Non-Smokers' Rights Association
Smoking and Health Action Foundation

October 2006

Appearing soon in a place near you: Health impacts of comprehensive smoke-free legislation

The main reason smoking bans are put in place is to protect non-smokers, especially workers, from the hazards of second-hand smoke (SHS). Studies have shown that employees in the hospitality industry are exposed to some of the highest levels of SHS measured in workplaces, making them more likely to develop lung cancer, cardiovascular disease and other health problems.[1,2,3] Evidence gathered from hospitality industry employees demonstrates how the creation of completely smoke-free environments can successfully prevent or rapidly reverse adverse health symptoms developed as a result of exposure to SHS. Smoking bans are also having positive impacts on the health of smokers. This document provides an up-to-date overview of health benefits observed following implementation of recent country-wide comprehensive smoking bans and includes some data from other large jurisdictions.

Key Findings

Prevention of odour annoyance, as well as eye, nose and throat irritation

- A study from Norway found that bar and restaurant workers experienced substantial improvements in air quality, especially in terms of odour, once 100% smoke-free legislation took effect.
- In Ireland and Norway's restaurant and bar workers, complaints of itchy eyes, runny nose, scratchy throat and other similar symptoms decreased dramatically once smoking bans came into effect. Throat and eye symptoms improve the most, with major improvements occurring within the first few months of bans. The incidence of itchy or watery eyes diminishes by as much as 50%.

Reduction of breathing problems

- Both smoking and non-smoking hospitality industry employees experienced measurable improvements in breathing problems such as coughing and phlegm production, shortly after bans in Ireland, Norway, New York and California were implemented.
- In Norway, even patrons reported fewer breathing problems.

Increased wellbeing and job satisfaction

- Employees report improved quality of life and job satisfaction when workplace sensory irritants and chronic odour annoyance are removed from the workplace, say the latest report by the U.S. Surgeon General on SHS and studies from Norway.

Probability of fewer fatal heart attacks

- Substantial declines in the incidence of heart attacks were observed following smoking bans in two American towns of Helena, Montana and Pueblo, Colorado. Though such results are consistent with clinical research, they need to be interpreted with caution due to sample size. According to experts from the Centers for Disease Control, such studies suggest that comprehensive smoke-free legislation has immediate effects on the overall incidence of heart attacks and reduces them by at least 10%.

Motivation of smokers to quit and not relapse

- Results of studies following the implementation of comprehensive smoke-free legislation in New Zealand, Sweden, Scotland, Norway and Ireland confirm that bans motivate smokers to quit.
- Current and former smokers say smoking bans in social venues create conditions which prevent relapse.
- Surveys of current and former smokers in New Zealand and Sweden report that comprehensive smoking bans help smokers who failed to quit successfully to repeat attempts to quit.

Reduction of tobacco consumption

- Smoking bans prevent the development of occasional "social" smoking, which often leads to daily smoking.
- Faced with fewer opportunities to smoke, smokers' consumption of tobacco is reduced. It is reasonable to suggest that that this creates less-addicted smokers, which then increases their chances of quitting successfully.
- Small inroads in cessation, such as an increased rate in successful quitting and a continued desire to renew quitting attempts are likely to produce a meaningful benefit to population health, including reduced lung cancer rates.
- Smokers who reduce the number of cigarettes smoked per day see improvements in various health symptoms.
- The more there are easy and comfortable areas where smoking is permitted, the less smoking bans reduce tobacco consumption.

Reduction of smoking in the home

- Smoking bans in workplaces and public places increase awareness of the harms of SHS, which leads to more people making their homes and cars smoke-free environment.
- Indirectly, smoking bans reduce children's exposure to SHS, which occurs primarily in the home and car.

Deterrent against youth smoking and reduction of socially cued smoking

- Youths in jurisdictions with smoking bans which extend to restaurants have a more accurate perception of smoking prevalence, and this makes them less likely to start smoking.
- Smoking bans make smoking less socially acceptable, which encourages smokers to quit and dissuades youth from ever starting.

1. Why should we document benefits?

Country-wide comprehensive smoke-free legislation is a relatively new phenomenon that is sweeping the globe.[i] Few observational studies have looked to objectively quantify the immediate health impacts generated by such measures, which unfortunately, can sometimes serves as an argument against implementing them rapidly. Given ongoing tobacco industry pressure for partial bans, health authorities need to re-iterate health benefits associated with comprehensive smoking bans.

2. What are we looking for?

Generally speaking, published results from other countries confirm the immediate health benefits smoking bans were expected to provide, and also show promising signs of long-term impacts. As SHS induced lung cancer can be diagnosed many years after exposure occurred, any substantial decrease in lung cancer rates among non-smokers or smokers who smoke less or quit altogether may take several years before becoming noticeable.[4] Hence, first assessments of health impacts from bans detect mostly sensory and respiratory symptoms, as well as changes in smoking patterns.

Ireland and Norway appear to be monitoring closely the impacts of their smoking restrictions, with some results already being published and other studies underway. Substantial evidence is also available on the health impacts of smoke-free policies in New York and California. Main findings from case studies and national preliminary reports are documented below.

[i] As of June 2006, Bermuda, Buhtan, Iceland, Ireland, Norway, Malta, New Zealand, Uruguay, Scotland, several Canadian provinces (Manitoba, New Brunswick, Newfoundland, North West Territories, Nunavut, Ontario, Prince Edward Island and Quebec) and American states (California, Colorado, Connecticut, Delaware, Maine, Massachusetts, New Jersey, New York, Rhode Island, Vermont and Washington) have comprehensive smoke-free legislation

3. Initial improvements in health status

(i) *Alleviation of sensory symptoms*— SHS is a principal source of indoor contamination and is usually responsible for most complaints about air quality, especially odour.[5] Prolonged or intense exposure to SHS commonly lead to sensory irritation symptoms such as soreness or itching of the throat, eyes and runny nose.[6]

With the exception of uncovered patio areas, Norway's bars and restaurants became smoke-free in June 2004. Despite smoking being restricted in some areas prior to the smoking ban, virtually every second employee (44%) in the hospitality industry reported being bothered by SHS.[7] One year into the ban, that number dropped to 6%.[4] More specifically, 57% of employees claimed their working conditions had improved as a result of fewer air quality problems such as dry air, odours and mustiness.[8] The percentage of employees who reported throat hoarseness decreased slightly, while complaints pertaining to irritated eyes dropped from 20% to 7%.[9]

Ireland implemented its comprehensive smoke-free legislation in April 2004. Employees reported significantly fewer sensory symptoms, in particular, less frequent red/irritated eyes (66%) and sore/scratchy throat (42%).[10] In the 12 months after New York State's hospitality workplaces (except casinos) became smoke-free, the proportion of non-smoking hospitality workers experiencing any one sensory symptom decreased by 57%. More specifically, the proportion of individuals reporting irritated eyes dropped by 63%, runny nose/sneezing symptoms by 78% and a sore/scratchy throat by 83%.[11]

Similarly, one month after California's bars and other hospitality venues were required to go smoke-free, 78% of bartenders with prior sensory irritation symptoms (red/teary eye, runny/irritated nose or sneezing and sore/scratchy throat) reported no such symptoms with the ban in place.[12] In Lexington, Kentucky, restaurant/bar workers even reported fewer colds and sinus infections after the smoking ban, revealed a small-scale study.[13]

(ii) *Effective reduction of the incidence of upper respiratory symptoms*— Hospitality industry workers subjected to chronic SHS exposure often complain of upper respiratory symptoms including morning cough, daytime cough and coughing up phlegm.[6,14] While such symptoms may not be life-threatening, they often require treatment, medication and cause unnecessary discomfort.[15] Several of these are early signs of more debilitating conditions such as chronic obstructive pulmonary disease (COPD)[16] Recent comprehensive smoking bans are preventing the occurrence of respiratory problems, which according to research reviewed by Norwegian scientists increase the likelihood of hospitalization, disability and mortality.[17]

Five months after bars in Norway became smoke-free (2004), non-smoking and former smoking workers reported a significant decrease in morning cough, daytime cough and coughing up of phlegm.[4] Non-smokers also reported fewer symptoms of dyspnoea (shortness of breath). Taking into account all employees regardless of smoking status (non-smokers, former smokers and current smokers), the prevalence of having any symptom decreased from 41 to 34%. Both persistent smokers and non-smokers reported improvements in respiratory health, indicating a positive effect on health regardless of personal smoking status.[4]

Non-smoking bar workers in Ireland also experienced a decrease of 25% in respiratory symptoms once the smoking ban was implemented. Workers reported a significant reduction in phlegm production and coughing during the day.[11]

According to the Swedish Network for Tobacco Prevention, the frequency of respiratory (wheezing, shortness of breath, coughing, excess mucus) and sensory symptoms (irritation of the eyes, nose or throat) among hospitality industry workers was reduced by half in the twelve months after Sweden implemented smoke-free legislation.[18] Initial reports suggest that the reduction of symptoms was larger among smoking employees. Sweden's legislation allows for smoking in designated rooms (DSRs). Though few establishments have built such spaces, benefits to non-smokers would be expected to be less important than those observed in jurisdictions with a complete ban, with no provision for DSRs.

The state-wide smoking ban in New York led to a marginal decline in the incidence of self-reported coughing in the morning, but had no significant effect on other symptoms such as wheezing and the production of phlegm.[19] The small sample size of the study may explain the lack of documented improvements to respiratory health among hospitality workers.

Even though most studies monitoring respiratory symptoms have relied on self-reported observations, measured empirical observations have come to similar conclusions. In a study on 53 bartenders' health pre- and post smoking ban in San Francisco, 59% of bar workers with symptoms of respiratory problems reported no such symptoms, and had measurably improved lung capacity in the weeks after the legislation came into force.[12] Similarly, respiratory measurement for bar workers in Ireland significantly improved among non-smokers and ex-smokers once the ban came into force.[20]

(iii) *Immediate reduction in the incidence in fatal heart attacks*— Despite the substantial clinical and experimental evidence showing the effects of SHS exposure on cardiovascular health, the magnitude of the protective effects that smoking bans have had on heart disease mortality, and

the speed with which these effect occur are still provoking much debate. Heart disease is a major cause of death in the western world, and low levels of exposure to SHS measurably increase the risk of coronary heart disease in non-smokers.[21] Hence, the slightest protective effect generated by comprehensive smoke-free measures has the potential of reaching a large segment of the population and can save many lives.[22]

Assuming non-smokers exposed to SHS are 25% more likely to suffer a fatal heart attack than non-exposed non-smokers, a Stanford University study projected that a nation-wide policy making all remaining US workplaces smoke-free (including hospitality and gaming venues) would prevent close to 500 fatal heart attacks the first year, and slightly fewer in the years that followed.[23] Non-smokers would account for 60% of the benefits and ex-smokers 40%, meaning that the first year approximately 300 non-smokers and 200 ex-smokers would be spared a fatal heart attack.

Recent small scale studies in the American cities of Helena, Montana and Pueblo, Colorado — which need to be interpreted with caution — suggest that the implementation of comprehensive smoking bans significantly reduce the number of hospital admissions for acute myocardial infarctions (heart attacks). These studies conclude that smoking bans produced a 40% (Helena, Montana)[24] and 27% (Pueblo, Colorado)[25] drop in heart attack rates. To compensate for the uncertainty created by the small sample and design of such studies, experts from the Centers for Disease Control recommend using more modest estimates: a 10-15% reduction instead of the 27-40% reported.[22] What these studies are suggesting is that SHS triggers far more fatal heart attacks than originally thought.

Implications for Canada

According to Health Canada's 2005 survey, 6% of Canadians report no restriction on smoking in their workplace, and only 51% of workers say their workplace is 100% smoke-free.[26] British Columbia, Alberta, Saskatchewan, Newfoundland, Prince Edward Island, Yukon and the federal government have failed to completely eliminate SHS from significant categories of workplaces under their jurisdiction.

The Stanford University model and the analysis by the CDC's experts of the Helena and Pueblo studies, make it possible to calculate an upper bound and lower bound estimate of fatal heart attacks that could be prevented if smoke-free workplace measures were strengthened, generally through the removal of designated smoking rooms (DSRs).

Comprehensive smoking bans impact heart attack rate by reducing non-smoker's exposure to SHS, and by encouraging smokers to quit, which thus diminishes their risks of having a fatal heart attack. In 2003, more than 18,000 Canadians suffered a fatal acute myocardial infarction (heart attack).[27]

If SHS triggers more fatal heart attacks than previously thought — as suggested by the studies in Helena and Pueblo — an upper bound estimate is calculated using the recommendation by CDC experts, to the effect that comprehensive smoking bans would prevent 10% of the 18,000 heart attacks in Canada, saving 1,800 lives. Assuming Canada's workplace exposure is no worse than that in Helena and Pueblo without the ban, then up to 1,800 Canadians could be spared a fatal heart attack. This is based on the plausible but untested assumption that a 10% reduction in *hospital admissions* for acute myocardial infarction translates into a 10% reduction in *deaths* from such infarctions

Based on relative risk data for fatal heart attacks, the Stanford model predicts more conservative estimates than those observed in Helena and Pueblo. Assuming the relative risk for fatal heart attack among current, former and non-smokers is accurate — as accounted for in the Stanford University scenario — and that Canada's population is approximately 1/10 that of the United States, then a corresponding 10% of the 500 U.S. lives would be saved in Canada. However, the proportion of Canadians having no protection from SHS in the workplace today (6%), is substantially lower than the proportion of the Americans who had no protection in 2000 (31%), year for which the Stanford model estimates are based. To account for reduced workplace exposure since 2000, the estimate for Canada using the Stanford estimate is further reducing by a factor of 10. In the most conservative of scenarios, where workplace exposure is rare and SHS only increases the risk of a fatal heart attack in non-smokers by 25%, then a lower bound estimate for lives saved in Canada is no less than 5.

The Canadian government has routinely adopted regulations to diminish risks that cause fewer deaths than those lost due to SHS induced-heart-attacks. Indeed, in an effort the prevent death and injury risk of pedestrians crossing near school buses — a risk which kills an average 4 Canadians per year[28] — the federal government has regularly amended regulations adding and modifying mirrors and other devices which improve visibility aboard school buses.[29] Likewise, the Government of Canada has intervened to minimize deaths from lightning: 6 Canadians died as a direct of being struck by lightning between 1991 and 1997.[30] At the first sign of lightning, mechanics and other personnel servicing planes in Canadian airports, a federally regulated workplace, are directed to protect themselves by seeking shelter indoors.

Given the scientific evidence on the seriousness of the risks associated with exposure to SHS, as well as the current limitations of ventilation as a means by which to reduce those risks, laws allowing for indoor designated smoking areas/rooms are weak and do not adequately workers and the public. Strengthening existing smoke-free legislation in Canada has the potential to prevent anywhere from 5 to 1,800 fatal heart attacks per year.

4. Long-term public health gains

Since other tobacco control measures usually take place (mass media campaigns, tax increases on tobacco products, health warnings on packaging, etc.) at the same time as smoking bans do, it is difficult to evaluate how smoking bans alone influence cessation and tobacco consumption.

Historically, smoking has been associated with drinking and socializing. Years of tobacco industry lifestyle promotion, whereby cigarette advertisements featured bar, club and cocktail-hour scenes with alcoholic beverages at social gatherings, have also reinforced this association. Socially-cued smoking is particularly important among young smokers.[31] Just as internal tobacco industry documents had in the past, more recent industry analysis confirms that banning smoking in social venues means "there will be fewer temptations and opportunities for social smokers to exercise their occasional habit".[32] Smoke-free measures in eating and drinking establishments are expected to motivate quit attempts and reduce the level of cigarette consumption among all smokers, especially those working in the hospitality industry.[33]

(i) *Effective motivation of quit attempts and prevention of relapse*— The prospect of smoking being banned in the remaining public places and social venues motivate many smokers to call a telephone quit-line and initiate a serious quit attempt. In New Zealand, the national quit-line registered a 45% increase in activity in the weeks preceding and following the coming into effect of the comprehensive smoke-free legislation.[34,35] Similarly, two Swedish newspapers who ran quit campaigns before the restrictions came into force had 30 000 people logon to websites and pledging to quit.[18] In Scotland, 7% of ex-smokers answering an extensive survey indicated the ban had either greatly or slightly helped them to quit.[36] Unsurprisingly, a steady increase in registration was observed in the country's cessation programs in the months leading to the smoking ban.[37]

In Norway, the proportion of smokers with the intention to quit in the next six months had remained near the 36% mark since 1996, but jumped to 47% before the ban in 2004.[7] The number of smokers attempting to quit in the last 12 months went from 28% before to 44% after the ban.[7] Answering an extensive survey a few months following the ban in Ireland, 39% of recent quitters indicated that the legislation had a significant influence on their decision to quit, while 55% of them said the ban was an important factor in preventing relapse.[38,39] Likewise, current and former smokers in New Zealand and Sweden report that comprehensive smoking bans help smokers persevere with quitting initiatives.

(ii) *Effective reduction of daily tobacco consumption and smoking prevalence*— Studies have shown that smokers who are employed in completely smoke-free workplaces consume fewer cigarettes per day than do smokers employed in workplaces with weaker smoking restrictions.[40] This also holds true for teenagers. Though smoke-free workplaces policies rarely affect youth and teenagers directly, teenagers working in smoke-free places consume fewer cigarettes per day and are also more likely to quit or smoke less than those working under less stringent smoking policies.[41]

A review of evidence from Australia, Canada, Germany and the United States concluded that smoke-free workplaces reduce workers' cigarette consumption by 29%.[40] It is reasonable to believe that bans in restaurants and bars will also decrease hospitality workers' tobacco consumption. Furthermore, smoking bans in social venues also affect the consumption of customers, meaning smokers outside the hospitality industry. Recent smoking bans[*] are being held partially responsible for major declines in cigarette sales in Ireland, Norway, Sweden and Italy.

In Italy, smoking restrictions produced an 8% reduction in tobacco consumption, with greatest decline observed among 15-24 year olds and women.[42] In the first 6 months following the ban in Norway, legal sales (per capita) for cigarettes and roll-your-own decreased by nearly 17%.[7] Though other factors such as smuggling and higher taxes may also contributing to part of this decline, surveys monitoring smoking habits do confirm that smokers reacted to the ban by reducing their consumption or by successfully quitting altogether. Daily cigarette consumption among hospitality industry employees dropped significantly after the ban, going from 14,7 cigarettes to 13,3 cigarettes.

Financial analysts confirm reduced cigarette consumption, with the first year of the smoking ban in Ireland leading to a 5-7% decline in cigarette sales[43,44] Evidence suggested that many smokers had quit and current smokers were smoking less than before: 59% of Irish smokers said that the law made them cut down on the number of cigarettes they smoked, and 46% said the law made it more likely for them to quit.[45] Impacts of the ban on smoking prevalence are still unclear.[46] Despite preliminary evidence suggesting a drastic decline in smoking prevalence in Ireland, [38,47,48] smoking rates among youth and young adults increased slightly in 2005.[49] The presence of outdoor heated smoking areas[50] as well as other factors related to cigarette pricing and packaging may be offsetting the positive impact on smoking rates generated by smoke-free legislation.

[*] Both Sweden and Italy allow for designated smoking rooms in bars

In New Zealand, comprehensive smoke-free legislation appears to have reduced by 50% the number of smokers who smoked heavily during time spent in bars, cafés and other social venues covered by the ban.[51] Smoking fewer cigarettes per day may help alleviate some upper respiratory symptoms,[7] and be a prelude to quitting entirely.

Thus, observations from recent smoking bans in social venues consistently indicate a small but non negligible reduction in tobacco consumption. In the short term, smoking bans appear to produce benefits to individuals, with smokers smoking less and finding it easier to quit. And of course, former smokers live longer than current smokers and have a decreased risk of lung cancer, other cancers, heart attack, stroke and chronic lung disease.[52] More strikingly, small inroads in cessation, such as an increased rate in successful quitting and a continued desire to renew quitting attempts are likely to produce a meaningful benefit to population health. California's comprehensive smoke-free legislation has contributed to reduce the numbers of smokers in California,[53] and unsurprisingly, reductions in lung and other bronchus cancers have declined more rapidly in California than they have in the rest of the U.S.[54]

5. Shaping of non-smoking attitudes

(i) *Reinforcement of the social unacceptability of smoking*— Prohibiting smoking indoors is a constant reminder that smoking is dangerous and that its effects spread beyond the smoker. As recent polls in Ireland and elsewhere, support for smoking bans in usually stronger after implementation, especially among smokers.[39] Research has consistently showed that smoking bans lead to favourable attitude changes, and a decrease in the social acceptability of smoking. Smoke-free environments counter the previous ubiquity of cigarettes, and erode the social acceptability that smoking achieved thanks to decades of tobacco industry promotion and practices. Moreover, smoking bans in public places encourage smoke-free policies in residential settings, namely through voluntary policies on homes, cars and hotel /motel rooms.

(ii) *An increase in the number of smoke-free homes*— Tobacco industry spokespersons and others, such as Simon Clark, director of Freedom Organization for the Right to Enjoy Smoking Tobacco (FOREST) — a front group for Philip Morris[55] — have suggested that smoking restrictions in public and workplace lead to more smoking in the home.[56] Evidence does not substantiate such claims.[10,42] Public opinion polls and studies from Ireland show that restrictions are associated with a decrease in overall exposure to SHS, meaning that non-smokers who live a smoker are being exposed to SHS more at home than they did before.[39]

In New Zealand, the percentage of people reporting being exposed to SHS at home dropped by 5%, in the year after the comprehensive smoke-free legislation came into effect.[57] Similarly, surveys in Canada show that the proportion of people, especially children, reporting being exposed to SHS in the home has decreased as SHS becomes more restricted in work and public places.[58,59] By leading to more voluntary smoke-free home policies, banning smoking in public places can substantially reduce children's exposure to SHS, which occurs primarily in the home or car.

Smoking bans are usually accompanied by substantial information campaigns and much public debate over the harms from SHS. As public awareness surrounding SHS is heightened, non-smokers are motivated to avoid the risks from SHS by making their homes completely smoke-free.[60] This also prompts smokers living with non-smokers, especially children, to protect their loved ones by going outside to smoke. Increased awareness among non-smokers and smokers also explains why smoking bans are largely self-enforcing, and rapidly become accepted by smokers.[61]

Research from Britain, USA, Australia, and New Zealand indicate that the best way to achieve smoke-free homes is to implement policies which reduce smoking prevalence in the overall population.[62] Comprehensive smoking bans are a driving factor for voluntary smoke-free home policies.[60] Reducing the number of smokers who are giving up smoking, inevitably, increases the number of homes that become smoke-free, but even smokers are more likely to make their homes smoke-free.

(iii) *Deterrent against youth smoking*— Perceptions on smoking prevalence are known to influence whether youth start smoking or not.[63] Studies have shown that when smoking is relatively unrestricted and common, smoking is viewed as being more socially acceptable, and initiation to smoking is more likely.[64] Massachusetts youths and adults, living in towns where smoking was banned in restaurants and other social venues, had a more accurate perception of the prevalence of smoking, than did those living in towns without such bans.[65] Smokers often resort to social venues to smoke indoors. When smoking bans extend to restaurants, cafés and bars, negative role models are less likely to be seen regularly by youth and other young smokers.[66]

6. Concluding remarks

Recent data, especially from Ireland, Iceland, Norway and the state of New York document the considerable public health value of legislation making public places smoke-free, including bars, restaurants and other indoor social venues. Such measures are alleviating, if not eliminating many chronic eye, nose and throat irritations experienced by hospitality workers, but are also improving respiratory health and reducing wheezing, coughing and other breathing problems. Direct improvements in the health of smokers and non-smokers, whether immediate or more long-term, translate into fewer visits to physicians, to the emergency room and hospitalizations for conditions related to SHS and smoking.

Smoke-free measures also provide tobacco control opportunities that would otherwise be more complicated and costly to pursue. Comprehensive smoke-free legislation increases the number of households which adopt smoke-free policies. It also reduces socially cued smoking which made tobacco use particularly appealing to youth, and are increasing the public's perception of the true addictive nature of cigarettes and immensity of the burden of tobacco related death and disease.

Evidence from several countries demonstrates how comprehensive smoking bans consistently provide tangible health benefits. Governments should implement them quickly because of the immediate pay-offs they generate for the public— affecting positively the health of non-smokers, ex-smokers, smokers trying to quit and ultimately even current smokers. Comprehensive smoking bans set into motion conditions and environments which modify smoking patterns, enhance quitting attempts, prevent relapse and reduce initiation. Bans making workplaces and social venues smoke-free enable governments to concretely address an entirely avoidable source of discomfort, distress and disease.

7. Cited References

[1] Repace J, 2004. Respirable particles and carcinogens in the air of Delaware hospitality venues before and after a smoking ban. *Journal of Occupational and Environmental Medicine* 2004; 46(9):887-905 www.no-smoke.org/pdf/RepaceJOEMpaper_090904.pdf

[2] Segel M, 1993. Involuntary smoking in the restaurant workplace. A review of employee exposure and health effects. *Journal of American Medical Association* 1993; 270:490-493 http://jama.ama-assn.org/cgi/content/abstract/270/4/490

[3] Siegel M, Skeer M, 2003. Exposure to secondhand smoke and excess lung cancer mortality risk among workers in the "5B's": bars, bowling alleys, billiard halls, betting establishments, and bingo parlours. *Tobacco Control* 2003; 12:333-338. http://tc.bmjjournals.com/cgi/content/abstract/12/3/333

[4] Eagan TML, Hetland J, Aarø LE, 2006. Decline in respiratory symptoms in service workers five months after a public smoking ban. *Tobacco Control* 2006; 15:242-246 http://tc.bmjjournals.com/cgi/reprint/15/3/242

[5] U.S. Department of Health, Education and Welfare, 1986. The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General. U.S. Department of Health, Education and Welfare, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health, Rockville, Maryland, 1986. (page 252)

[6] California Environmental Protection Agency, 2005. *Proposed Identification of Environmental Tobacco Smoke as a Toxic Air Contaminant*, Part B (Health Risks). California Environmental Protection Agency, Air Resources Board, Office of Environmental Health Hazard Assessment, June 2005. www.oehha.ca.gov/air/environmental_tobacco/pdf/app3partb2005.pdf (Accessed Aug. 2006) (page 6-73)

[7] Lund M, *et al*., 2005. Smoke-free bars and restaurant in Norway. Oslo: HEMIL/SIRUS, June 2005. www.sirus.no/cwobjekter/SmokefreebarsandrestaurantsinNorway.pdf (Accessed June 2006)

[8] Norwegian Directorate for Health and Social Affairs 2005. Norway's ban on smoking in bars and restaurants – A review of the first year, Department for Tobacco Control, Oslo, Norway, May 2005. www.shdir.no/vp/multimedia/archive/00003/Norway_s_ban_on_smoki_3413a.pdf (Accessed June 2006)

[9] Norwegian Directorate for Health and Social Affairs, 2005. Norway's ban on smoking in bars and restaurants – A review of the first year, Department for Tobacco Control, Oslo, Norway, May 2005. (page 15). www.shdir.no/vp/multimedia/archive/00003/Norway_s_ban_on_smoki_3413a.pdf (Accessed June 2006)

[10] Allwright S, *et al.,* 2005. Legislation for smoke-free workplaces and health of bar workers in Ireland: before and after study. *British Medical Journal* 2005; 331:1117-1123. http://bmj.bmjjournals.com/cgi/content/full/331/7525/1117

[11] Abrams SM. *et al*., 2004. Clean indoor air laws protect hospitality workers: evidence from New York State. Presentation at National Conference on Tobacco or Health, May 4, 2005 http://ncth.confex.com/ncth/2005/techprogram/paper_12438.htm (Accessed June 2006)

[12] Eisner MD, Smith AK, Blanc PD, 1998. Bartenders' respiratory health after establishment of smoke free bars and taverns. *Journal of American Medical Association* 1998; 280(22):1909 1914. www.tobaccoscam.ucsf.edu/pdf/9.1-Eisner.pdf

[13] Hahn EJ, *et al*., 2005. Secondhand smoke exposure in restaurant and bar workers before and after Lexington's smoke-free ordinance. University of Kentucky, July 2005. www.mc.uky.edu/tobaccopolicy/ResearchProduct/Hair_Study_Council_Report.pdf (Accessed June 2006)

[14] U.S. Department of Health and Human Services, 2006. *The Health Consequences of Involuntary Exposure to Secondhand Smoke: A Report of the Surgeon General.* Executive Summary. U.S. 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, Washington DC, 2006. www.cdc.gov/tobacco/sgr/sgr_2006/index.htm page 13 (Accessed June 2006)

[15] Samet JM, 2004. Adverse effects of smoke exposure on the upper airway. *Tobacco Control* 2004; 13(suppl_1):i57-i60. http://tc.bmjjournals.com/cgi/content/full/13/suppl_1/i57

[16] U.S. Department of Health and Human Services, 2006. COPD. Disease and Condition Index, National Institutes of Health. National Heart, Lung and Blood Institute. Washington DC, 2006. www.nhlbi.nih.gov/health/dci/Diseases/Copd/Copd_SignsAndSymptoms.html (Accessed June 2006)

[17] Hetland J, Aarø LE, 2005. Smokefree restaurants and pubs: Air quality, self reported health and job satisfaction. HEMIL/SIRUS Report no 4. Research Centre for Health Promotion, National Institute for Alcohol and Drug Research, Oslo 2005. www.sirus.no/cwobjekter/SIRUSskrifter0305eng.pdf (Accessed May 2006)

[18] Anon., 2006a. Beware of the Swedish horse. Swedish tobacco control: progress and challenges- both are greater than ever. Swedish Network for Tobacco Prevention, 2006. www.tobaccoorhealthsweden.org/pdf/worldconference/Tidningen.pdf (Accessed June 2006)

[19] Farelly MC, *et al*., 2005. Changes in hospitality workers' exposure to secondhand smoke following the implementation of New York's smoke-free law. *Tobacco Control* 2005; 14:236-241 http://tc.bmjjournals.com/cgi/content/abstract/14/4/236

[20] Agnew M, Goodman P, Clancy L, 2005. Evaluation of the lung function of Barworkers in Dublin, pre and post the introduction of a workplace ban on smoking in Ireland. Preliminary Research Results on the effects of the Workplace Ban on Smoking, Scientific Symposium 29th March 2005- Preliminary Research Results Abstracts, Research Institute for a tobacco free society, Dublin, 2005. http://tri.ie/Default.aspx?tabid=71 (Accessed June 2006)

[21] U.S. Department of Health and Human Services, 2006. The Health Consequences of Involuntary Exposure to Tobacco smoke: A Report of the Surgeon General- Executive Summary. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and Health Promotion, Office on Smoking and Health, Rockville, Maryland, 2006. (page 524)

[22] Pechacek TF, Babb S, 2004. How acute and reversible are the cardiovascular risks of secondhand smoke? (Commentary) *British Medical Journal* 2004; 328:980-983. http://bmj.bmjjournals.com/cgi/content/full/bmj;328/7446/980

[23] Ong M, Glantz SA, 2004. Cardiovascular health and economic effects of smokefree workplaces. July 1, 2004 *American Journal of Medicine* 2004; 117:32-38. www.tobaccoscam.ucsf.edu/pdf/Ong-CV-Disease.pdf (Accessed June 2006)

[24] Sargent R, Shepard RM, Glantz SA. Reduced incidence of admissions for myocardial infarction associated with public smoking ban: before and after study. *British Medical Journal* 2004; 328:977-980. http://bmj.bmjjournals.com/cgi/content/full/328/7446/977

[25] Bartecchi C, *et al*., 2005. Reduction in the incidence of acute myocardial infarction associated with a citywide smoking ordinance. *Circulation* 2006; 114 :1490-1496. (poster presented at the American Heart Association Annual Scientific Sessions, Dallas, Texas, 2005).

[26] Health Canada, 2006. Canadian Tobacco Use Monitoring Survey 2005 (CTUMS)- Summary of Annual Results for 2005. www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/2005/index_e.html

[27] Statistic Canada, 2003. Total annual deaths by infarction for Canada in 2003. Table 102-0529 Deaths, by cause, Chapter IX: Diseases of the circulatory system. Available at www.statcan.ca/english/search/ (Accessed June 2006)

[28] Transport Canada, date unknown. Review of Bus Safety Issues - School Bus Passenger Protection, www.tc.gc.ca/roadsafety/tp/tp13330/busclu_e.htm (Accessed June 2006)

[29] Government of Canada, 2002. Regulations amending the motor vehicle safety regulations (mirrors) and Regulatory impact analysis statement. Canada Gazette Part II, Vol. 136, No 26, page 2852-2853. http://canadagazette.gc.ca/partII/2002/20021218/pdf/g2-13626.pdf (Accessed June 2006)

[30] Bains N, Hoey J, 1998. Before lightning strikes. *Canadian Medical Association Journal* 1998; 159(2):163 www.cmaj.ca/cgi/reprint/159/2/163 (Accessed June 2006)

[31] Trotter L, Wakefield M, Borland R, 2002. Socially cued smoking in bars, nightclubs, and gaming venues: a case for introducing smoke-free policies. *Tobacco Control* 2002; 11: 300-304. *http://tc.bmjjournals.com/cgi/content/abstract/11/4/300*

[32] Euromonitor International, 2005. Tobacco in Ireland. April 2005. www.euromonitor.com/Tobacco_in_Ireland (Accessed June 2006)

[33] Longo DR, *et al.*, 2001. A prospective investigation of the impact of smoking bans on tobacco cessation and relapse. *Tobacco Control* 2001; 10:267-272. http://tc.bmjjournals.com/cgi/reprint/10/3/267

[34] New Zealand Ministry of Health, 2005. The Smoke is clearing: Anniversary Report 2005. Initial data on the impact of smoke-free environments law changes since December 2004. Wellington, New Zealand. www.moh.govt.nz/publications (Accessed June 2006)

[35] Wilson N, *et al.*, 2005. New smoke-free environments legislation stimulates calls to a national Quitline. *Tobacco Control* 2005; 14:287-288 http://tc.bmjjournals.com/cgi/content/full/14/4/287

[36] Anon., 2006b. Public attitudes to smoking in public places – MRUK omnibus survey – March 2006 and May 2006 main findings, for Clearing up the air. Healthier Scotland, Scottish Executive, 2006. www.clearingtheairscotland.com/research/opinion-survey.html (Accessed June 2006)

[37] Macleod M, 2005. "Helpline swamped by smokers trying to quit ahead of ban." The Scotsman, 12 June 2005. http://news.scotsman.com/scotland.cfm?id=645282005 (Accessed June 2006)

[38] Government of Ireland, 2004. 7,000 Fewer smokers in Ireland -*Quitline and smoking ban attributed to 33% decline in prevalence of smoking.* Micheál Martin, Minister of Health and Education. Health Promotion News release, September 26, 2004. www.healthpromotion.ie/uploaded_docs/PRESS_RELEASE_-_RESEARCH_FINDINGS_-_SEPT_004.pdf (Accessed June 2006)

[39] Fong GT, *et al.*, 2006. Reductions in tobacco smoke pollution and increases in support for smoke-free public places following the implementation of comprehensive smoke-free workplace legislation in the Republic of Ireland: findings from the ITC Ireland/UK Survey. *Tobacco Control* 2006; 15(suppl_3):iii51-iii58 http://tc.bmjjournals.com/cgi/content/abstract/15/suppl_3/iii51

[40] Fichtenburg CM, Glantz SA, 2002. Effects of smoke-free workplaces on smoking behaviour: systematic review. *British Medical Journal, 2002*; 235:188-191 http://bmj.bmjjournals.com/cgi/content/full/325/7357/188

[41] Farkas AJ, Gilpin EA, White MM, Pierce JP, 2000. Association between household and workplace smoking restrictions and adolescent smoking. *Journal of American Medical Association* 2000; 284: 717-722

[42] Gallus S, *et al*., 2005. Effects of new smoking regulations in Italy. *Annals of Oncology* 2006; 17(2) :346-347 http://bmj.bmjjournals.com/cgi/content/extract/331/7526/1159-a

[43] Dow Jones, 2005. UK Tobacco Stks: Total Smoking Ban? >ITY, GLH, Newswires, 10 October 2005. www.newratings.com/analyst_news/article_1055017.html (Accessed June 2006)

[44] Citigroup Smith Barney, Gallaher, 9 September 2004. The startling economics of tobacco. April 2005, page 34 *as cited by* Joossens L, 2004. Effective tobacco control policies in 28 European countries. École nationale de Santé publique, Rennes, 2004. www.ensp.org/files/effectivefinal2.pdf (Accessed June 2006) http://tc.bmjjournals.com/cgi/content/full/15/3/247?ijkey=ChA3HDK8oqYx.&keytype=ref&siteid=bmjjournals

[45] Fong G, 2005. The impact of smokefree workplace legislation on smokers in Ireland. Findings from the ITC-Ireland/UK survey. Presentation by Geoffrey Fong at the Smokefree Europe Conference. June 2, 2005. www.smokefreeeurope.com/assets/downloads/geoffreytfong.pdf (Accessed June 2006) for detailed study Fong GT *et al*, *Tobacco Control* 2006(15) suppl_3.

[46] Bowers S, 2006. "Smoking ban shows no impact on Scottish sales, says Imperial". *The Guardian*, April 27, 2006. www.guardian.co.uk/smoking/Story/0,,1762285,00.html (Accessed June 2006)

[47] Office of Tobacco Control, 2006. Cigarette Smoking Trends: smoking prevalence 2003-2005. www.otc.ie/research_reports.asp#cigarette

[48] Mullally B, *et al*, 2005. The effect of the Legislative ban on smoking rates among bar workers Workplace Ban Abstract, Scientific Symposium Preliminary Research Results, 29th March 2005, Dublin, Research Institute for a Tobacco Free Society, 2005. www.tri.ie/Default.aspx?tabid=71

[49] Office of Tobacco Control, 2006. Cigarette Smoking Trends: smoking prevalence 2003-2005. Ireland. www.otc.ie/research_reports.asp#cigarette

[50] McNicholas WT, 2004. Controlling passive smoking through legislation in Ireland: an attack on civil liberty or good public health policy? *European Respiratory Journal* 2004; 24:337-338. http://erj.ersjournals.com/cgi/content/full/24/3/337

[51] Thomson G, Wilson N, 2006. One year of smokefree bars and restaurants in New Zealand: Impacts and responses. *BMC Public Health*. 2006; 6: 64. doi: 10.1186/1471-2458-6-64. www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1475576#B25

[52] U.S. Department of Health and Human Services, 1990. The health benefits of smoking cessation: a report of the Surgeon General. Centers for Disease Control and Prevention, Atlanta, GA, 1990.

[53] Gilpin EA, *et al.,* 2006. What contributed to the major decline in per capita cigarette consumption during California's comprehensive tobacco control programme? *Tobacco Control* 2006; 15: 308-316. http://tc.bmjjournals.com/cgi/content/abstract/15/4/308

[54] California Department of Health Services, 2006. Smoking rates in California fall to an all-time low: smoking among adults ages 45 to 64 and men show largest declines. News release, 20 April 2006. www.applications.dhs.ca.gov/pressreleases/store/PressReleases/06-25.html

[55] Non-Smokers' Rights Association, 2003. Tobacco industry front groups in Canada. Industry documents, February 2003. www.nsra-adnf.ca/cms/index.cfm?group_id=1222 (Accessed June 2006)

[56] BBC News, 2005. Public ban would cut home smoking. BBC News UK, Tuesday, 12 July 2005, 10:06 UK. http://news.bbc.co.uk/1/hi/health/4672005.stm (Accessed June 2006)

[57] Waa A, Gillespie J, 2005. Reducing Exposure to Second Hand Smoke: Changes associated with implementation of the amended Smoke-free Environments Act 1990: 2003-2005. Report to the Ministry of Health, Wellington, New Zealand *as cited by* New Zealand Ministry of Health, 2005.

[58] Non-Smokers' Rights Association, 2006. Second-hand Smoke in Homes and Cars (revised version). Second-hand smoke, April 2006. http://www.nsra-adnf.ca/cms/index.cfm?group_id=1457

[59] Health Canada, 200x. Exposure of children at home to Environmental Tobacco Smoke (ETS), by province and age group, Canada 200x. Canadian Tobacco Use Monitoring Survey 2002-2005 (CTUMS)- Summary of Annual Results for 2002-2005. http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/index_e.html (Accessed June 2006)

[60] Borland R, *et al.*, 2006a. Determinants and consequences of smoke-free homes: findings from the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control* 2006; 15(suppl_3):iii42-iii50 http://tc.bmjjournals.com/cgi/content/full/15/suppl_3/iii42

[61] Borland R, *et al.*, 2006b. Support for and reported compliance with smoke-free restaurants and bars by smokers in four countries: findings from International Tobacco (ITC) Four Country Survey. *Tobacco Control* 2006; 15:(suppl_3):iii34-iii41 http://tc.bmjjournals.com/cgi/content/abstract/15/suppl_3/iii34

[62] Thompson G, Wilson N, 2006. Population level policy options for increasing the prevalence of smokefree homes. *Journal of Epidemiology and Community Health* 2006; 60:298-304. http://jech.bmjjournals.com/cgi/content/abstract/60/4/298

[63] Alesci NL, *et al.*, 2003. Smoking visibility, perceived acceptability, and frequency in various locations among youth and adults. *Preventive medicine* 2003; 36:272–281 *as cited by* Wakefield M, Forster J, 2005.

[64] Siegel M*, et al*., 2005. Effect of local restaurant smoking regulations on progression to established smoking among youths. *Tobacco Control* 2005;14:300-306 http://tc.bmjjournals.com/cgi/content/full/14/5/300

[65] Albers AB, *et al*, 2004. Relation between local restaurant smoking regulations and attitudes towards the prevalence and social acceptability of smoking: a study of youths and adults who eat out predominantly at restaurants in their town. *Tobacco Control* 2004;13:347-355 http://tc.bmjjournals.com/cgi/content/abstract/13/4/347

[66] Wakefield M, Forster J, 2005. Growing evidence for new benefit of clean indoor air laws: reduced adolescent smoking. *Tobacco Control* 2005;14:292-293 http://tc.bmjjournals.com/cgi/content/full/14/5/292