4. Cost-benefits of workplace smoking policies

Tamara Raaijmakers, Dutch Center for Workplace Health Promotion (The Netherlands)
Inge van den Borne, Dutch Center for Workplace Health Promotion (The Netherlands)

4.1 Introduction

This chapter is about the cost-benefits of implementing a workplace smoking policy. The focus lies mainly on costs and benefits for the employer. The effects of smoke free workplaces on costs and benefits for society are discussed only briefly.
There are three main types of workplace smoking policy: 1) a general ban in all company facilities (by order of the management), 2) demarcating and putting up appropriate signs in those areas where smoking is not permitted (often without effective monitoring of compliance), and 3) a comprehensive policy with the commitment of all those involved (directors, union representatives, health professionals etc.) which aims to act systematically in all possible areas (information for employees, demarcation of areas, withdrawal from smoking etc.).
The costs and benefits may vary per type of policy. However, only limited (recent) literature on this topic is available. Therefore this chapter provides a global insight in costs and benefits and not by type of workplace smoking policy.

The chapter has the following format: first, the economic reasons for organisations to implement a workplace smoking policy are considered. Secondly, the economic reasons for society are discussed. Cost studies of workplace smoking policies form the third part of this chapter. These studies are described by country. The next section is a short summary of costs involved when implementing a workplace smoking policy and the obstacles to implementation. The chapter ends with a summary of the most important conclusions and some closing remarks.

Sources for this chapter are articles on costs and benefits of workplace smoking policies published after 1990. Because of limited research on this topic, not only European studies are described, but also research conducted in Canada and the USA. Comments and personal communications of experts working in this field are also used.

4.2 Reasons for implementing a workplace smoking policy - employers

An employer may want to introduce a smoking policy for various reasons, not all of them economic. In this chapter, the health of employees, absenteeism, occupational accidents, conflicts, the company image, risks of litigation and extra costs due to smoking are described as reasons for implementing a workplace smoking policy.

4.2.1 Health

Health of employees

The primary reason for implementing a workplace smoking policy is the health of employees. The harmful effects of active and passive smoking are now established beyond dispute and have been widely publicised (see also chapter 1). Studies establish that passive smoking is a cause of heart disease and lung cancer and that it initiates or aggravates respiratory conditions such as asthma and bronchitis. For most people, passive smoking is an irritation and causes discomfort. Furthermore, tobacco smoke is also a factor contributing to sick building syndrome[*] [1].

Legislation on health and safety at work requires that employers protect their staff from harmful substances at the workplace, as in this case tobacco smoke, and take reasonable and practicable measures to secure the health, safety and welfare of their employees (see also chapter 2). Employers have responded to this by introducing workplace smoking restrictions. In some sectors such as food manufacturing plants or firms using chemicals, smoking bans are a statutory requirement because of health and safety legislation.

Employee sickness and death caused by smoking related diseases impose costs on employers. These costs depend upon several factors such as how easily the employee can be replaced and the prevailing level of unemployment. In an economy with a high level of unemployment, costs will tend to be lower since there is a pool of replacement

[*] Health effects typically caused by poor indoor air quality have been categorized as sick building syndrome (SBS). Some of the symptoms that characterize SBS include: irritation of eyes, nose and throat, dry skin, coughs, hoarseness of voice and wheezing, nausea and dizziness.

labour available. However, for specialist work in short supply the costs to an employer may be significant[2].

The most important goal of a workplace smoking policy is the protection of employees against tobacco smoke. A well designed smoking policy will lead to less exposure to tobacco smoke, in particular for non-smokers, and therefore promote health and well-being of employees.

Cigarette consumption

Banning smoking in the workplace does not necessarily turn smokers into non-smokers. However, a non-smoking atmosphere could help smokers to reduce consumption or even quit smoking. This may be a welcome side effect of smoking bans.

Different studies demonstrate this side effect. A review of evaluation studies of the health impact of smoking control at the workplace of the last three decades, shows consistent evidence of tobacco policies decreasing workday cigarette consumption by smokers and a decrease in exposure to environmental tobacco smoke (ETS) at work[3].

Findings from a study of the US National Cancer Institute clearly show that smokers who are employed in smoke free workplaces experience a quit ratio of 1.34 (or 34 percent) greater than smokers not employed in a smoke free worksite[4]. In fact, working in a smoke free workplace is more strongly correlated with successful quitting than physician advice or use of nicotine replacement products[4].

This finding was consistent with a study that Philip Morris conducted during the late 80's and 90's which found that smokers working in worksites where smoking is banned experience a 84 percent higher quit rate than smokers not working in such an environment[4,5]. In this cohort of some 25,000 smokers, those in smoke free workplaces consumed on average 11 to 15 percent fewer cigarettes.

Comparable results are found in a national survey in the USA in which 97,882 indoor workers (aged above 18) from various demographic and industry groups reported their smoking history and workplace smoking policy[6]. The survey shows that having a 100% smoke free workplace reduces smoking prevalence by 5.7%. Average daily cigarette consumption among smokers is reduced by 14%. It appears that workplace bans have their greatest impact on groups with the highest rates of smoking. The impact of work area bans is reduced by allowing smoking in some common areas. The authors state

that if all workplaces were smoke free, smoking prevalence would be reduced by 10%[6].

Evans et al. investigated whether workplace policies reduce smoking prevalence and consumption among workers. They used data from national health interview surveys in the USA (1991, 1993). Their estimates suggest that workplace bans reduce smoking prevalence by 5% and average daily consumption among smokers by 10%[7]. The impact of the ban is greatest for those with longer working weeks.

Comparable results are found in the UK, but with a smaller sample of 239 smokers employed in different types of workplaces[8.] This study concludes that the median cigarette consumption per working day is significantly lower in smokers working in a total ban compared with those in a partial ban: 10 versus 15 cigarettes. Smokers working under total bans also report greater self-efficacy (i.e. a person's beliefs about his/her abilities to quit smoking) and are more ready to quit than smokers working under partial bans. In general, both groups smoke between 3 and 4 cigarettes fewer on working days than on non-working days[8]. Since the introduction of the restrictions, more than half of the smokers (57%) reported smoking fewer cigarettes during working hours. For the largest group of smokers (67%) the restrictions did not lead to change in cigarette consumption outside working hours. A small minority practiced compensatory smoking outside working hours: only 24% (of whom 76% reported reduced consumption at work) smoked more. This last finding was independent of the type of restriction. A third of the smokers who attempted to quit in this study were encouraged to do so by the restrictions at work[8].

Results of a study of 11,704 Californian employees showed that in smoke free workplaces the prevalence of regular smokers is significantly lower than in workplaces with no restrictions (13.6% versus 20.6%)[9]. This study concluded that regular smokers in smoke free workplaces smoke significantly fewer cigarettes than those in workplaces with no restrictions (296 versus 341 packs per year). Furthermore, it calculated that if all Californian workplaces were smoke free, cigarette consumption among employees would be 41% below that if there were no workplace smoking restrictions, approximately a 406 million USD annual loss in sales to the tobacco industry[9].

Although quitting smoking is not the primary goal of workplace smoking policy, offering smoking cessations programs can be part of this policy. In the US Healthy Worker

Project, a randomised trial involving 32 worksites, the impact of smoking cessation programs on smoking prevalence throughout the worksite was examined[10]. Over 2 years, about 12% of all smokers participated in a smoking program consisting of classes and an incentive system, resulting in a 4% net reduction in smoking prevalence throughout the worksite.
For the Netherlands it is estimated that if all Dutch worksites implemented smoking cessation programs, national smoking rates in the adult population might decline by at least 2% to 3% every two years[11].

From the studies described above it follows that smoking policies and smoking cessation programs can be an effective measure for decreasing smoking prevalence and cigarette consumption at the workplace and on national level.
But the primary aim of workplace smoking policy is the protection of employees from ETS.

4.2.2 Absenteeism

Absenteeism and sick days

Smokers are likely to suffer a greater variety of illnesses and more ill health than non-smokers and as a result be more prone to absenteeism. As well as major illnesses, such as cancer, bronchitis, emphysema, strokes and heart disease, smokers experience higher susceptibility to coughs, colds and flu (see also chapter 1). Robbins et al. found that current cigarette smoking accounted for a substantial proportion of hospitalisation and lost workdays, particularly among men[12]. From this study, which analyses health data for almost 88,000 young men and women in the US Army between 1987 and 1998, it was estimated that current smoking is associated with a 60% increase in risk of lost workdays among men and a 15% increase in risk of lost workdays among women. As a result, the rate ratios for lost workdays attributable to current smoking (i.e., population attributable fraction or PAF) are 14.1% for men and 3.0% for women[12].
Scottish data, based on a combination of a telephone survey and a review of the literature, also show absenteeism to be higher among smokers when compared to non-smokers[2].
In accordance with the scientific literature, the Centre of Tobacco Prevention in

Stockholm informs the Swedish employers that smokers have up to 30% or 2.5 more sick-days than non-smokers[13].

A large study of nearly 80,000 employees by Telecom Australia for the years 1991-1992 indicates that illness attributable to smoking or alcohol accounts for 25% of the sick leave[14]. The estimated costs for smoking are 16,500,000 AUD (more than 12 million USD 1994 figures).

The results from an Australian study examining the relationship between smoking cessation and absence from work by analysing data collected from a large sample of ex-smokers (n=4812, quit smoking 1 to 20 years or more ago) provide strong support for the argument that attendance improves gradually with the length of time since smoking cessation[15]. The results show that a person who quit smoking more than 20 years ago is 4.5 times less likely to be absent from work than a person who stopped smoking during the previous year. However, such improvement is observed only over relatively long periods of time, given that some of the adverse health effects of smoking may take quite a long time to diminish.

Another aspect is absenteeism of non-smokers due to passive smoking. As mentioned earlier, ETS can cause illness to non-smokers. Conflicts between smokers and non-smokers can also lead to absenteeism of non-smokers. McGhee et al. found in a cross sectional survey of 4819 never smoking police officers in Hong Kong that the exposure to passive smoking at work is related to increased utilization of health care services and extra time off from work[16]. Male officers who were exposed for more than a year to ETS reported 2.04 times more time off from work because of illness in the previous 6 months than those not exposed to ETS. For women this figure was not statistically significant: 1.58 more time off from work than those not exposed to ETS[16].

Production loss

The costs for the employer following absenteeism is not just sick leave pay, but also costs that arrive for substitute staff and production loss[13,17,18]. Despite bringing in substitute staff, there are often disruptions to production when the regular workforce is on sick leave and these can considerably increase the company's production costs. Examples of such disruption include lower production volumes due to waiting times and understaffing, as well as lower production quality and increased wastage costs as well as higher operational and service costs because staff have insufficient training

and experience for the job. Another important factor is the additional burden on non-smoking colleagues when smoking employees are on leave due to ill health as a result of smoking.

Not only ill health leads to absenteeism and thereby productivity loss, smoking in working hours can also result in losses of productivity. These productivity losses are highly dependent upon the type of smoking policy which is operated by the employer[2]. A policy permitting smokers to smoke in a designated area at any time is likely to result in the largest productivity losses, as smoke breaks can be taken in addition to the breaks allowed to other workers. A moderate estimate of 5 cigarettes per day at an average of 6 minutes per cigarette represents a time loss of 30 minutes per day because of smoking (See also paragraph 4.4).
However, it should be acknowledged that non-smoking employees also can take long breaks. And, although the results are not clear, it is suggested that there may also be positive effects on workplace performance associated with cigarette smoking. Some investigators found enhancement of cognitive performance (higher concentration and reduction in stress levels) after nicotine intake, but others failed to find evidence[2,11].

4.2.3 Occupational accidents

As mentioned before, in some sectors such as the chemical industry, smoking bans are a statutory requirement because of safety legislation. Smoking at other kind of workplaces is also associated with a higher risk of accidents. A prospective study among postal employees who were allowed to smoke at work reports that smoking is associated with a higher prevalence of industrial accidents, occupational injuries and a higher rate of disciplinary actions, after controlling for age, gender, race, drug use, exercise and occupational type[19].

4.2.4 Conflicts

The nuisance non-smokers experience from ETS can lead to conflicts between smokers and non-smokers at the workplace and even, as mentioned before, to absenteeism. This is especially the case when smokers and non-smokers share the same room or workspace. A review of the psychological literature on smokers/non-

smokers interaction concludes that these groups perceive each other negatively and that this affects the work performance[20].

From an anonymous survey under 15,000 employees in the Netherlands 42% of the non-smokers who are bothered by ETS at the workplace do not discuss this with their smoking colleagues, to avoid conflicts[21]. In the year 2000 about 76% of non-smoking employees in the Netherlands is bothered by ETS at the workplace.

For non-smokers, smoking colleagues form a health risk. Smokers, on the other hand, feel personally attacked by smoking bans. This may lead to conflicts.

Conflicts may also arise from feelings of inequality. Breaks taken by smoking employees may create inequalities in the workplace if non-smokers feel that they are working longer hours for the same pay.

A smoking room as part of workplace smoking policy can also create these feelings of inequality. However, in none of the publications on the effects of smoking restrictions at the workplace has it been mentioned that the measures increase the conflicts between smokers and non-smokers or deteriorate the working atmosphere or morale. The feelings of inequality as a consequence of smoke breaks can also be diminished when smokers are required to clock off while taking smoking breaks or compensate this time[2,18].

4.2.5 Company image

Another reason for implementing a workplace smoking policy can be the company image and the public opinion. Smoking is increasingly becoming a deviant behaviour rather than normal behaviour in social settings.

It can be attractive for organisations to guarantee non-smokers a smoke free work environment and offer smokers smoking cessation programs. Smoke free workplaces can be seen as employee benefits and can benefit the company by attracting new staff members and increasing the loyalty of existing employees to the company. This may be especially true in worksites with high percentages of white-collar workers[11].

4.2.6 Litigation

Concern about the possibility of legal action being taken by employees affected by ETS has been one of the forces motivating employers to introduce smoke free

policies[18]. Employers might be sued for negligence where exposure to passive smoke damages the health of employees (See chapter 2).

4.2.7 Extra costs due to smoking

Finally, smoking can create a number of extra costs for employers such as a more intensive interior and equipment cleaning due to tobacco smoke and earlier replacement of apparatus[18,22]. Tobacco smoke can diminish the life of electronic apparatus such as computers and fine measuring instruments. Further, when smoking in buildings is allowed insurance companies can ask higher insurance premiums following increased fire risk. In England it is estimated that 8.9% of all serious fires in 1996 were caused by smoking materials[23]. Total losses due to fire caused by smoking materials is about 14 million GBP (almost 22 million USD in 1996 prices).
Other costs mentioned by employers are the great costs of the rent for the square meters of the smoking rooms, which could have been better used for other purposes and also for the extra cleaning and upkeep these rooms requires.

4.3 Reasons for implementing a workplace smoking policy - society

As described briefly above, smoking causes significant health damage (see also chapter 1) and may be a significant economic burden to society. To date, there are few investigations on the economic burden to society caused by smoking[24].
Welte et al. investigated the years of potential life lost, the direct medical costs and the indirect costs of cigarette smoking in Germany[25]. Direct costs include the medical costs of smoking-attributable diseases. Indirect costs consist of the value of lost productivity due to smoking-attributable diseases or deaths.
Using the concept of attributable risks and the prevalence-based approach, smoking-attributable mortality and morbidity were calculated for 1993. Neoplasms, cardiovascular diseases, respiratory diseases, perinatal diseases and burn deaths were considered. Attributable risks were derived from the literature and were processed in an epidemiological model. The results were as follows: in 1993, 22% of all male and 5% of all female deaths as well as 1.5 million years of potential life lost were attributable to smoking in Germany. The costs of acute hospital care, in-patient

rehabilitation care, ambulatory care and prescribed drugs attributable to smoking were 9.3 billion DEM (about 4.4 billion USD, 1993 prices). The cost of premature mortality due to smoking was 8.2 billion DEM. Costs due to work-loss days and early retirement were 16.4 billion DEM (almost 8 billion USD, 1993 prices). The total costs added up to 33.8 billion DEM, 415 DEM per inhabitant or 1,599 DEM per current smoker (respectively 16 billion USD, 198 USD, 760 USD, 1993 prices)[25].

Another study concluded that smoking-related health care costs in Germany amounted to 16.6 billion EURO in 1996, representing over 6% of the total German health care costs[26]. This corresponds to the estimate of the World Bank that smoking-related health care in high-income countries accounts for 6-15% of all health care costs[24].

The Berkeley Economic Research Associates (BERA) found, based on econometric models, that the medical costs attributable to cigarette smoking were 56.3 billion USD per year in the United States in 1993[27]. This estimate does not include any indirect costs of smoking such as those associated with work days lost to smoking-related illness or to years of life lost due to premature mortality caused by smoking. It also does not include medical care costs associated with ETS or those associated with the treatment of children exposed to tobacco before birth.

The US Environmental Protection Agency (EPA) assessed the impact of the proposed Smoke Free Environment Act[28]. The act would ban or restrict smoking in all non-residential indoor air environments. The main conclusion of the analysis is that this legislation would produce net benefits of between 39 and 72 billion USD (1994 prices). The report estimates that only 10-20% of buildings would construct separate smoking lounges, owing mainly to cost and feasibility. These smoking lounges would cost between 0.3 and 0.7 billion USD (1994 prices).

Health Canada estimates that 15 billion CAD (approximately 13 billion USD, 1995 prices) are spent each year on direct health care costs related to the use of tobacco[29]. These costs break down as: 2.5 billion CAD toward hospitalisations and health care expenses, 1.5 billion CAD for residential care costs, 2 billion CAD towards employee absenteeism and 9 billion CAD from loss of future income.

Table 1. gives an overview of the above mentioned costs due to smoking for society based on the estimations per country.

Table 1. Estimated costs ***for society*** due to smoking

Country	Estimated costs for society (USD)	Year
Canada [a]	13 billion	1995
Germany [b]	16 billion	1993
US [c]	39-72 billion	1994
US [d]	56.3 billion	1993

[A] Direct health care costs: hospitalisation, health care expenses, residential care costs and absenteeism due to smoking.

[B] Based on acute hospital care, in-patient rehabilitation care, ambulatory care and prescribed drugs, mortality, work loss days, early retirement attributable to smoking

[C] Based on organisational efficiency due to conflicts between smokers and non-smokers and absenteeism

[D] Medical costs based on econometric models, exclusive indirect costs associated with work days lost to smoking-related illness

Although the first aim of a workplace smoking policy is the protection of employees, especially non-smokers, from ETS, from the data above it can be concluded that the magnitude of the burden to society from workplace smoking and the effects of smoking restrictions are sufficient reasons to call for stronger support, especially by government, for smoke free workplaces.

However, some do not agree, especially the tobacco industry. They use the economic argument that people who smoke are less of a burden on the health care system than others because they die early, thereby saving the government money by not collecting pensions and social security.

In health economics, however, the estimate of costs of individual diseases is usually used and not the cost that occurs due to living longer. For example, by investigating the cost-effectiveness of a vaccination program, the costs of the program as well as the savings that occur due to the avoidance of diseases (and their treatments) are taken in. The so called indirect costs within the health care system are not included, i.e. the health care costs that emerge due to other diseases that a vaccinated person experiences later and that are not related to the vaccine's target disease (Personal communication National Institute of Public Health and Environment).

This implies that the effects of smoking policies are to be calculated in the additional years free of smoking related diseases. A Dutch study, conducted by the Department of Public Health and the Institute for Social Medicine, shows that interventions aimed

at quitting smoking will extend the length of life and will reduce the number of years spent with disability[30].

In general it is believed that the potential benefits on public health from prevention measures far outweigh the costs[24]. In the view of high costs of smoking, primary, secondary and tertiary prevention should be enhanced[26]. The workplace can be seen as an important medium to prevent people starting to smoke and to help people quit smoking.

4.4 Cost studies of workplace smoking policies

As mentioned in the introduction, there is limited literature on the cost-benefits of workplace smoking. Another aspect is that from health economic view the studies found are not really cost-benefits analyses but cost studies.
Of the available literature to date the majority is concentrated on the USA and is not recently published. This paragraph gives an overview of studies on costs found in recently literature (after 1990) and personal communications with experts working in this field.
Note: Much of the data cited are taken from company studies and have not undergone peer review.

The Netherlands

In 1993 research by Shell Pernis was conducted on the costs of smoking employees. There are no publications of the results of this study. Personal notes from (former) employees of Shell involved in this study tell us that a smoking employee costs the company 2000 Dutch guilders per year more than a non-smoking employee (at 1993 prices, about 940 USD). These cost estimates were mainly based on absenteeism. The employees were divided in non-smoking, light smoking (< 10 cigarettes per day) and heavy smoking (> 10 cigarettes per day) groups. The heavy smokers were absent an average 7.5 days more than non-smokers, light smokers were absent 5.5 days more than non-smokers.

Scotland

In a Scottish study, the costs of employee smoking in the workplace were estimated by means of a telephone survey of 167 companies combined with evidence from a literature review[2]. The individuals responsible for smoking policies, usually personnel officers or health and safety officers, were interviewed.

Of these 167 companies, 156 (93%) operated some form of restrictive smoking policy. Of these 156 firms 57% restricted smoking to a 'smoking room'. A smoke free building policy was operated by 37% of employers with a smoking policy. Three employers (2%) placed restrictions upon the times at which employees were allowed to smoke. Seven employers (4%) stated that the decision whether to allow smoking in an office was based upon individuals' preferences.

Health benefits were the most commonly cited benefits of a restrictive smoking policy (n=130). Other benefits were safety (n=40), hygiene benefits (n=30), wider cost savings (n=19), legal benefits (n=9), benefits to staff morale (n=9) and reduced absenteeism (n=2).

Seventeen employers cited reduced productivity as a major cost of imposing worksite restrictions as smokers leave their tasks to smoke in permitted areas.

The majority of the employers were aware of the health benefits of introducing a restrictive smoking policy. However, there appeared to be a lack of awareness surrounding wider cost saving benefits of policies aimed to help employees stop smoking. Cost savings to the firm due to quitting smoking were not thought important or have not been considered[2].

In Scotland, the total estimated costs due to absenteeism of smoking employees were based on the results of a USA study conducted in 1991, the DuPont study[2]. This study was selected because of the large population (n=45,976) and diversified workforce. The results should be treated with caution because of differences in institutional structure between the USA and Scotland, and the different penalties faced between countries as a consequence of absenteeism. It followed that the total cost of employee smoking in terms of excess absenteeism was estimated almost 40 million GBP per annum (1997 prices, about 20 million USD). This may be an underestimation: smoking related absence from work is likely to increase with age. Age was not taken into account in this estimate. Furthermore, since earning profiles also tend to increase with age, the estimated costs may also underestimate the true costs.

In order to calculate the productivity loss caused by smoking, the time spent on

smoking was valued at the average wage rate. The productivity loss to Scottish employers due to smoking was estimated at 450 million GBP per annum based on 46 working weeks a year and 5 working days a week (1997 prices)[2]. It is possible that productivity losses are also incurred at smoke free workplaces. This is the case if employees are permitted to take smoke breaks in excess of usually permitted breaks and are allowed to leave the building to smoke. This study estimated that total costs varied with the time spent taking smoke breaks from an annual 372 million GBP (zero productivity loss for smoke free buildings) to 605 million GBP (smokers spend 30 minutes for smoke breaks) (1997 prices, respectively about 180 and 300 million USD). From the estimates presented it is clear that employees who smoke do impose considerable costs on their employers and that cessation programs to assist smokers to stop smoking do offer a significant potential for cost savings in the workplace as well as health benefits for smokers[2].

Sweden

The Swedish Center for Tobacco Prevention has studied the situation in Sweden. The Center has found that many employers want to promote quitting among their employees[31]. Seventy-eight percent consider it important that employees are non-smokers, while ninety-five percent think it is important that the environment is free from smoke. The following reasons are given: the Swedish Tobacco Act holds employers responsible for non-voluntary exposure to tobacco smoke, the health and well-being aspects and the economic burden of smoking breaks and sick-leave among smokers. Another reason is that a smoke free staff and premises enhances the company profile.

The Swedish Center for Tobacco Prevention has calculated the costs of smoking employees for the employer[13]. This calculation is based on the scientific literature and has taken the Swedish average salary, sick pay and the health insurance system into account. The minimum cost for an employee who smokes and earns 17,160 SEK per month (about 1,700 USD, 1999 prices) and who is absent 2.5 days extra per year is estimated at 1,800 SEK per year (about 180 USD, 1999 prices). These are only the costs due to sick leave. The costs for temporary substitute staff and production loss must be calculated for each individual case.

The Swedish Centre for Tobacco Prevention also calculated the costs of production

loss due to smoking breaks. It is assumed that it takes at least 30 minutes per working day to smoke. This assumption is based on the following[13]:

- Most people smoke 15-20 cigarettes per day
- As a conservative estimate five of these cigarettes are consumed during the working day
- Three of these cigarettes are smoked during the "natural" breaks in the morning and afternoon and at lunch time
- Two cigarettes are smoked at other times during the working day
- It takes an estimated ten minutes to smoke a cigarette
- It takes an estimated five minutes to go to and from the smoking area

The economic loss for the company due to extra smoking breaks is in Sweden estimated at SEK 18,000-24,000 (USD 1,760-2,345, 1999 prices) a year per smoker.
In Sweden it is estimated that sick leave due to smoking and smoking breaks compromise an extra economical burden for the employer of 1,936- 2,579 USD (1999 prices) a year per employee.

Germany

In Germany the Nichtraucher-Initiative Deutschland (NID) made an estimation of the costs of a smoking employee[17]. This estimation is based on costs due to: sick pay, loss of productivity due to the smoking habit itself but also due to effects on health of non-smoking employees (headache, disturbance of concentration et cetera), drop out of smoking employees and loss of know how, settling new employees into the job and paying overtime work, extra ventilation and cleaning, installing a smoking room and risk of fire due to smoking. Krause estimated that a smoking employee costs yearly minimal 2,460 Mark more than a non-smoking employee (about 1200 USD, 1995 prices)[17].

Canada

The study conducted by the Conference Board of Canada estimated the incremental costs of employing a worker who smokes compared to employing an otherwise similar non-smoker[32]. The calculation of these costs is made from the perspective of the employer and based on four factors: increased absenteeism, decreased productivity,

increased life insurance premiums and smoking area costs. The costs are derived from formulae. See for accompanying formulae Annex 4.1. The total estimated costs per smoker are over 2000 CAD per annum (about 1700 USD, 1995 prices).

Table 2. Annual cost per smoking employee in Canada 1995

Cost Factor	Cost (CAD*)
Increased absenteeism	230
Decreased productivity	2,175
Increased life insurance premiums	75
Smoking area costs	85
Total costs	2,565

* At 1995, 1.18 CAD had a value of 1 USD.

An explanation of these costs:

- Increased absenteeism: 230 CAD. Many studies have shown that smokers tend to miss more work than non-smokers. If employees are paid for their sick leave, employers experience a real cost. The Conference Board's calculations assume smokers have 1.8 more sick days each year than non-smokers.
- Decreased productivity: 2,175 CAD. Employees who smoke may take cigarette breaks at non-designated break periods if they are not allowed to smoke at their work station. The Conference Board's calculations assume smokers take 30 minutes non-designated break time per day in order to smoke two cigarettes
- Increased life insurance premiums: 75 CAD. Employers with smokers on staff will experience increased life insurance premiums over time because of the increased level of claims submitted by smoking employees. Although Canadian insurance companies do not provide a direct discount for non-smoking employees (this discount is only available to individual non-smoking policy holders), the lower level of claims associated with non-smoking employees will reduce a company's life insurance premiums over time. The Conference Board's calculations are based on applying the average discount for individual policies taken from a sample of

Canadian life insurance companies. This figure does not include disability, medical or dental insurance.

- Smoking area costs: 85 CAD. For workplaces that have a separately ventilated smoking area on the premises, there are the costs of constructing, operating and cleaning a smoking area. The Conference Board's calculations assumes a set-up cost of 11,000 CAD, amortized over 10 years, plus annual operating costs of 5% of the initial capital cost.

Table 3 gives an overview of the above mentioned annual costs per smoking employee per country. For a better comparison, the annual costs are converted to the actual costs in the year 1999[*]

[*] For the calculation of the annual costs per smoking employee per country in the year 1999 data of the Organisation for Economic Cooperation and Development (OECD) are used. Source: OECD health data for windows, version 2000 (computer program). Paris: OECD, 2000.

Table 3. Overview of annual costs ***per smoking employee*** per country in the year 1999

Country	Annual costs (USD)
The Netherlands [a]	1025
Germany [a, b]	1226
Canada [a, c]	1794
Sweden [d]	2258

[a] Based on increased absenteeism and sick pay due to smoking

[b] Based on paying overtime work for compensating absent colleagues due to smoking, extra ventilation and cleaning, installing of a smoking room and fire risk

[c] Based on increased life insurance premiums and smoke area costs

[d] Based on costs for increased sick-leave and extra breaks due to smoking

4.5 Costs of workplace smoking policies

As mentioned above, implementing a workplace smoking policy itself has a financial aspect. Costs that may be incurred when implementing a workplace smoking policy can be the result of consulting and planning the policy, dissemination of information on benefits of non-smoking, special ventilation when smoking rooms are designated, cessation programs for individual employees, substitutes for cigarettes like nicotine gum etc.

In general, it is believed that the benefits of a workplace smoking policy vastly outweigh the costs. A simulation analysis of a work-site smoking cessation program showed that smoking cessation is a very sound economic investment for a firm and is particularly profitable when long-term benefits are included[33]. This study found an eventual benefit-cost ratio of 8.75. In this analysis costs of a smoking cessation program were assumed to be 150 USD per participant.

The Lung Association of Nova Scotia's successful Quit 4 Good program costs 150 CAD per employee. The investment is well worth the return, the Conference Board of Canada study says. In fact, Cancer Care Nova Scotia, in a recent report, documented

that for every dollar an employer spent on a cessation program, they would get a 4 CAD return[34].

In the Netherlands generally a cost of 50 Dutch guilders per employee is assumed. These costs are mainly derived from offering a smoking cessation program to smoking employee in large companies.

4.6 Obstacles to implementing smoking restrictions

Although in the studies mentioned above, the benefits of implementing a workplace smoking policy may be obvious for many employers, there may be characteristics of a workplace which hinder smoking restrictions. For example, little work has been done on dealing with passive smoking when employees are exposed to it in a client's home or other residential accommodation. This is not easy to resolve due to the conflict of the individuals right to take part in a legal activity in their home and another's right not to be exposed to passive smoking during work.

Another problematic workplace is the hospitality sector, such as restaurants and bars. These businesses are concerned about the economic impact of smoking restrictions on their incomes. Studies in the USA show that revenues of hospitality businesses are not reduced by smoke free laws and ordinances, and, in most cases, they increase following passage of such laws[34, 35]. For example, a Canadian survey of 401 Québec restaurants and 600 Québec firms shows that, although businesses expected high costs from strict tobacco regulation because of change in infrastructure, decreased productivity and decreased patronage, that none of these were actually observed[36]. Annualised infrastructure costs amounted less than 0.0002% of firm revenues and 0.15% of restaurant revenues. The number of smoke free restaurants etc. is increasing, but the some owners are still resistant to clean-air regulations.

4.7 Conclusions and closing remarks

The primary goal of workplace smoking policies is to protect employees, especially non-smokers, from ETS. Other reasons for implementing a workplace smoking policy are cutting costs, enhancing company image, as well as decreasing the rate of

absenteeism, occupational accidents, conflicts, and extra costs due to smoking.
This chapter makes clear that employers can improve the health of their employees by implementing a workplace smoking policy. The protection of non-smokers from ETS does not impose increased costs to the employer. Although much of the data cited in this chapter is taken from company studies and has not undergone peer review, it can be concluded that employers gain financial benefits by implementing a workplace smoking policy. The benefits of a workplace smoking policy are far greater than the investments, especially in the long term. These financial benefits are maximised by introducing a smoke free workplace i.e. a total ban on smoking at the workplace instead of smoking rooms.

The magnitude of the burden for society and the beneficial effects of workplace smoking restrictions are considered sufficient reasons to call for stronger support by government and employers for smoke free workplaces. The workplace can be seen as an important medium to prevent people starting to smoke and to help people quit.

Annex 4.1 Formulae for cost calculations

Source: Conference Board of Canada 1997[32]

1. Increased Absenteeism

The calculation of the annual cost of increased absenteeism per employee is based on the following formula:

$$COST_{ABSENT} = (DAYS_{EVER} - DAYS_{NEVER}) \times DAILYWAGE \times (1 + BENEFITS)$$

where:

$COST_{ABSENT}$ = annual cost due to increased absenteeism (in dollars per employee)

$DAYS_{EVER}$ = average number of sick days taken annually by "ever" smokers

$DAYS_{NEVER}$ = average number of sick days taken annually by "never" smokers

DAILYWAGE = average daily wage (industrial composite)

BENEFITS = benefits paid by the employer on behalf of the employee (ratio)

2. Decreased Productivity

The annual loss in productivity that results when an employee leaves their work area to have a cigarette is calculated by use of the following calculation:

$$COST_{PROD} = CIGS \times \frac{TIME}{MINUTES} \times WAGE_{AVERAGE} \times (1 + BENEFITS) \times DAYSWORKED$$

where:

$COST_{PROD}$ = annual loss in productivity (in dollars per employee)

CIGS = average number of cigarettes smoked per day at work during non-designated break periods

TIME = time taken to smoke cigarette in minutes

MINUTES = number of minutes in an hour (60 minutes)

$WAGE_{AVERAGE}$ = average hourly wage-industrial composite (dollars)

BENEFITS = benefits paid by the employer on behalf of the employee (ratio)

DAYSWORKED = number of days worked per year (days)

3. Increased Life Insurance Premiums

The formula for calculating the annual incremental life insurance premium between employees who smoke and non-smoking employees is:

$$COST_{LIFE} = \frac{PREMIUM_{AVERAGE} \times EMPLOYER \times DISCOUNT}{1 - DISCOUNT + \%SMOKE \times DISCOUNT}$$

where:

$COST_{LIFE}$ = annual loss in life insurance premiums (dollars per employee)

$PREMIUM_{AVERAGE}$ = average group life insurance premium per employee-both employer and employee contributions (dollars per employee)

EMPLOYER = percentage of group life insurance premium paid by employer (ratio)

DISCOUNT = average discount for non-smokers on individual life insurance (ratio)

%SMOKE = percentage of the population that smokes (ratio)

4. Smoking Areas Costs

The increased cost of a smoking area is divided into two items: the cost of constructing and operating a separately ventilated smoking area; and the cost of cleaning and maintaining the smoking area.

a) Capital and Operating Costs for a Separately Ventilated Smoking Area

The formula for calculating the annual cost of constructing and operating a separately ventilated smoking area is:

$$COST_{ROOM} = \frac{CAPITAL \times \left(\frac{1}{AMORTIZATION} + OPERATING \right)}{SMOKERS}$$

where:

$COST_{ROOM}$ = annual cost of constructing and operating a separately ventilated smoking area (dollars per employee)

CAPITAL = capital cost of constructing a separately ventilated smoking area (dollars)

SMOKERS = maximum number of smoking employees accommodated by the smoking area (number of employees)

AMORTIZATION = the amortization period for the smoking area (years)

OPERATING = the annual cost of operating the smoking area expressed as a percentage of the initial capital cost (ratio)

b) Cost of Cleaning and Maintaining the Smoking Area

The formula for calculating the annual cost of cleaning and maintaining the separately ventilated smoking area is:

$$COST_{CLEANING} = \frac{\left(\frac{DAILY + WEEKLY/5}{MINUTES} \right) \times WORKDAYS}{SMOKERS} \times WAGE_{JANITOR} \times (1 + BENEFITS)$$

where:

$COST_{CLEANING}$ = annual cost of cleaning and maintaining a smoking area (dollars per employee)

DAILY = time spent cleaning ashtrays in the smoking area each day (minutes)

WEEKLY = time spent cleaning the smoking area each week (minutes)

MINUTES = number of minutes in an hour (60 minutes)

WORKDAYS = number of working days per year (days)

$WAGE_{JANITOR}$ = the average wage for janitorial employees (dollars per hour)

SMOKERS = number of smoking employees accommodated by the smoking area (number of employees)

BENEFITS = benefits paid by the employer on behalf of the employee (ratio)