005. Cost-effectiveness of face-to-face smoking cessation interventions: A dynamic modeling study. *Value in Health* 8:178-190.
- Feighery, E.C., Ribisl, K.M., Clark, P.I., and Haladjian, H.H. 2003. How tobacco companies ensure prime placement of their advertising and products in stores: Interviews with retailers about tobacco company incentive programmes. *Tobacco Control* 12:184-188.
- Feighery, E.C., Ribisl, K.M., Schleicher, N.C., Lee, R.E., and Halvorson, S. 2001. Cigarette advertising and promotional strategies in retail outlets: Results of a statewide survey in California. *Tobacco Control* 10:184-188.
- Feighery, E.C., Ribisl, K.M., Schleicher, N.C., and Clark, P.I. 2004. Retailer participation in cigarette company incentive programs is related to increased levels of cigarette advertising and cheaper cigarette prices in stores. *Preventive Medicine* 38:876-884.
- Fichtenberg, C.M., and Glantz, S.A. 2002. Youth access interventions do not affect youth smoking. *Pediatrics* 109:1088-1092.

- Fishman, P.A., Ebel, B.E., Garrison, M.M., Christakis, D.A., Wiehe, S.E., and Rivara, F.P. 2005. Cigarette tax increase and media campaign: Cost of reducing smoking-related deaths. *American Journal of Preventive Medicine* 29:19-26.
- Forster, J., Chen, V., Blaine, T., Perry, C., and Toomey, T. 2003. Social exchange of cigarettes by youth. *Tobacco Control* 12:148-154.
- Foulds, J., Steinberg, M.B., Williams, J.M., and Ziedonis, D.M. 2006. Developments in pharmacotherapy for tobacco dependence: Past, present and future. *Drug and Alcohol Review* 25:59-71.
- Friend, K., and Levy, D.T. 2002. Reductions in smoking prevalence and cigarette consumption associated with mass-media campaigns. *Health Education Research* 17:85-98.
- Gabhainn, S.N., and Kelleher, C.C. 2000. School health education and gender: An interactive effect? *Health Education Research* 15:591-602.
- Galbraith, J.W., and Kaiserman, M. 1997. Taxation, smuggling and demand for cigarettes in Canada: Evidence from time-series data. *Journal of Health Economics* 16:287-301.
- Gallet, C.A. 2004. The efficacy of state-level antismoking laws: Demand and supply considerations. *Journal of Economics and Finance* 28:404-412.
- Gates, S., McCambridge, J., Smith, L.A., and Foxcroft, D.R. 2005. Interventions for prevention of drug use by young people delivered in non-school settings (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Gehrman, C.A., and Hovell, M.F. 2003. Protecting children from environmental tobacco smoke (ETS) exposure: A critical review. *Nicotine and Tobacco Research* 5:289-301.
- Gilbert, H., Sutton, S., and Sutherland, G. 2005. Who calls QUIT? The characteristics of smokers seeking advice via a telephone helpline compared with smokers attending a clinic and those in the general population. *Public Health Reports* 119:933-939.
- Giles-Corti, B., Clarkson, J.P., Donovan, R.J., Frizzell, S.K., Carroll, A.M., Pikora, T., and Jalleh, G. 2001. Creating smoke-free environments in recreational settings. *Health Education and Behaviour* 28:341-351.
- Gilpin, E.A., Lee, L., and Pierce, J.P. 2004. Does adolescent perception of difficulty in getting cigarettes deter experimentation? *Preventive Medicine* 38:485-491.
- Glantz, S.A., and Mandel, L.L. 2005. Since school-based tobacco prevention programs do no work, what should we do? *Journal of Adolescent Health* 36:157-159.
- Glantz, S.A., and Wilson-Loots, R. 2003. No association of smoke-free ordinances with profits from bingo and charitable games in Massachusetts. *Tobacco Control* 12:411-413.
- Goel, R.K., and Nelson, M.A. 2005. Tobacco policy and tobacco use: Differences across tobacco types, gender and age. *Applied Economics* 37:765-771.

- Goldman, L.K., and Glantz, S.A. 1998. Evaluation of antismoking advertising campaigns. *Journal of the American Medical Association* 279:772-777.
- Goren, N., and Wright, K. 2006. *Peer education as a drug prevention strategy*. West Melbourne: DrugInfo Clearinghouse.
- Gospodinov, N., and Irvine, I. 2005. A "long march" perspective on tobacco use in Canada. *Canadian Journal of Economics* 38 (2):366-393.
- Goss Gilroy. 1997. *Evaluation of the enforcement program for federal tobacco legislation*. Ottawa, ON: Health Canada.
- Gottlieb, N.H., Loukas, A., Corrao, M., McAlister, A., Snell, C., and Huang, P. 2004. Minors' tobacco possession law violations and intentions to smoke: Implications for tobacco control. *Tobacco Control* 13:237-243.
- Green, E., Courage, C., and Rushton, L. 2003. Reducing domestic exposure to environmental tobacco smoke: A review of attitudes and behaviours. *Journal of the Royal Society for the Promotion of Health* 123:46-51.
- Grierson, T., van Dijk, M.W., Dozois, E., and Mascher, J. 2006. Using the Internet to build community capacity for healthy public policy. *Health Promotion Practice* 7:13-22.
- Gruber, Jonathan, Sen, A. and Stabile, M. 2003. Estimating price elasticities when there is smuggling: The sensitivity of smoking to price in Canada. *Journal of Health Economics* 22:821-842.
- Guindon, G.E., Tobin, S., and Yach, D. 2002. Trends and affordability of cigarette prices: Ample room for tax increases and related health gains. *Tobacco Control* 11:35-43.
- Hall, S.M., Lightwood, J.M., Humfleet, G.L., Bostrom, A., Reus, V.I., and Munoz, R. 2005. Cost-effectiveness of bupropion, nortriptyline, and psychological intervention in smoking cessation. *Journal of Behavioral Health Services and Research* 32:381-392.
- Hammond, D., Tremblay, I., Chaiton, M., Lessard, E., Callard, C., and the Tobacco on Campus Workgroup. 2005. Tobacco on campus: Industry marketing and tobacco control policy among post-secondary institutions in Canada. *Tobacco Control* 14:136-140.
- Harper, T. 2006. *A smokefree generation? The opportunities in tobacco control*. Melbourne: Quit Victoria and the VicHealth Centre for Tobacco Control.
- Harris, J.E., and Chan, S.W. 1999. The continuum-of-addiction: Cigarette smoking in relation to price among Americans aged 15-29. *Health Economics Letters* 8:81-86.
- Harris, F., MacKintosh, A.M., Anderson, S., Hastings, G., Borland, R., Fong, G.T., Hammond, D., and Cummings, K.M., for the ITC Collaboration. 2006. Effects of the 2003 advertising/promotion ban in the United Kingdom on awareness of tobacco marketing: Findings from the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control* 15 (Suppl 3):iii26-iii33.

- Hawkins, J.D., Catalano, R.F., and Arthur, M.W. 2002. Promoting science-based prevention in communities. *Addictive Behaviors* 27:951-976.
- Health Canada. 2002. *The economics of workplace smoking restrictions – Economic benefits*. Ottawa, ON: Author.
- Health Canada 2005. *Evaluation of retailers' behaviour towards certain youth access-to-tobacco restrictions (final report findings: 2005)*. Ottawa, ON: Author.
- Henriksen, L., Feighery, E.C., Schleicher, N.C., Haladjian, H.H., and Fortmann, S.P. 2004a. Reaching youth at the point of sale: Cigarette marketing is more prevalent in stores where adolescents shop frequently. *Tobacco Control* 13:315-318.
- Henriksen, L., Feighery, E.C., Wang, Y, and Fortmann, S.P. 2004b. Association of retail tobacco marketing with adolescent smoking. *American Journal of Public Health* 94:2081-2083.
- Henriksen, L, Flora, J.A., Feighery, E., and Fortmann, S.P. 2002. Effects on youth of exposure to retail tobacco advertising. *Journal of Applied Social Psychology* 32 (9):1771-1789.
- Hodge, J.G, and Eber G. 2004. Tobacco control legislation: Tools for public health improvement. *Journal of Law, Medicine, and Ethics* 32 (3):516-523.
- Hoek, J. 2004. Tobacco promotion restrictions: Ironies and unintended consequences. *Journal of Business Research* 57:1250-1257.
- Hoffmann, K., and Jackson, S. 2003. *A review of the evidence for the effectiveness and costs of interventions preventing the burden of non-communicable diseases: How can health systems respond?* Toronto: Centre for Health Promotion, University of Toronto.
- Hopkins, D.P., Briss, P.A., Ricard, C.J., Husten, C.G., Carande-Kulis, V.G., Fielding, J.E., Alao, M.O., McKenna, J.W., Sharp, D.J., Harris, J.R., Woollery, T.A., and Harris, K.W., and the Task Force on Community Preventive Services 2001. Reviews of evidence regarding interventions to reduce tobacco use and exposure to environmental tobacco smoke. *American Journal of Preventive Medicine* 202 (Supp. 1):16-66.
- Hovell, M.F., Zakarian, J.M., Wahlgren, D.R., and Matt, G.E. 2000. Reducing children's exposure to environmental tobacco smoke: The empirical evidence and directions for future research. *Tobacco Control* 9:ii40-ii47.
- Hrywna, M., Adler, R., Delnevo, C., and Slade, J. 2004. Content analysis and key informant interviews to examine community response to the purchase, possession, and/or use of tobacco by minors. *Journal of Community Health* 29:209-216.
- Hudmon, K.S., Fenlon, C.M., Corelli, R.L., Prokhorov, A.V., and Schroeder, S.A. 2006. Tobacco sales in pharmacies: Time to quit. *Tobacco Control* 15:35-38.
- Hughes, J.R., Shiffman, S., Callas, P., and Zhang, J. 2003. A meta-analysis of the efficacy of over-the-counter nicotine replacement. *Tobacco Control* 12:21-27.

- Hunt, M.K., Fagan, P., Lederman, R., Stoddard, A., Frazier, L., Girod, K., and Sorensen, G. 2003. Feasibility of implementing intervention methods in an adolescent worksite tobacco control study. *Tobacco Control* 12:iv40-iv45.
- Ivers, R.G. 2004. An evidence-based approach to planning tobacco interventions for Aboriginal people. *Drug and Alcohol Review* 23:5-9.
- J. Gottheil Marketing Communications Inc. 2005. *The influence of tobacco powerwall advertising on children: A report for the Non-Smokers' Rights Association and the Smoking and Health Action Foundation*. Richmond Hill: Author.
- Jaen, C.R., Cummings, K.M., Zielezny, M., and O'Shea, R. 1993. Patterns and predictors of smoking cessation among users of a telephone hotline. *Public Health Reports* 108:772-778.
- Jalleh, G., Donovan, R., Stewart, S., and Sullivan, D. 2006. Is there public support for banning smoking in motor vehicles? *Tobacco Control* 15:71.
- Jason, L.A., Billows, W., Schnopp-Wyatt, D., and King, C. 1996. Reducing the illegal sales of cigarettes to minors: Analysis of alternative enforcement schedules. *Journal of Applied Behavior Analysis* 29:333-344.
- Jason, L.A., Pokorny, S.B., Mikulski, K., and Schoeny, M.E. 2004. Assessing storefront tobacco advertising after the billboard ban. *Evaluation and the Health Professions* 27(1):22-33.
- Jason, L.A., Pokorny, S.B., and Schoeny, M.E. 2003. Evaluating the effects of enforcements and fines on youth smoking. *Critical Public Health* 13:33-45.
- Jason, L.A., Pokorny, S.B., Sherk, J.L., Helzing, D.M., and Rebus, P.J. 2003. Selling tobacco to minors: Can merchants accurately determine a customer's age? *Journal of Human Behavior in the Social Environment* 8:67-73.
- Jha, P., and Chaloupka, F. (Eds.). 2000. *Tobacco control in developing countries*. Oxford: Oxford University Press.
- Ji, P.Y., Pokorny, S.B., Blaszkowski, E., Jason, L.A., and Rabin-Belyaev, O. 2002. Examining risks for minors participating in tobacco purchase attempts. *Journal of Prevention and Intervention in the Community* 24:75-83.
- Johnson, J.L., Macdonald, S., Reist, D., and Bahadori, K. 2006. *Tobacco reduction in the context of mental illness and addictions: A review of the evidence*. Vancouver, BC: Centre for Addictions Research of BC.
- Johnson, K.M., Lando, H.A., Schmid, L.S., and Solberg, L.I. 1997. The Gains Project: Outcome of smoking cessation strategies in four urban Native American clinics. *Addictive Behaviors* 22 (2):207-218.
- Joseph, A.M., Muggli, M., Pearson, K.D., and Lando, H. 2005. The cigarette manufacturers' efforts to promote tobacco to the US military. *Military Medicine* 170:874-880.

- Kalke, J., and Raschke, P. 2004. Learning by doing: 'Initiated abstinence', a school-based programme for the prevention of addiction. *European Addiction Research* 10:88-94.
- Kaper, J., Wagena, E.J., Willemsen, M.C., and van Schayck, C.P. 2005. Reimbursement for smoking cessation treatment may double the abstinence rate: Results of a randomized trial. *Addiction* 100.
- Kaplan, C.P., Perez-Stable, E.J., Fuentes-Afflick, E., Gildengorin, V., Millstein, S., and Juarez-Reyes, M. 2004. Smoking cessation counselling with young patients: The practices of family physicians and pediatricians. *Archives of Pediatrics and Adolescent Medicine* 158:83-90.
- Keeler, T.E., Hu, T., Manning, W.G., and Sung, H.-Y. 2001. State tobacco taxation, education and smoking: Controlling for the effects of omitted variables. *National Tax Journal* 54:83ff.
- Killen, J.D., Robinson, T.N., Ammerman, S., Hayward, C., Rogers, J., Stone, C., Samuels, D., Levin, S.K., Green, S., and Schatzberg, A.F. 2004. Randomized clinical trial of the efficacy of bupropion combined with nicotine patch in the treatment of adolescent smokers. *Journal of Consulting and Clinical Psychology* 72:729-735.
- Klerman, L.V. 2004. Protecting children: Reducing their environmental tobacco smoke exposure. *Nicotine and Tobacco Research* 6 (Suppl. 2):S239-S252.
- Klonoff, E.A., and Landrine, H. 2004. Predicting youth access to tobacco: The role of youth versus store-clerk behavior and issues of ecological validity. *Health Psychology* 23:517-524.
- Krainuwat, K. 2005. Smoking initiation prevention among youths: Implications for community health nursing practice. *Journal of Community Health Nursing* 22:195-204.
- Krevor, B., Capitman, J.A., Oblak, L., Cannon, J.B., and Ruwe, M. 2003. Preventing illegal tobacco and alcohol sales to minors through electronic age-verification devices: A field effectiveness study. *Journal of Public Health Policy* 24:251-268.
- Krueger and Associates 2005. *Resources for health: A cost-effective risk factor plan for British Columbia*. Vancouver, BC: Author.
- Kumpfer, K.L., Alvarado, R., and Whiteside, H.O. 2003. Family-based interventions for substance use and misuse prevention. *Substance Use and Misuse* 38:1759-1787.
- Lancaster, T., and Stead, L. 2005. Individual behavioural counselling for smoking cessation (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Lancaster, T., Silagy, C., and Fowler, G. 2005. Training health professionals in smoking cessation (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Lancaster, T., Stead, L., Silagy, C., and Sowden, A. 2000. Effectiveness of interventions to help people to stop smoking: Findings from the Cochrane Library. *British Medical Journal* 321:355-358.

- Landrine, H., and Klonoff, E.A. 2003. Validity of assessments of youth access to tobacco: The familiarity effect. *American Journal of Public Health* 93:1883-1886.
- Landrine, H., Klonoff, E.A., Campbell, R., and Reina-Patton, A. 2000. Sociocultural variables in youth access to tobacco: Replication 5 years later. *Preventive Medicine* 30:433-437.
- Lantz, P.M., Jacobson, P.D., Jacobson, K.E., Wasserman, J., Pollack, H.A., Berson, J., and Ahlstrom, A. 2000. Investing in youth tobacco control: A review of smoking prevention and control strategies. *Tobacco Control* 9:47-63.
- Lasser, K., Boyd, J.W., Woolhandler, S., Himmelstein, D.U., McCormick, D., and Bor, D.H. 2000. Smoking and mental illness: A population-based prevalence study. *Journal of the American Medical Association* 284 (20):2606-2610.
- Laugesen, M., Scollo, M., Sweanor, D., Shiffman, S., Gitchell, J., Barnsley, K., Jacobs, M., Giovino, G.A., Glantz, S.A., Daynard, R.A., Connolly, G.N., and Difranza, J.R. 2000. World's best practice in tobacco control. *Tobacco Control* 9:228-236.
- Lavack, A.M., and Toth, G. 2006. Tobacco point-of-purchase promotion: Examining tobacco industry documents. *Tobacco Control* 15:377-384.
- Lawrance, K., and Lawler, S. (n.d.). *Smoking cessation supports on college and university campuses - "Leave The Pack Behind"*. Kitchener, ON: Program Training & Consultation Centre.
- Lawrence, D., Graber, J.E., Mills, S.L., Meissner, H.I., and Warnecke, R. 2003. Smoking cessation interventions in US racial/ethnic minority populations: An assessment of the literature. *Preventive Medicine* 36:204-216.
- Laws, M.B., Whitman, J., Bowser, D.M., and Krech, L. 2002. Tobacco availability and point of sale marketing in demographically contrasting districts of Massachusetts. *Tobacco Control* 11 (Suppl. 2):ii71-ii73.
- Le, A., Shamasunder, B., and Bero, L. 2001. *The relationship between the tobacco industry and pharmacies: What the internal tobacco industry documents tell us*. Abstract of paper presented at the 128th Annual Meeting of the American Public Health Association, Boston, MA, October 23, 2001.
- Leatherdale, S.T., and McDonald, P.W. 2005. What smoking cessation approaches will young smokers use? *Addictive Behaviors* 30:1614-1618.
- Lee, D.J., Trapido, E., Weatherby, N., and Rodriguez, R. 2001. Correlates of participation and willingness to participate in anti-tobacco activities among 4th-7th graders. *Journal of Community Health* 26:447-457.
- Letcher, T., Cameron, M., Inglis, G., and Wakefield, M. 2003. Bans on tobacco advertising at point of sale. In *Quit Victoria Research and Evaluation Studies* (No. 11), edited by T. Letcher and L. Trotter. Carlton South: Quit Victoria.

- Levinson, A.H., Hendershott, S., and Byers, T.E. 2002. The ID effect on youth access to cigarettes. *Tobacco Control* 11:296-299.
- Levy, D.T., Chaloupka, F., and Slater, S. 2000. Expert opinions on optimal enforcement of minimum purchase age laws for tobacco. *Journal of Public Health Management and Practice* 6:107-114.
- Levy, D.T., and Friend, K.B. 2000. A simulation model of tobacco youth access policies. *Journal of Health Politics, Policy and Law* 25:1023-1050.
- Lipkus, I.M., McBride, C.M., Pollak, K.I., Schwartz-Bloom, R.D., Tilson, E., and Bloom, P.N. 2004. A randomized trial comparing the effects of self-help materials and proactive telephone counseling on teen smoking cessation. *Health Psychology* 23:397-406.
- Lister-Sharp, D., Chapman, S., Stewart-Brown, S., and Sowden, A. 1999. Health promoting schools and health promotion in schools: Two systematic reviews. *Health Technology Assessment* 3:1-207.
- Livingood, W.C., Woodhouse, C.D., Sayre, J.J., and Wludyka, P. 2001. Impact study of tobacco possession law enforcement in Florida. *Health Education and Behavior* 28:733-748.
- Loomis, B.R., Farrelly, M.C., Nonnemaker, J.M., and Mann, N.H. 2006. Point of purchase cigarette promotions before and after the Master Settlement Agreement: Exploring retail scanner data. *Tobacco Control* 15:140-142.
- Loppe, J., and Thibault, S. n.d.. *Breathing space: Community partners for smoke-free homes*. Kitchener, ON: Program Training and Consultation Centre.
- Lovato, C., Linn, G., Stead, L.F., and Best, A. 2003. Impact of tobacco advertising and promotion on increasing adolescent smoking behaviours (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Lowe, G.S. 2006. Creating healthy health care workplaces in British Columbia: Evidence for action: A discussion paper. Vancouver, BC: Provincial Health Services Authority.
- Lowey, H., Tocque, K., Bellis, M.A., and Fullard, B. 2003. Smoking cessation services are reducing inequalities. *Journal of Epidemiology and Community Health* 57:579-580.
- Luk, R., and Ferrence, R. 2005. *The economic impact of smoke-free legislation on the hospitality industry*. Toronto: Ontario Tobacco Research Unit, Special Report Series.
- Luk, R., Ferrence, R., and Gmel, G. 2006. The economic impact of a smoke-free bylaw on restaurant and bar sales in Ottawa, Canada. *Addiction* 101:738-745.
- Lumley, J., Oliver, S.S., Chamberlain, C., and Oakley, L. 2005. Interventions for promoting smoking cessation during pregnancy (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.

- Ma, G.X., Shive, S., and Tracy, M. 2001. The effects of licensing and inspection enforcement to reduce tobacco sales to minors in Greater Philadelphia, 1994-1998. *Addictive Behaviors* 26:677-687.
- MacCallum, J., and Beltman, S. 2002. *Role models for young people: What makes an effective role model program?* Tasmania: Australian Clearinghouse for Youth Studies. Retrieved January 2006, from [http://www.facs.gov.au/internet/facsinternet.nsf/VIA/youthpubs/\\$File/rolemodels.pdf](http://www.facs.gov.au/internet/facsinternet.nsf/VIA/youthpubs/$File/rolemodels.pdf).
- Martin, P. 2002. Les médicaments utilisés comme traitement antitabagique: Période du 1er octobre 2000 au 31 janvier 2002. Québec: Régie de l'assurance maladie du Québec.
- Marsh, A., and McKay, S. 1994. *Poor smokers*. London: Policy Studies Institute.
- McAlister, A.L., Rabiou, V., Geiger, A., Glynn, T.J., Huang, P., and Todd, R. 2004. Telephone assistance for smoking cessation: One year Cost-Effectiveness estimations. *Tobacco Control* 13:85-86.
- McGee, R., Williams, S., and Reeder, A. 2006. Parental tobacco smoking behaviour and their children's smoking and cessation in adulthood. *Addiction* 101:1193-1201.
- McLachlan, H.V. 2002. Tobacco, taxation, and fairness. *Journal of Medical Ethics* 28:381-383.
- Merrill, R., Stanford, J., Lindsay, G., and Neiger, B. 2000. The relationship of perceived age and sales of tobacco and alcohol to underage customers. *Journal of Community Health* 25:401-410.
- Miller, N., Frieden, T.R., Liu, S.Y., Matte, T.D., Mostashari, F., Deitcher, D.R., Cummings, K.M., Chang, C., Bauer, U., and Bassett, M.T. 2005. Effectiveness of a large-scale distribution programme of free nicotine patches: A prospective evaluation. *Lancet* 365:1849-1854.
- Ministerial Council on Drug Strategy. 2004. *National tobacco strategy, 2004-2009: The Strategy*. Canberra: Author.
- Ministry of Health 2005. *Quitnow: A path for helping tobacco users in British Columbia*. Victoria, BC: Author.
- Moher, M., Hey, K., and Lancaster, T. 2005. Workplace interventions for smoking cessation (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Moller, A., and Villebro, N. 2005. Interventions for pre-operative smoking cessation (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Molyneux, A. 2004. Nicotine replacement therapy. *British Medical Journal* 328:454-456.
- Moore, M.J., and Werch, C.E. 2005. Sport and physical activity participation and substance use among adolescents. *Journal of Adolescent Health* 36:486-493.

- Mudarri, D.H. 1994. *The costs and benefits of smoking restrictions: An assessment of the Smoke-Free Environment Act of 1993 (H.R. 3434)*. Washington, DC: US Environmental Protection Agency.
- Mudde, A.N., and De Vries, H. 1999. The reach and effectiveness of a national mass media-led smoking cessation campaign in the Netherlands. *American Journal of Public Health* 89:346-350.
- National Association of Pharmacy Regulatory Authorities. 2005. *Sale of tobacco through pharmacies*. Accessed November 1, 2006. Available at: <http://www.napra.org/docs/0/97/195/743.asp>.
- NRC+Picker Group Canada 2004. *Smoke free homes pre and post campaign survey: Final report*. Markham, ON: Author.
- Niederhofer, H., and Huber, M. 2004. Bupropion may support psychosocial treatment of nicotine-dependent adolescents: Preliminary results. *Pharmacotherapy* 24:1524-1528.
- Obermayer, J.L., Riley, W.T., Asif, O., and Jean-Mary, J. 2004. College smoking-cessation using cell phone text messaging. *Journal of American College Health* 53:71-78.
- O'Connell, M.L., Freeman, M., Jennings, G., Chan, W., Greci, L.S., Manta, I.D., and Katz, D.L. 2004. Smoking cessation for high school students: Impact evaluation of a novel program. *Behavior Modification* 28:133-146.
- Ong, M.K., and Glantz, S.A. 2005. Free nicotine replacement therapy programs vs implementing smoke-free workplaces: A cost-effectiveness comparison. *American Journal of Public Health* 95:969-975.
- Paglia, A., and Room, R. 1999. Preventing substance use problems among youth: A literature review and recommendations. *Journal of Primary Prevention* 20:3-50.
- Park, E.-W., Schultz, J.K., Tudiver, F., Campbell, T., and Becker, L. 2005. Enhancing partner support to improve smoking cessation (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Parrott, S., Godfrey, C., Raw, M., West, R., and McNeill, A. 1998. Guidance for commissioners on the Cost-Effectiveness of smoking cessation interventions. *Thorax* 53:2-37.
- Payne, W., Reynolds, M., Brown, S., and Fleming, A. 2002. Sports role models and their impact on participation in physical activity: A literature review. Retrieved January 2006, from http://www.ausport.gov.au/fulltext/2002/vic/Role_Model.pdf.
- Pechmann, C., and Reibling, E.T. 2000. Anti-smoking advertising campaigns targeting youth: Case studies from USA and Canada. *Tobacco Control* 9(Supp. 2):ii18-ii31.
- Pentz, M.A., Sussman, S., and Newman, T. 1997. The conflict between least harm and no-use tobacco policy for youth: Ethical and policy implications. *Addiction* 92:1165-1173.

- Peretti-Watel, P. 2004. Pricing policy and some other predictors of smoking behaviours: An analysis of French retrospective data. *International Journal of Drug Policy* 16:19-26.
- Peretti-Watel, P., Beck, F., and Legleye, S. 2002. Beyond the U-curve: The relationship between sport and alcohol, cigarette and cannabis use in adolescents. *Addiction* 97:707-716.
- Physicians for a Smoke-Free Canada. 2005. *Tobacco company payments to retailers for cigarette promotions increase by 50%: Doctors call for an end to retail-promotions of cigarettes*. Retrieved November 22, 2006, from http://www.smoke-free.ca/eng_home/news_press_jan17_2005_retail_promotion.htm.
- Pierce, J.P., and Gilpin, E.A. 2002. Impact of over-the-counter sales on effectiveness of pharmaceutical aids for smoking cessation. *Journal of the American Medical Association* 288:1260-1264.
- Pierce, J.P., and Gilpin, E.A. 2004. How did the Master Settlement Agreement change tobacco industry expenditures for cigarette advertising and promotions? *Health Promotion Practice* 5 (Suppl. 3):84S-90S.
- Pizacani, B.A., Martin, D.P., Stark, M.J., Koepsell, T.D., Thompson, B., and Diehr, P. 2004. A prospective study of household smoking bans and subsequent cessation related behaviour: The role of stage of change. *Tobacco Control* 13:23-28.
- Platt, S., Tannahill, A., Watson, J., and Fraser, E. 1997. Effectiveness of antismoking telephone helpline: Follow up survey. *British Medical Journal* 314:1371-1375.
- Pokorny, S.B., Jason, L.A., and Schoeny, M.E. 2003. The relation of retail tobacco availability to initiation and continued smoking. *Journal of Clinical Child and Adolescent Psychology* 32:193-204.
- Proescholdbell, R.J., Chassin, L., and MacKinnon, D.P. 2000. Home smoking restrictions and adolescent smoking. *Nicotine and Tobacco Research* 2:159-167.
- Prout, M., Martinez, O., Ballas, J., Geller, A., Lash, T., Brooks, D., and Heeren, T. 2002. Who uses the smoker's quitline in Massachusetts? *Tobacco Control* 11(Suppl. II):ii74-ii75.
- Rabius, V., McAlister, A.L., Geiger, A., Huang, P., and Todd, R. 2004. Telephone counseling increases cessation rates among young adult smokers. *Health Psychology* 23:539-541.
- Ramsay, J., and Hoffmann, A. 2004. Smoking cessation and relapse prevention among undergraduate students: A pilot demonstration project. *Journal of American College Health* 53:11-18.
- Ranson, K., Jha, P., Chaloupka, F.J., and Nguyen, S. 2000. The effectiveness and cost-effectiveness of price increases and other tobacco-control policies. In *Tobacco Control in Developing Countries*, edited by P. Jha, and F. Chaloupka. Oxford: Oxford University Press.

- Rehm, J., Baliunas, D., Brochu, S., Fischer, B., Gnam, W., Patra, J., Popova, S., Sarnocinska-Hart, A., and Taylor, B. 2006. *The costs of substance abuse in Canada 2002*. Ottawa, ON: Canadian Centre on Substance Abuse.
- Reid, D. 1999. Failure of an intervention to stop teenagers smoking. *British Medical Journal* 319:934-935.
- Reid, R.D., Pipe, A., and Dafoe, W.A. 1999. Is telephone counselling a useful addition to physician advice and nicotine replacement therapy in helping patients to stop smoking? A randomized controlled trial. *Canadian Medical Association Journal* 160:1577-1581.
- Reinert, B., Campbell, C., Carver, V., and Range, L.M. 2003. Joys and tribulations of faith-based youth tobacco use prevention: A case study in Mississippi. *Health Promotion Practice* 4 (3):228-235.
- Ringen, K., Anderson, N., McAfee, T., Zbikowski, S.M., and Fales, D. 2002. Smoking cessation in a blue-collar population: Results from an evidence-based pilot program. *American Journal of Industrial Medicine* 42:367-377.
- Rivara, F.P., Ebel, B.E., Garrison, M.M., Christakis, D.A., Wiehe, S.E., and Levy, D.T. 2004. Prevention of smoking-related deaths in the United States. *American Journal of Preventive Medicine* 27 (2):118-125.
- Rodgers, A., Corbett, T., Bramley, D., Riddell, T., Wills, M., Lin, R.-B., and Jones, M. 2005. Do u smoke after txt? Results of a randomised trial of smoking cessation using mobile phone text messaging. *Tobacco Control* 14:255-261.
- Ross, H., and Chaloupka, F. 2004. The effect of public policies and prices on youth smoking. *Southern Economic Journal* 70:796-815.
- Ruel, E., Mani, N., Sandoval, A., Terry-McElrath, Y., Slater, S.J., Tworek, C., and Chaloupka, F.J. 2004. After the Master Settlement Agreement: Trends in the American tobacco retail environment from 1999 to 2002. *Health Promotion Practice* 5 (Suppl. 3):99S-110S.
- Sargent, R.P., Shepard, R.M., and Glantz, S.A. 2004. Reduced incidence of admissions for myocardial infarction associated with public smoking ban: Before and after study. *British Medical Journal* 328:977-980.
- Schinke, S.P., Tepavac, L., and Cole, K.C. 2000. Preventing substance use among Native American youth: Three-year results. *Addictive Behaviors* 25 (3):387-397.
- Schooler, C., Feighery, E., and Flora, J.A. 1996. Seventh graders' self-reported exposure to cigarette marketing and its relationship to their smoking behavior. *American Journal of Public Health* 86 (9):1216-1221.
- Scollo, M., Lal, A., Hyland, A., and Glantz, S. 2003. Review of the quality of studies on the economic effects of smoke-free policies on the hospitality industry. *Tobacco Control* 12:13-20.

- Secker-Walker, R.H., Gnich, W., Platt, S., and Lancaster, T. 2002. Community interventions for reducing smoking among adults (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Seo, D.-C. 2005. Correlates of attitudes toward a smoking ban in vehicles. *Journal of Public Health Management and Practice* 11:346-350.
- Sepe, E., and Glantz, S.A. 2002. Bar and club tobacco promotions in the alternative press: Targeting young adults. *American Journal of Public Health* 92:75-78.
- Sepe, E., Ling, P.M., and Glantz, S.A. 2002. Smooth moves: Bar and nightclub tobacco promotions that target young adults. *American Journal of Public Health* 92:414-419.
- Serra, C., Cabezas, C., Bonfill, X., and Pladevall-Vila, M. 2005. Interventions for preventing tobacco smoking in public places (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Share, M., Quinn, M., and Ryan, C. 2005. Evaluation of a 5-year school-based county-wide smoking education programme. *Irish Medical Journal* 9.
- Shibuya, K., Ciecierski, C., Guindon, E., Bettcher, D.W., Evans, D.B., and Murray, C.J.L. 2003. WHO framework convention on tobacco control: Development of an evidence based global public health policy. *British Medical Journal* 327:154-157.
- Shiffman, S. 2005. Nicotine lozenge efficacy in light smokers. *Drug and Alcohol Dependence* 77:311-314.
- Shiffman, S., DiMarino, M.E., and Sweeney, C.T. 2005. Characteristics of selectors of nicotine replacement therapy. *Tobacco Control* 14:346-355.
- Siegel, M., and Biener, L. 2000. The impact of an antismoking media campaign on progression to established smoking: Results of a longitudinal youth study. *American Journal of Public Health* 90:380-386.
- Siegel, M., Biener, L., and Rigotti, N.A. 1999. The effect of local tobacco sales laws on adolescent smoking initiation. *Preventive Medicine* 29:334-342.
- Sinclair, H.K., Bond, C.M., and Stead, L.F. 2005. Community pharmacy personnel interventions for smoking cessation (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Skara, S., and Sussman, S. 2003. A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. *Preventive Medicine* 37:451-474.
- Skeer, M., George, S., Hamilton, W.L., Cheng, D.M., and Siegel, M. 2004. Town-level characteristics and smoking policy adoption in Massachusetts: Are local restaurant smoking regulations fostering disparities in health protection? *American Journal of Public Health* 94:286-292.

- Slater, S., Chaloupka, F.J., and Wakefield, M. 2001. State variation in retail promotions and advertising for Marlboro cigarettes. *Tobacco Control* 10:337-339.
- Smith, P.M., Cameron, R., McDonald, P.W., Kawash, B., Madill, C., and Brown, K.S. 2004. Telephone counseling for population-based smoking cessation. *American Journal of Health Behavior* 28:231-241.
- Smoke-Free Nova Scotia. n.d. *Banning point of sale tobacco advertising in Nova Scotia. Questions and answers*. Retrieved November 2006, from <http://www.smokefreens.ca/documents/QandA.pdf>.
- Snell, C., and Bailey, L. 2005. Operation Storefront: Observations of tobacco retailer advertising and compliance with tobacco laws. *Youth Violence and Juvenile Justice* 3 (1):78-90.
- Solberg, L.I., Maciosek, M.V., Edwards, N.M., Khanchandani, H.S., and Goodman, M.J. 2006. Repeated tobacco-use screening and intervention in clinical practice: Health impact and Cost-Effectiveness. *American Journal of Preventive Medicine* 31:62-71.
- Sowden, A., Arblaster, L., and Stead, L. 2003. Community interventions for preventing smoking in young people (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Stead, L., and Lancaster, T. 2004. Interventions for preventing tobacco sales to minors (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Stead, L., and Lancaster, T. 2005a. Group behaviour therapy programmes for smoking cessation (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Stead, L., and Lancaster, T. 2005b. Interventions for preventing tobacco sales to minors (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Stead, L., Lancaster, T., and Perera, R. 2005. Telephone counselling for smoking cessation (Cochrane Review). *The Cochrane Library*. Oxford: Update Software.
- Stein, R.J., Haddock, C.K., O'Bryne, K.K., Hymowitz, N., and Schwab, J. 2000. The pediatrician's role in reducing tobacco exposure in children. *Pediatrics* 106:66-82.
- Steinberg, M.L., Williams, J.M., and Ziedonis, D.M. 2004. Financial implications of cigarette smoking among individuals with schizophrenia. *Tobacco Control* 13 (2):206.
- Stephens, T., Kaiserman, M.J., McCall, D.J., and Sutherland-Brown, C. 2000. School-based smoking prevention: Economic costs versus benefits. *Chronic Diseases in Canada* 21:62-67.
- Stephens, T., Pederson, L.L., Koval, J.J., and Macnab, J. 2001. Comprehensive tobacco control policies and the smoking behaviour of Canadian adults. *Tobacco Control* 10:317-322.
- Stephenson, M.T., Quick, B.L., Atkinson, J., and Tschida, D.A. 2005. Authoritative parenting and drug-prevention practices: Implications for antidrug ads for parents. *Health Communication* 17:301-321.

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- Stoddard, A., Fagan, P., Sorensen, G., Hunt, M.K., Frazier, L., and Girod, K. 2005. Reducing cigarette smoking among working adolescents: Results from the SMART study. *Cancer Causes and Control* 16:1159-1164.
- Strecher, V.J., Shiffman, S., and West, R. 2005. Randomized controlled trial of a web-based computer-tailored smoking cessation program as a supplement to nicotine patch therapy. *Addiction* 100:682-688.
- Sung, H.-Y., Hu, T., Ong, M., Keeler, T.E., and Sheu, M. 2005. A major state tobacco tax increase, the master settlement agreement, and cigarette consumption: The California experience. *American Journal of Public Health* 95:1030-1035.
- Swisher, J.K., Scherer, J., and Yin, R.K. 2004. Cost-benefit estimates in prevention research. *Journal of Primary Prevention* 25:137-148.
- Szabo, E., White, V., and Hayman, J. 2006. Can home smoking restrictions influence adolescents' smoking behaviors if their parents and friends smoke? *Addictive Behaviors* (In press).
- Tengs, T.O., Osgood, N.D., and Chen, L.L. 2001. The cost-effectiveness of intensive national school-based anti-tobacco education: Results from the Tobacco Policy Model. *Preventive Medicine* 33:558-570.
- Thomson, G., Wilson, N., and Howden-Chapman, P. 2006. Population level policy options for increasing the prevalence of smokefree homes. *Journal of Epidemiology and Community Health* 60:298-304.
- Tilson, M. 2004. *Restrictions on the retail display of tobacco products: Policy analysis*. Lower Sackville, NS: Smoke-Free Nova Scotia.
- Timperio, A., Jalleh, G., Clarkson, J., Donovan, R., and Giles-Corti, B. 2001. *Observational audits of healthway sponsored events: Preliminary results*. Perth: Health Promotion Evaluation Unit, Department of Public Health, University of Western Australia.
- Tingen, M.S., Waller, J.L., Smith, T.M., Baker, R.R., Reyes, J., and Treiber, F.A. 2006. Tobacco prevention in children and cessation in family members. *Journal of the American Academy of Nurse Practitioners* 18:169-179.
- Tomar, S.L. 2001. Dentistry's role in tobacco control. *Journal of the American Dental Association* 132:30S-35S.
- Tomson, T., Helgason, A.R., and Gilljam, H. 2004. Quitline in smoking cessation: A cost-effectiveness analysis. *International Journal of Technology Assessment in Health Care* 20:469-474.
- United States Department of Health and Human Services 2000. *Reducing tobacco use: A report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

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Healthy Living – Tobacco Control

- United States Preventive Services Task Force 1996. *Guide to clinical preventive services*. Atlanta, GA: Author.
- Upadhyaya, H., Deas, D., and Brady, K. 2005. A practical clinical approach to treatment of nicotine dependence in adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry* 44:942-946.
- Velleman, R.D.B., Templeton, L.J., and Copello, A.G. 2005. The role of the family in preventing and intervening with substance use and misuse: A comprehensive review of family interventions, with a focus on young people. *Drug and Alcohol Review* 24:93-109.
- Verheijden, M.W., and Kok, F.J. 2005. Public health impact of community-based nutrition and lifestyle interventions. *European Journal of Clinical Nutrition* 59 (Suppl. 1):S66-S76.
- VicHealth. 2003. *Tobacco control: A blue chip investment in public health – Overview document*. Melbourne: Author.
- Vickers, K.S., Thomas, J.L., Patten, C.A., and Mrazek, D.A. 2002. Prevention of tobacco use in adolescents: Review of current findings and implications for health care providers. *Current Opinion in Pediatrics* 14:708-712.
- Voorhees, C.C., Yanek, L.R., Stillman, F.A., and Becker, D.M. 1998. Reducing cigarette sales to minors in an urban setting: Issues and opportunities for merchant intervention. *American Journal of Preventive Medicine* 14 (2):138-142.
- Wagner, E.F., Tubman, J.G., and Gil, A.G. 2004. Implementing school-based substance abuse interventions: Methodological dilemmas and recommended solutions. *Addiction* 99 (Suppl. 2):106-119.
- Wakefield, M., Chaloupka, F.J., Kaufman, N.J., Orleans, C.T., Barker, D.C., and Ruel, E.E. 2000. Effect of restrictions on smoking at home, at school, and in public places on teenage smoking: Cross sectional study. *British Medical Journal* 321:333-337.
- Wakefield, M., Flay, B., Nichter, M., and Giovino, G. 2003. Effects of anti-smoking advertising on youth smoking: A review. *Journal of Health Communication* 8:229-247.
- Wakefield, M., Germain, D., Durkin, S., and Henriksen, L. 2006. An experimental study of effects on schoolchildren of exposure to point-of-sale cigarette advertising and pack displays. *Health Education Research* 21 (3):338-347.
- Wakefield, M., and Giovino, G. 2003. Teen penalties for tobacco possession, use, and purchase: Evidence and issues. *Tobacco Control* 12 (Suppl. 1):i6-i13.
- Wakefield, M., Ruel, E.E., Chaloupka, F.J., Slater, S.J., and Kaufman, N.J. 2001. *Association of point of purchase tobacco advertising and promotions with choice of usual brand among teenage smokers*. Chicago: ImpactTeen.
- Wakefield, M., Terry-McElrath, Y.M., Chaloupka, F.J., Barker, D.C., Slater, S.J., Clark, P.I., and Giovino, G.A. 2002. Tobacco industry marketing at point of purchase after the 1998 MSA billboard advertising ban. *American Journal of Public Health* 92 (6):937-940.

- Walsh, P.M., Carrillo, P., Flores, G., Masuet, C., Morchon, S., and Ramon, J.M. 2006. Effects of partner smoking status and gender on long term abstinence rates of patients receiving smoking cessation treatment. *Addictive Behaviors* (In press).
- Warner, K.E. 1997. Cost-Effectiveness of smoking-cessation therapies. Interpretation of the evidence and implications for coverage. *Pharmacoeconomics* 11:538-549.
- West, R., McNeill, A., and Raw, M. 2000. Smoking cessation guidelines for health professionals: An update. *Thorax* 55:987-999.
- Wewers, M.E., and Uno, M. 2002. Clinical interventions and smoking ban methods to reduce infants' and children's exposure to environmental tobacco smoke. *Journal of Obstetric, Gynecologic, and Neonatal Nursing* 31:592-598.
- White, V., Tan, N., Wakefield, M., and Hill, D. 2003. Do adult focused anti-smoking campaigns have an impact on adolescents? The case of the Australian National Tobacco Campaign. *Tobacco Control* 12 (Supp. 2):23-29.
- Wiehe, S.E., Garrison, M.M., Christakis, D.A., Ebel, B.E., and Rivara, F.P. 2005. A systematic review of school-based smoking prevention trials with long-term follow-up. *Journal of Adolescent Health* 36:162-169.
- Wilson, D.M., Taylor, D.W., Gilbert, J.R., Best, J.A., Lindsay, E.A., Willms, D.G., and Singer, J. 1988. A randomized trial of a family physician intervention for smoking cessation. *Journal of the American Medical Association* 260:1570-1574.
- Wilson, N., and Thomson, G. 2000. *The impact on Maori and low-income families/Whanau of tobacco tax increases: A brief review. Report to Apararangi Tautoko Auahi Kore and the Smokefree Coalition.* Wellington: National Drug Policy New Zealand.
- Wilson, N., and Thomson, G. 2005. Tobacco taxation and public health: Ethical problems, policy responses. *Social Science and Medicine* 61:649-659.
- Wilson, N., Thomson, G., Tobias, M., and Blakely, T. 2004. How much downside? Quantifying the relative harm from tobacco taxation. *Journal of Epidemiology and Community Health* 58:451-454.
- Wiltshire, S., Bancroft, A., Amos, A., and Parry, O. 2001. "They're doing people a service"-- Qualitative study of smoking, smuggling, and social deprivation. *British Medical Journal* 323:203-207.
- Winett, R.A., Anderson, E.S., Whiteley, J.A., Wojcik, J.R., Rovniak, L.S., Graves, K.D., and Galper, D.I. 1999. Church-based health behavior programs: Using social cognitive theory to formulate interventions for at-risk populations. *Applied and Preventive Psychology* 8:129-142.
- Woodruff, S.I., Agro, A.D., Wildey, M.B., and Conway, T.L. 1995. Point-of-purchase tobacco advertising: Prevalence, correlates, and brief intervention. *Health Values: The Journal of Health Behavior, Education and Promotion* 19 (5):56-62.

- World Bank 1999. *Curbing the epidemic: Governments and the economics of tobacco control*. Washington, DC: Author.
- World Health Organization 2002. *The world health report 2002: Reducing risks, promoting healthy life*. Geneva: Author.
- World Health Organization 2004. *WHO European strategy for smoking cessation policy*. Copenhagen: Author.
- Woolacott, N.F., Jones, L., Forbes, C.A., Mather, L.C., Sowden, A., Song, F.J., Raftery, J.P., Aveyard, P., Hyde, C.J., and Barton, P.M. 2002. The clinical effectiveness and cost-effectiveness of bupropion and nicotine replacement therapy for smoking cessation: A systematic review and economic evaluation. *Health Technology Assessment* 6:1-89.
- Woollery, T., Asma, S., and Sharp, D. 2000. Clean indoor-air laws and youth access restrictions. In *Tobacco Control in Developing Countries* (pp. 237-272), edited by P. Jha, and F. Chaloupka. Oxford: Oxford University Press.
- Wyman, J., Price, J., Jordan, T., Dake, J.A., and Telljohann, S.K. 2006. Parents' perceptions of the role of schools in tobacco use prevention and cessation for youth. *Journal of Community Health* 31:225-248.
- Yiow, L. 2005. Australia: campaign gets smoking parents to cut down. *Tobacco Control* 14:363.
- Zhu, S.-H., Anderson, C.M., Johnson, C.E., Tedeschi, G., and Roeseler, A. 2000. A centralised telephone service for tobacco cessation: The California experience. *Tobacco Control* 9 (Suppl. 2):ii48-ii55.
- Zhu, S.-H., Anderson, C.M., Tedeschi, G.J., Rosbrook, B., Johnson, C.E., Byrd, M., and Gutierrez-Terrell, E. 2002. Evidence of real-world effectiveness of a telephone quitline for smokers. *New England Journal of Medicine* 347:1087-1093.