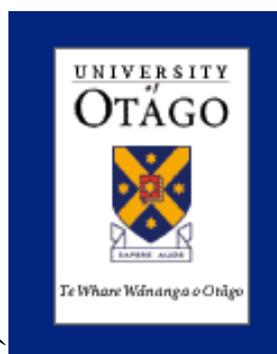


# After the Smoke has Cleared: Evaluation of the Impact of a New Smokefree Law

A Report Commissioned and Funded by the New Zealand  
Ministry of Health



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# Executive summary

## Introduction

The report details an evaluation of the process and outcomes of the sections of the 2003 Smoke-free Environments Amendment Act relating to the extension of smokefree workplace from the provisions of the Smoke-free Environments Act (1990). The aim was to identify outcomes, direct anticipated and indirect and/or unanticipated, and determine the degree to which the goals of the SEAA (2003) were met; and the degree of adherence with underlying principles, values, and process objectives. Excluded is an evaluation of the impact of the SEAA (2003) on schools and early childhood centres.

## **The Smoke-free Environments Act (1990) and Smoke-free Environments Amendment Act (2003)**

The SEA (1990) introduced restrictions on smoking in indoor workplaces, particularly in shared offices, and partial restrictions for licensed premises such as restaurants and meal-serving areas of pubs and other venues. There were no restrictions on non-meal serving areas of pubs, clubs and nightclubs. The SEAA (2003) was introduced following sustained advocacy efforts. This was partially in response to evidence that about 20% of the workforce continued to be exposed to secondhand smoke in indoor workplaces, with greater exposure among blue collar workers and Māori. The immediate trigger was the March 2003 Health Committee report to Parliament, which recommended introducing a complete ban on smoking in all indoor workplaces including bars, casinos, members' clubs and restaurants.

The SEAA (2003) was passed by Parliament on 3<sup>rd</sup> December 2003 and extended the provisions of the SEA (1990) by making all schools and early childhood centres smokefree from 1<sup>st</sup> January 2004; and most other indoor workplaces smokefree from 10<sup>th</sup> December 2004. This included bars, casinos, members' clubs and restaurants. There were specified partial exemptions, notably for prisons, hotel and motel rooms, and residential establishments such as long-term care institutions and rest homes. Dissemination of information about the forthcoming smokefree legislation occurred through a range of methods to businesses, particularly the hospitality industry, and the public.

## **International experience of the evaluation of smokefree legislation and ordinances**

The international literature on the experience of smokefree legislation is extremely positive from a public health and societal perspective. There is strong and consistent evidence that smokefree policies are effective at reducing secondhand smoke (SHS) exposure, and improving air quality in the workplace and other indoor public places. There is some evidence that short-term adverse health effects such as respiratory symptoms and impaired lung function are reduced, particularly among heavily exposed occupational groups. The limited data available suggest that there will also be positive long-term health effects.

Smokefree policies are mostly well supported by the public and key stakeholders, particularly following implementation. Compliance is generally high, and the enforcement measures and enforcement infrastructure required are modest.

There is good evidence that introducing individual workplace policies reduces tobacco consumption and smoking prevalence within the affected workforce. However, it is unclear, largely due to methodological difficulties, whether smokefree legislation reduces the prevalence of smoking and tobacco consumption at the population level. There is evidence that comprehensive smokefree legislation reduces ‘socially-cued’ smoking (e.g. in bars and restaurants), and increases motivation to quit among smokers. The best available evidence suggests that the economic effects of smokefree legislation are broadly neutral or weakly positive on the hospitality industry and other sectors.

### **Development of the evaluation approach**

Objectives and guiding principles for the legislation were identified from the Act and other key documentary sources. The main aim of the aspects of the SEAA (2003) that are the subject of this evaluation, was to reduce SHS exposure among the workforce in indoor workplaces, by extending protection to workers still exposed to SHS in these settings after the SEA (1990). Key guiding principles identified were that the SEAA (2003) should promote equity in health by improving health among groups disproportionately affected by tobacco smoking and SHS exposure, such as Māori, Pacific peoples, and low income groups. Secondly, policies should be congruent with the principles and provisions of the Treaty of Waitangi, including Māori participation, active protection of Māori interests and participation of Māori communities and organisations.

The Centers for Disease Control model for the evaluation of smokefree legislation and policies was adapted to the New Zealand context, and used to develop a logic model to underpin the evaluation, and the following information areas for the core process measures, and core (direct, anticipated) and non-core (indirect, possible) outcomes:

**Process evaluation:**

- Knowledge, attitudes and support for smokefree policies (core)
- Enforcement and compliance with smokefree policies (core)

**Outcome evaluation:**

- Reductions in exposure to SHS in the workplace (core, and principal outcome measure)
- Reductions in exposure to SHS in public places and private places such as homes (non-core)
- Reductions in health impacts due to active smoking and SHS exposure (core)
- Changes in smoking prevalence and smoking-related behaviours (non-core)
- Economic impacts (non-core)

**Knowledge, attitudes and beliefs about second-hand smoke, smoke free workplaces and public places, and support for the Smoke-free Environments Amendment Act (2003)**

The main sources of evidence were nationally representative surveys carried out by UMR research and the Health Sponsorship Council (HSC) before and after implementation of the SEAA (2003). There was also a survey of a cohort of bar managers and owners conducted by the HSC. There were some limitations to the data, mainly low response rates in the surveys and loss to follow-up in the cohort study. However, response rates between surveys were probably comparable and data collection methods were largely constant over time, so the trends reported should be robust.

The principal finding was that there was strong and growing support for the New Zealand smokefree legislation and its underlying principles. This support included all population sub-groups, including smokers, and bar managers and owners. For example, by 2006, the population surveys showed overwhelming support (over 90% agreement, and 6% or less disagreement) for the right to live and work in a smokefree environment; and for indoor workers, including bar and restaurant workers, to work in a smokefree environment. There was also very strong support for smoking bans in bars and restaurants in the surveyed population. Support was similar among men and women, Māori and non-Māori, and across all income groups. Support was less strong among smokers. For example, by 2006 there was

either roughly equal support versus non-support (UMR survey), or modest majority support for smokefree bars (HSC Monitor survey and bar managers study) among smokers; though support was greater for other smokefree provisions within the SEAA (2003).

### **Compliance and enforcement**

The main sources of evidence were: three studies which observed compliance in bars and pubs in 2005-2006; the Ministry of Health complaints database; and qualitative interviews with representatives of employers, union and the hospitality industry; tobacco control NGOs; Ministry officials; local enforcement officers; and Māori stakeholders. The major limitation to the observational evidence was that it was mainly from urban pubs, with little or not data from other workplaces. Evidence of compliance from the complaints database, has inherent limitations since it is influenced by the public's knowledge of the legislation and their propensity to make a complaint.

Observed compliance in pubs and bars was close to 100%. Enforcement occurred largely through local enforcement officers in District Health Boards in response to complaints from the public to the Ministry's freephone complaints line. Most complaints concerned smoking on licensed premises. The number of complaints fell rapidly after the first month, with less than 20 per month since October 2005. Most complaints were resolved through letters, telephone calls and visits by enforcement staff. Only five resulted in prosecutions. Anecdotal reports suggest that there may be greater non-compliance in licensed premises in more remote rural areas, and in smaller businesses with a high proportion of smokers.

Stakeholders interviewed were mostly positive about the SEAA (2003). The legislation was seen as effective at protecting staff from SHS, and was mostly accepted, even among Hospitality Association of New Zealand members who had opposed its introduction. Interviewees welcomed the focus on SHS exposure in workplaces and schools, and praised the role of NGOs in implementation. Māori stakeholders were supportive of the legislation and the process of implementation. Ongoing problem areas identified included confusion over the definition of non-enclosed outdoor areas, lack of resources for enforcement, and non-coverage of workplaces such as prisons and residential homes and care establishments.

## **Reducing Secondhand Smoke exposure**

The main sources of evidence were the HSC Monitor surveys, National Year 10 Smoking surveys, the Institute of Environmental Science Research (ESR) Bar Customer Cotinine study, and the University of Otago air quality monitoring studies. The main limitations to the evidence were: lack of biomarkers and air quality data from non-hospitality workplaces; lack of data on biomarkers of exposure among the hospitality sector workforce; and reliance on self-reports for data on SHS exposure in homes.

Prior to the SEAA (2003) at least 20% of the adult workforce was exposed to SHS in the workplace, with higher exposure among Māori and blue-collar workers. The greatest SHS exposure was among workers in the hospitality sector. The ESR study found that SHS exposure during visits to pubs and bars reduced by about 90% post-SEAA (2003). In the University of Otago air quality studies the mean fine particulate levels in bars and restaurants were similar to those in the outdoor air, and far lower than found in international studies from venues where smoking was allowed. Self-reported SHS exposure indoors at work in the previous week fell from around 20% in 2003 to 8% in 2006 among employed adults. There were greater reductions among Māori. Workplace exposure in 2006 was highest among men, and workers in blue collar jobs such as labouring and operating machinery.

A possible additional impact of restricting smoking in workplaces is less smoking in homes. Self-reported SHS exposure in the home in the HSC surveys fell from 20% in all households (42% of households with one or more smokers) in 2003, to 9% (30% of households with one or more smokers) in 2006. Reductions in self-reported SHS exposure in Māori households were more marked. In the Year 10 Smoking survey, children's reporting of smoking in the home decreased, but to a lesser degree.

## **Impact on Health**

No data were available for this aspect of the evaluation, other than from a study carried out as part of this evaluation by a team at the University of Auckland. This involved an analysis of routinely collected hospitalisation information from July 1996 to December 2005 for a range of conditions that are potentially sensitive in the short term to a change SHS exposure, to see if there was a significant change in admission rates from the long term trends after implementation of the SEAA (2003).

Hospitalisation rates for acute asthma, acute stroke, unstable angina, and exacerbations of chronic obstructive pulmonary disease (COPD) were lower in the 12 months after

implementation of the SEAA (2003), relative to the preceding 12 months; but these findings were not confirmed in a more rigorous analysis which adjusted for longer term trends and other potential influences on hospitalisation rates. There was therefore no clear evidence that the hospitalisation rate for these health outcomes reduced in the first 12 months after implementation of the SEAA (2003).

Possible reasons for the failure to demonstrate a significant change in health outcomes include: possible changes in exposure to the other causes for these conditions masking the effect of changes in SHS exposure; the limited amount of disease attributable to SHS exposure for these conditions (e.g. in comparison to active smoking); that the SEAA (2003) only directly addressed smoking in the workplace, whereas much SHS exposure occurs in the home and other private settings; and that the SEAA (2003) could only reduce SHS exposure among workers still exposed to SHS indoors in the workplace, a minority by 2004.

There is strong evidence that SHS exposure results in adverse health effects. There is good evidence that implementation of the SEAA (2003) had resulted in reduced SHS exposure in the workplace, and probably in other settings. Therefore, despite the failure of the hospitalisation study to demonstrate unequivocal health benefits, it is likely that health benefits due to the SEAA (2003) have occurred, and will continue to accumulate over time.

### **Smoking related behaviour**

The main sources of information were: data from Quitline on the number of caller registrations and nicotine replacement therapy (NRT) exchange cards issued in relation to expenditure on television advertisements which promoted smoking cessation; HSC Monitor survey data on smoking behaviour in pubs and bars, restaurant and nightclubs (socially-cued smoking); Year 10 Smoking survey data on reported parental smoking prevalence; and data on supermarket tobacco sales and the amount of tobacco released onto the New Zealand market. A major gap in the data was the lack of up to date information on adult smoking prevalence.

For a six-month period after the law change, there was evidence of increased quitting-related behaviour, with increases in caller registrations and in the issuing of NRT exchange cards through Quitline. These findings were much stronger when adjusted by expenditure on television advertising promoting smoking cessation, though promotion of the Quitline was reduced in the six months after implementation of the SEAA (2003). This suggested that an opportunity to maximise the numbers of smokers quitting was missed. There was evidence

that socially-cued smoking (smoking more than normal) in bars, nightclubs, casinos and cafés substantially declined between 2003-4 and 2005-6.

Youth smoking rates decreased significantly between 2004 and 2005, but in line with long-term trends. There was a small reduction in reported parental smoking between 2004 and 2005. The *per capita* release of tobacco onto the New Zealand market (a marker for overall consumption) was fairly constant from 2003-5, with no evidence of any change in 2005 following implementation of the SEAA (2003). There was a small decline in tobacco supermarket sales after the law change though this represents only a small proportion of the tobacco market, and may represent the continuation of long-term trends.

### **Economic impacts**

The main sources of information were routinely collected economic activity data from Statistics New Zealand website, as annual and quarterly time-series. This included data series on retail sales and employment by sector. Other data included economic activity data relating to construction in the hospitality industry and tourism numbers. Data on patronage of hospitality industry venues was available from the HSC Monitor surveys and on problem gambling from the problem gambling helpline and counselling data. Additional analysis of the retail sales data was carried out to adjust for the effect of long-term trends.

Data from the HSC Monitor surveys revealed little change in the reported patronage of bars and pubs between 2003-4 and 2005-6. There has been a downward trend in retail sales in bars and clubs since 2002. There was probably a modest additional reduction (around 4%) in retail sales of bars and clubs in the first quarter of 2005, with some evidence of displacement to liquor retailers for home sales. However, the effect was not sustained, and subsequent figures were in line with pre-existing trends. Patronage and sales for cafes and restaurants have increased steadily since 2002. The rate of increase was maintained or possibly slightly greater after implementation of the SEAA (2003). Trends in employment in these hospitality sectors largely mirrored the retail sales data.

There was evidence of decreased expenditure on gambling, and large falls in the numbers accessing the problem gamblers helpline and face-to-face counselling services in 2005. The number of overseas visitors and their expenditure increased in 2005, though the increase in numbers of visitors was less than the long term trend.

## **Conclusion**

In conclusion, despite some limitations and gaps in the evidence, the evaluation of the recent smokefree legislation in New Zealand adds further evidence to the positive experiences and outcomes from other jurisdictions such as Ireland, Norway, Scotland, New York, California that have recently introduced similar legislation.

# 1. Introduction, scope and approach to the evaluation of the Smoke-free Environments Act Amendment

## Summary

This section describes the scope, approach and methods used in this evaluation report. The report details an evaluation of the process and outcomes of the sections of the 2003 Smoke-free Environments Amendment Act relating to the extension of smokefree workplace from the provisions of the Smoke-free Environments Act (1990). The aim was to identify outcomes, direct anticipated and indirect and/or unanticipated, and determine the degree to which the goals of the SEAA (2003) were met; and the degree of adherence with underlying principles, values, and process objectives. Excluded is an evaluation of the impact of the SEAA (2003) on schools and early childhood centres.

## 1.1. Introduction

This report describes an evaluation of the New Zealand Smoke-free Environments Amendment Act (2003), henceforth referred to as the SEAA (2003). This Act became law on 10<sup>th</sup> December 2003, with most of the provisions coming into force on 10<sup>th</sup> December 2004. In particular, the report focuses on the process of implementation and outcomes of the parts of the legislation relating to smokefree workplaces and public places, which extended the provisions of the Smoke-free Environments Act (1990) – henceforth referred to as the SEA (1990)

The New Zealand Ministry of Health commissioned the evaluation. It was carried out by a team based at the Department of Public Health, Wellington School of Medicine and Health Sciences, the University of Otago; the Health Sponsorship Council; and the School of Population Health of The University of Auckland.

The report begins with a description of the rationale, scope and approach taken to the evaluation of the SEAA (2003), then sketches the SEA (1990) and traces the context, development and implementation of the 2003 Act. Next, we review the international evidence from evaluations of

smokefree legislation <sup>a</sup> in other settings. Finally, we present the results from the SEAA (2003) evaluation, and discuss our findings. Supplementary tables and full reports from additional studies carried out during the conduct of this evaluation are appended.

## 1.2. Scope of the evaluation

In common with the Ministry's interim evaluation report 'The Smoke is Clearing: Anniversary report 2005', (Ministry of Health, 2005b) this report focuses on evaluating the SEAA (2003) provisions relating to the extension of smokefree indoor workplaces. It does not include an evaluation of the impact of making schools and early childhood centres smokefree. However, there is a strong public health case for the Ministry of Health to commission an independent evaluation of the impact of this aspect of the legislation. Such an evaluation is also justified from an international health perspective, given that other countries will wish to benefit from New Zealand's experience of implementing robust tobacco control policies.

## 1.3. Approaches to policy evaluation

The evaluation of health-related policy or legislative interventions is complex, and involves many areas of theory and practice. Determining whether changes in desired outcomes or costs and harms are attributable to an intervention is seldom straightforward, particularly for interventions introduced in environments where multiple influences could influence the outcome, and where there may be no comparison group. Issues requiring decisions about evaluation may include:

- The overall *purpose* of the evaluation. Evaluations can be *outcome-orientated*; i.e. concentrating on assessing effectiveness or cost-effectiveness, and the achievement of intended objectives or other valued outcomes. They can also be *process-orientated*; i.e. focusing on assessing the process of implementation, such as whether the intervention was delivered as intended and in accordance with values such as equity and acceptability to the target groups. Many evaluations encompass both these approaches.
- The *perspective* of the evaluation. Evaluations can be performed from many different perspectives, for example, those of government, society, specific sub-groups within society, health providers, or economic interests.

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<sup>a</sup> Smokefree legislation in this report refers to legislation or policies which make all or almost all workplaces, including hospitality industry settings, totally smokefree; with no smoking at all allowed in any internal area.

- The *timing* of the evaluation. Deciding the appropriate time to perform an evaluation is particularly pertinent for complex policy interventions, where outcomes may occur in the medium or long term: if performed too soon outcomes may not yet have occurred; if too late, information may no longer be available.

#### **1.4. Evaluation approach adopted in this report**

In this report we aim to evaluate process and outcome measures in relation to the SEAA (2003). Our aim is to identify and determine the degree to which the main direct anticipated and indirect and/or unanticipated outcomes have been met; as well as the degree of adherence with underlying principles, values, and process objectives.

The evaluation was commissioned in April 2006 and hence the timing of the evaluation was fixed. We have broadly adopted the perspective of the current Ministry of Health, as articulated in the aims within the Act and within key strategy documents. Where appropriate, we have also carried out evaluation from the perspective of specific population groups such as smokers and ethnic groups, and interest groups such as the hospitality industry <sup>b</sup>.

The rationale for evaluating largely from the Ministry's perspective is that the Ministry's stated broad objectives are shared with those of key public health advocacy groups including the tobacco control non-governmental organisations (NGOs). Thus, the three core objectives listed in the 2004-2009 Tobacco Control Plan (Ministry of Health, 2005a) are to prevent smoking initiation, promote smoking cessation, and prevent harm to non-smokers from secondhand smoke (SHS) exposure <sup>c</sup>. These are congruent with the aims of most public health workers and tobacco control NGOs, though not with the perspectives of some sections of the business community (i.e. those of the tobacco industry and its business allies).

#### **1.5. Models of evaluation for tobacco control interventions**

A commonly used approach to the process of evaluation was articulated by the Centers for Disease Control and Prevention (CDC) in their publication 'Introduction to program

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<sup>b</sup> The term 'hospitality industry' is used in this report to refer to pubs, bars, members clubs, nightclubs, cafes, restaurants, hotels, motels and other businesses whose main purpose is to serve food and drink and/or provide serviced, generally short-term accommodation.

<sup>c</sup> Secondhand smoke exposure is defined as secondary exposure of individuals to tobacco smoke as a result of others smoking tobacco.

evaluation for comprehensive tobacco control programs'. (MacDonald et al., 2001) This involves the preparation of a logic model which specifies key inputs, activities, outputs and short-term, intermediate and long-term outcomes. Outcome indicators (defined as specific, observable and measurable characteristics or changes which represent achievement of an outcome) are used to assess whether outcomes are achieved. The importance of process evaluation with its emphasis on measuring process indicators to assess the adequacy of program implementation is acknowledged. CDC has used this approach to develop a logic model for the goal of eliminating non-smokers' exposure to SHS. A series of process and outcome indicators were developed and assessed for their quality and utility by an expert panel. (Starr et al., 2005b) The CDC approach has been adapted for use in the evaluation of the SEAA (2003).

## 2. The Smoke-free Environments Act (1990) and Smoke-free Environments Amendment Act (2003)

### Summary

This section describes the smokefree workplaces provisions of the Smoke-free Environments Act (1990) (SEA (1990)) and the 2003 Smoke-free Environments Amendment Act (SEAA (2003)). The events leading up to the introduction of the SEAA (2003), and the pre-implementation activities are also described.

The SEA (1990) introduced restrictions on smoking in indoor workplaces, particularly in shared offices, and partial restrictions for licensed premises such as restaurants and meal-serving areas of pubs and other venues. There were no restrictions on non-meal serving areas of pubs, clubs and night clubs. The SEAA (2003) was introduced following sustained advocacy efforts. This was partially in response to evidence that about 20% of the workforce continued to be exposed to secondhand smoke in indoor workplaces, with greater exposure among blue collar workers and Māori. The immediate trigger was the March 2003 Health Committee report to Parliament, which recommended introducing a complete ban on smoking in all indoor workplaces including bars, casinos, members' clubs and restaurants.

The SEAA (2003) was passed by Parliament on 3<sup>rd</sup> December 2003 and extended the provisions of the SEA (1990) by making all schools and early childhood centres smokefree from 1<sup>st</sup> January 2004; and most other indoor workplaces smokefree from 10<sup>th</sup> December 2004. This included bars, casinos, members' clubs and restaurants. There were specified partial exemptions, notably for prisons, hotel and motel rooms, and residential establishments such as long-term care institutions and rest homes. Dissemination of information about the forthcoming smokefree legislation occurred through a range of methods to businesses, particularly the hospitality industry, and the public.

## 2.1. The Smoke-free Environments Act (1990)

The SEA (1990) introduced a range of tobacco control measures including those addressing tobacco promotion and advertising, sale, labelling and testing of tobacco products. The Act also introduced restrictions on smoking in indoor workplaces, particularly in shared offices, and partial restrictions for licensed premises such as restaurants and meal-serving areas of pubs and other venues. There were no restrictions on non-meal serving areas of pubs (box 2.1). (Ministry of Health, 1990) An amendment in 1995 replaced the total ban on smoking in gaming areas of casinos with a more limited ban on smoking in a quarter of those areas.

The first of the four aims of the SEA (1990) was stated as: *“to reduce the exposure of people who do not themselves smoke to any detrimental effect on their health caused by smoking by others.”*

### **Box 2.1 Principal provisions of the Smoke-free Environments Act (1990)**

All workplaces to have a written smoking policy based on the principle that employees who do not smoke, or who do not wish to smoke in the workplace, should be as far as reasonably practicable protected from tobacco smoke in the workplace

Minimum provisions to include:

- No smoking in lifts and ‘common air space’ office areas (except where all employees working in a specified area agree that smoking can be permitted in that area)
- No smoking in  $\geq$  half of the total area of cafeterias or lunchrooms
- No smoking in parts of the workplace where the public usually have access
- No smoking on passenger carrying aircraft, or buses (except ‘small’ buses where the driver and all passengers agree smoking should be permitted); but allowed in designated areas on ships and trains, and passenger lounges
- Smoking permitted on licensed premises, except in meal-serving areas, where at least half of the seats should be designated as non-smoking
- Smoking permitted in restaurants in half or less of the seating area in single-roomed restaurants, or in designated smoking rooms (which contained half or less of the total seating area) in multi-roomed restaurants

## **2.2. Events leading to the Smoke-free Environments Amendment Act (2003)**

Self-reported exposure in the workplace was monitored from 1989 to 2001 through a series of National Research Bureau (NRB) surveys. Implementation of the SEA (1990) was associated with a reduction in SHS exposure during working hours from 31% in 1989 to 21% in 1991, with similar reductions in exposure during breaks. (National Research Bureau, 1989, 1991) However, during the next decade reported SHS exposure remained fairly static, with a substantial minority, 17% of the workforce, still reporting exposure during worktime by 2001. (National Research Bureau, 1989, 2001) There was also evidence in these surveys that SHS exposure remained far greater among Māori and blue collar workers. Similarly, a study of SHS exposure in all settings conducted in 1992-3, found that the mean number of minutes per week of SHS exposure varied from 31 minutes in Europeans, to 53 minutes in Pacific Islanders and 79 minutes in Māori; and from 33 minutes per week to 50 minutes week between subjects in the highest and lowest quintiles of household income respectively. (Whitlock et al., 1998) The Public Health Commission, in a 1994 report about tobacco products, noted that most of those exposed in the workplace were blue collar workers, and service personnel in bars, hotels, restaurants and coffee shops. (Public Health Commission, 1994) As a result there were continued pressures for further action to address SHS in the workplace.

Subsequent events were summarised in a report commissioned by Action on Smoking and Health – ‘Going smokefree in New Zealand, lessons from the battlefield’. (Price et al., 2006) In July 1999, Tukuroirangi Morgan MP introduced the Smoke-free Environments (Enhanced Protection) Amendment Bill as a Members Bill. This proposed to extend the provisions of the SEA (1990) by banning all smoking in buildings and grounds of educational establishments at any time. Further restrictions on workplace smoking were proposed to extend protection from SHS exposure protection, though this did not include in licensed premises. The Bill was subsequently supported by Tuariki Delamere MP, and then taken over by MPs Steve Chadwick and then Judy Keall, and a Supplementary Order Paper was introduced to Parliament in 2001 to amend the Bill. This now included specific provisions to ensure that 50% of licensed premises were designated as non-smoking areas, though clubs were exempted.

Submissions on the Bill and Supplementary Order Paper were received from 2001-2003. In March 2003, the Health Committee reported back to Parliament with the recommendation that

a complete ban on smoking should be introduced in all indoor workplaces including bars, casinos, members' clubs and restaurants.

The Health Committee report described the main aim of the revised Bill as: *“to extend the protections for workers, volunteers and the public in the Smoke-free Environments Act 1990 particularly against exposure to second-hand smoke, to reduce the harm caused to individuals by their smoking, to further restrict minors' access to smoking products and the visual influence of smoking in front of minors, and to provide limited enforcement powers”*.

The Smoke-free Environments (Enhanced Protection) Amendment Act was passed by Parliament on 3<sup>rd</sup> December 2003, and received Royal Assent on December 10<sup>th</sup> 2003. The only change to the smokefree aspects of the Bill, as reported back from the Health Committee in March 2003, was the removal of the provision to issue infringement orders against individual smokers.

### **2.3. The Smoke-free Environments Amendment Act (2003)**

The SEAA (2003) extended the provisions of the SEA (1990) by making all schools and early childhood centres smokefree from 1<sup>st</sup> January 2004, and most other indoor workplaces smokefree with effect from 10<sup>th</sup> December 2004 (see box 2.3). (Ministry of Health, 2003c)

The indoor workplaces covered included factories and hospitality venues such as pubs, bars, casinos, clubs, restaurants and cafes. The SEAA (2003) also included provisions further restricting the display and sales of tobacco products, reducing under 18-year-old access to tobacco and herbal smoking products, and providing for stronger future regulation of smoking product information and warnings.

**Box 2.3 Principal smokefree provisions of the  
Smoke-free Environments Amendment Act (2003)**

Employers responsible for taking ‘all reasonably practical steps’ to ensure that no person smokes at any time in internal areas within all workplaces, including licensed premises, restaurants, gaming machine venues and casinos, except for specified exceptions:

- Work vehicles: where the public does not usually have access and where employees and volunteers who use it regular have asked for smoking to be permitted and not objected to smoking in the vehicle
- Hotel and motel bedrooms and cabins on ships or sleeping compartments on trains
- Hospital care and residential disability institutions, and rest homes: smoking allowed (for residents only) in dedicated smoking rooms with independent mechanical ventilation system taking air outside workplace and where ‘reasonably practicable steps’ have been taken to minimise escape of smoke to the rest of the workplace
- Prisons: to have written smoking policies prepared for the protection of health of employees and inmates. Policy should protect ‘as far as is reasonably practicable’ the rights of staff and inmates to protection from SHS, and non-smoking inmates should not be required to share a cell with a smoker
- Open areas of workplaces (or non-internal areas). A non-internal area was defined as one where, when all windows, doors and other closable openings are closed, is completely or substantially enclosed by ceiling, roof, wall, sides and the closable openings

No smoking on any part of the premises of schools and early childhood centres (including open areas)

No smoking in any operating taxi

No smoking in enclosed travel terminals

## 2.4. The pre-implementation period

In the period prior to implementation, the Ministry of Health established a ‘Legislation Communication Group’, comprising of tobacco control and communication experts. This was responsible for liaising with key stakeholders such as hospitality venues, sports clubs, workplaces and retailers. The Legislation Communication Group established specialist advisory groups for each of these areas with stakeholder representatives included. Leaflets and other communication resources about the SEAA (2003) were developed, and 60,000 were sent to businesses. Communications included three separate letters sent to 11,000 hospitality businesses describing the changes to the law and providing information packs and signage.

The Health Sponsorship Council (HSC) developed a public awareness campaign, and a variety of mass media campaigns were implemented. These included the ‘*Let’s Clear the Air*’ national television commercial developed by the Quit Group and HSC, which was run in August-December 2003. This drew attention to SHS exposure among hospitality staff in the workplace and encouraged smokers to smoke outside bars and restaurants. It was supported by print and radio advertising, and resources such as posters and stickers. The HSC developed a further media campaign to inform the public about the impending law change on smokefree workplaces. This ran in November-December 2004 and January 2005. There was a national TV commercial reminding viewers about the date of implementation of the Smokefree legislation in the weeks immediately before 10<sup>th</sup> December, and a commercial run in January 2005, set in a nightclub reminding people about the law with the message ‘*You can smoke, as long as you take it outside*’. Te Reo Māori versions were screened on the Māori television channel.

This campaign was also supported by print and radio advertising, and a range of leaflets and posters. An information helpline, 0508 SMOKEFREE, was launched in November 2004. A Smokefree Law website ([www.smokefreelaw.co.nz](http://www.smokefreelaw.co.nz)) was developed with additional information, including links to all the resources. The Ministry’s efforts were supported by additional promotional material produced by NGOs, such as the Smokefree Coalition and Action on Smoking and Health (ASH).

From when the Bill was first announced, and continuing into the pre-implementation period, there was strong opposition to comprehensive smokefree legislation. This came mainly from the tobacco industry (notably British American Tobacco), and the hospitality industry – particularly expressed through the Hospitality Association of New Zealand (HANZ) and Clubs New Zealand. The main arguments presented were: dire predictions of economic

effects such as mass bar closures and job losses, and loss of tourism earnings; the difficulty of enforcement and widespread non-compliance; questioning the health effects of SHS; questioning the rights of the government to control smoking in commercial premises; and promoting an alternative strategy of using ventilation and smoking areas or rooms (also see section 6.3.7). (Price et al., 2006)

### 3. International experience of the evaluation of smokefree legislation and ordinances

#### Summary

This section describes the methods and summarises the international evidence from the evaluation of comprehensive smokefree legislation (i.e. legislation or policies which bans smoking from all or almost all indoor workplaces, including hospitality industry settings), drawing particularly on recent experiences from Norway, Ireland, California, and New York.

The international experience of smokefree legislation is extremely positive from a public health and societal perspective. There is clear evidence that smokefree policies reduce SHS exposure, and improve air quality in the workplace and other indoor public places. There is some evidence that short-term adverse health effects such as respiratory symptoms and impaired lung function are reduced, particularly among heavily exposed occupational groups. The limited data available suggest that there will also be positive long-term health effects.

Smokefree policies are mostly well supported by the public and key stakeholders, particularly following implementation. Enforcement measures and resources dedicated for enforcement have been modest, but compliance has been high.

There is good evidence that introducing individual workplace policies reduces tobacco consumption and smoking prevalence within the affected workforce. However, it is unclear, mainly due to methodological difficulties, whether smokefree legislation reduces the prevalence of smoking and tobacco consumption at the population level. There is some evidence that comprehensive smokefree legislation reduces ‘socially-cued’ smoking (e.g. in bars and restaurants), and increases motivation to quit among smokers. The best available evidence suggests that the economic effects of smokefree legislation are broadly neutral or weakly positive on the hospitality industry and other sectors.

The impact of smokefree legislation on disadvantaged, minority and indigenous peoples does not seem to have been evaluated. This is particularly important as such communities generally have higher prevalences of smoking, SHS exposure and smoking-related health effects.

### 3.1. Introduction

In order to appraise the evidence available from New Zealand data sources and studies and to put the findings of the evaluation into a broader international context, it is important to review the scope, methods used and results of evaluations of smokefree legislation internationally.

### 3.2. Methods

The six information areas which were used for the evaluation of the SEAA (2003) (see section 4.3) were used to structure the review of international experience:

- Knowledge, attitudes and support for smokefree policies
- Enforcement of, and compliance with, smokefree policies
- Reductions in exposure to SHS in the workplace, public places and private places such as the home
- Health impacts due to reductions in active smoking and exposure to SHS
- Changes in smoking prevalence and smoking-related behaviours
- Economic impacts

We identified relevant published literature through searches of bibliographic data sources, relevant websites, bibliographies of published papers and reports, and requests to investigators. We included papers and reports which evaluated the impact of comprehensive smokefree legislation and ordinances implemented at country, state or district level for each of the above dimensions. We have defined comprehensive smokefree legislation as that which at a minimum bans smoking in all indoor workplaces, including in hospitality industry settings, other than a few defined exceptions <sup>d</sup>.

Evidence has been drawn particularly from the experiences of jurisdictions which implemented comprehensive smokefree legislation more than two years ago, and for which evaluation has been carried out using a range of routine and specially commissioned data collection systems. These include:

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<sup>d</sup> Examples of common exceptions are to exempt or introduce less stringent restrictions in workplaces which are also places of residence e.g. prisons, residential care homes and long-stay hospitals.

- California – state-wide comprehensive smokefree workplace legalisation implemented 1<sup>st</sup> January 1995, with restaurants, bars and taverns exempted until 1<sup>st</sup> January 1998.
- New York – 1995 Act introduced restrictions in many offices and restaurants as well as on public transport and stations, cinemas and theatres. Citywide comprehensive smokefree legalisation implemented 30<sup>th</sup> March 2003.
- Republic of Ireland – voluntary codes of practice on workplace smoking during 1990s and limited legislation for restrictions on smoking in public places from 1995. Comprehensive national smokefree workplace legislation from 29<sup>th</sup> March 2004.
- Norway - comprehensive national smokefree workplace and public places legislation introduced in 1988, and extended to bars and restaurants from 1<sup>st</sup> June 2004.

### **3.3. Knowledge, attitudes and support for smokefree policies**

The international experience of public attitudes towards and support for smokefree legislation was reviewed in the 2005 UK Royal College of Physicians report. (Tobacco Advisory Group of the Royal College of Physicians, 2005a) This found that recent experience from around the world was of widespread public support, which increases during the build-up to introduction, and increases further after smokefree legislation is implemented. Evidence cited included studies from California, (Weber et al., 2003) Connecticut, (Global Strategy Group, 2004) New York City, (RTI International et al., 2004) and Ireland. (Office of Tobacco Control, 2005b) Typical levels of support were 60-70% before and at the time of implementation, rising to 75-90% afterwards.

The example of Ireland is particularly striking. Support for the Irish smokefree law among the public increased from 67% before, to 82% four months after implementation. (Office of Tobacco Control, 2005b) Among smokers, there was 64% support for smokefree pubs eight to nine months after the smokefree law was implemented, and most smokers (83%) reported that the smokefree law was a ‘good’ or ‘very good’ thing. (Fong et al., 2005) Comparisons of data from 3-4 months before the smokefree legislation with the post-legislation surveys showed large increases in support among smokers for smokefree workplaces. The increase was much greater than over the same time period in the UK, where no change in the law occurred. (Fong et al., 2005)

Another recent example is Norway, where support for the Smokefree law increased from 47% in surveys six months before to 58% six months after implementation. Support for smokefree

bars and restaurants in a different national survey increased from 54% before the legislation to 68% one year after. A survey in May 2005, a year after the legislation, found that 77% thought the law had been a success. There were smaller increases in support for legislation among a cohort of hospitality industry employees (from 48% pre to 51% three months post implementation, with 18-22% neutral and the proportion opposed remaining at 30-31%). (Directorate for Health and Social Affairs, 2005)

### **3.4. Enforcement and compliance with smokefree policies**

The international experience of smokefree workplace legislation is that initial views of the public, politicians and employers are that it will be unenforceable or at least require extensive enforcement infrastructure and resources. This is because of high anticipated levels of sustained non-compliance, particularly in bars. These expectations are generally not supported by events, with high and increasing levels of compliance generally observed.

For example, in California, patron compliance (defined as no smoking patrons observed in the venue when inspected) increased from 92.2 to 98.5% between 1998 and 2002 for bars with restaurants, and from 45.7 to 75.8% in free-standing bars. (Weber et al., 2003) In Boston, three months after the introduction of comprehensive smokefree regulations, a random sample of 102 bars found only three with any patrons smoking inside, and that complete removal of ash-trays had occurred. After eight months, only six violation notices had been issued to free-standing bars in Boston. (Skeer et al., 2004)

In Ireland, inspection data from almost 42,706 compliance checks by Environmental Health Services in the first year after implementation of the smokefree legislation found compliance rates (no smoking observed on the premises) of 94%, ranging from 89% in pubs to 98% in restaurants. (Office of Tobacco Control, 2005a) Compliance of office and factory workplaces in the Health and Safety Authority Inspection Programme was 92%, in almost 7,500 inspections. (Office of Tobacco Control, 2005b) Complaints to the smokefree compliance line in Ireland were concentrated in the first month (677 complaints, 30% of all calls in the first year), and then declined to around 150 per month over the first year, (Office of Tobacco Control, 2005a) and to less than 120 calls per month in 2005. A study in 38 Dublin pubs visited 7-12 months after the smokefree legislation, found that of over 2500 customers, none were smoking inside the pubs. (McCaffrey et al., 2006) In Norway, before the smokefree legislation, 43% of bar and restaurant employees thought that many guests would refuse to obey the law. However, four months after implementation, only 7% reported many guests refusing to comply. Feedback from the municipalities responsible for enforcing the smokefree

law in Norway was very positive about compliance levels. (Directorate for Health and Social Affairs, 2005)

### **3.5. Exposure to second-hand smoke in the workplace public places and private settings**

Reducing SHS exposure of workers and members of the public (such as customers in the hospitality industry) in indoor workplaces is usually the main immediate aim of smokefree legislation.

Opponents of smokefree legislation such as the former UK Secretary of State for Health, Dr John Reid, have argued that the introduction of comprehensive restrictions on smoking in indoor workplaces, particularly in bars and restaurants, may result in displacement of smoking to other indoor settings, and hence indirectly cause an increase in smoking and SHS exposure in the home and other non-workplace settings. (Reid, 2005) However, the opposite effect is also possible. Thus, a reduction in tobacco smoking in the home could result from reduced overall smoking prevalence (see next section), and changed social norms about the acceptability of smoking around non-smokers brought about by smokefree workplace legislation and associated debate and health promotion campaigns. This is made plausible by the finding that support for bans on smoking in public places, and beliefs about the dangers of SHS are associated with the likelihood of smokers living in a smokefree home. (Borland et al., 2006) Hence, an additional dimension of some evaluations has been to investigate the effect of smokefree legislation on exposure to SHS in the home and other private settings.

In the international literature, changes in the level of workplace SHS exposure are one of the most commonly studied aspects of smokefree legislation and regulation. Methods include:

- self-reports of exposure to SHS by business owners/managers, workers, customers and the public
- measurement of air quality, for example, in workplaces, hospitality industry venues, other public places, and homes

- measurement of biomarkers of exposure to SHS such as cotinine <sup>e</sup> levels among workers, customers and the public

Workplaces where smoking is allowed are highly polluted when assessed by markers of air quality such as respirable particles (PM<sub>2.5</sub>), vapour phase nicotine, and polycyclic aromatic hydrocarbons. (Edwards et al., 2006; Gee et al., 2006; Hammond, 1999; Nebot et al., 2005; Repace, 2004) For example, levels of PM<sub>2.5</sub> in pubs and bars are many times higher than are seen next to heavily trafficked streets in urban areas. (Edwards et al., 2006; Repace, 2004) Studies using biomarkers show that hospitality workers such as bar staff in the UK have very high levels of SHS exposure, 3-4 times those of non-smokers who live with smokers. (Jarvis, 2001; Jarvis et al., 1992; Tobacco Advisory Group of the Royal College of Physicians, 2005a)

Comprehensive smokefree legislation which bans smoking in all indoor areas of workplaces is highly effective at reducing SHS exposure in indoor workplaces. A study from the USA involving six bars, a casino and a pool hall in Delaware, found that the mean levels of respirable particles and polycyclic aromatic hydrocarbons reduced on average to less than 10% and 5% of their pre-smokefree legislation levels. (Repace, 2004) A similar study from western New York State found a 93% reduction in PM<sub>2.5</sub> levels (from mean of 412 µg/m<sup>3</sup> to 27 µg/m<sup>3</sup>) at 14 bars and restaurants where active smoking had been allowed pre-legislation. (Travers et al., 2004) Another study from New York State measured SHS exposure before and after smokefree legislation in non-smoking non-hospitality; hospitality non-casino; and hospitality casino workers. (Abrams et al., 2006) Casino workers were included because casinos were exempt from the legislation. Self-reported SHS exposure over a four-day period decreased from a median of over 20 hours to six hours in non-casino hospitality workers, but was 18 and 19.8 hours respectively in casino workers. There was no significant change in non-hospitality workers, who had low self-reported exposure at the outset. Mean urinary cotinine values fell from 4.9 ng/ml to 0.1 ng/ml in the non-casino hospitality workers and from 2.0 ng/ml to 0.1 ng/ml in the non-hospitality workers. There was only a modest and not statistically significant change in cotinine levels among casino workers (8.4 ng/ml versus 6.5 ng/ml). There were similar findings in another study of bar workers from New York State. (Farrelly et al., 2005) A study of bar-tenders from San Francisco before and after the

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<sup>e</sup> Cotinine is a specific metabolite of nicotine, which can be measured in the blood, urine and saliva. Levels are raised in people who have smoked or have been exposed to SHS for 2-3 days following exposure.

implementation of smokefree legislation reported reductions in median self-reported SHS exposure over the previous seven days from 28 to two hours. (Eisner et al., 1998)

In Norway, there were marked improvements in perceived air quality in the workplace among bar and restaurant workers and customers following the smokefree legislation. (Directorate for Health and Social Affairs, 2005; Lund et al., 2005) For example, there was a reduction from 44% to 6% in hospitality workers who were occasionally or frequently bothered by SHS exposure in the workplace. This is supported by air quality data which showed a reduction in mean total dust levels from 262  $\mu\text{g}/\text{m}^3$  in 13 bars and restaurants before the legislation to 77  $\mu\text{g}/\text{m}^3$  after, and in nicotine levels from 28  $\mu\text{g}/\text{m}^3$  pre to 0.6  $\mu\text{g}/\text{m}^3$  post legislation. There were also large reductions in post-shift urinary cotinine levels among non-smoking bar and restaurant workers. (Ellingsen et al., 2006)

In Ireland, there was an 83% reduction in air nicotine levels in 20 Galway city centre bars following the smokefree legislation, and a mean 69% reduction in saliva cotinine among 35 hospitality workers at 15 hotels. (Mulcahy et al., 2005) A study from 24 Dublin pubs before and one year after the smokefree legislation found a reduction in mean levels of  $\text{PM}_{10}$  from 79 to 37.4  $\mu\text{g}/\text{m}^3$  (53% decrease), and in  $\text{PM}_{2.5}$  from 40.2 to 5.0  $\mu\text{g}/\text{m}^3$  (88% decrease). (Office of Tobacco Control, 2005b) Finally, a study of no-smoking bar staff in the Republic of Ireland and Northern Ireland showed 80% reductions in salivary cotinine among the Irish bar staff following introduction of the smokefree legislation. This compared with a reduction of 22.5% in the Northern Irish staff (where there was no smokefree law) over the same period. (Allwright et al., 2005)

There is less direct evidence about the effect of introducing smokefree workplace legislation on domestic SHS exposure. The topic was reviewed in the Royal College of Physicians report into smokefree legislation. (Tobacco Advisory Group of the Royal College of Physicians, 2005a) This found no evidence to support UK politician John Reid's contention that making hospitality venues smokefree would increase SHS exposure of children and families in the home, and some indirect evidence to suggest the opposite. For example, population surveys in the UK found steady reductions in children's cotinine levels, including among children from households with one or more smokers, between 1988 and 2003. This was during a period when smoke free workplaces steadily increased. Similarly, in Australia, as workplace smoking restrictions expanded, the proportion of adult smokers reporting that they did not smoke in their home increased. Cross-sectional studies from Australia and the USA have also found that smokers working in smokefree workplaces were more likely not to smoke in their

home. (Tobacco Advisory Group of the Royal College of Physicians, 2005a) Evidence from Ireland shows that the 2004 smokefree law was associated with a statistically significant decrease in the proportion of homes where smoking was allowed – from 85% to 80%. (Fong et al., 2005) However, this was similar to the decrease from 82% to 76% over the same time period in the “control country” for this study (the UK).

### **3.6. Reductions in health impacts**

The link between smoking and ill health is strong and extremely well established scientifically. (Doll et al., 2004; U.S. Department of Health and Human Services, 2004) The evidence supporting an association between SHS exposure and harmful health effects is less extensive, but nevertheless compelling. (International Agency on Research on Cancer, 2004; U.S. Department of Health and Human Services, 2006) There is good evidence from a range of studies that exposure to SHS increases the risk of heart disease by around 30%. (Law et al., 1997) Other cardiovascular and respiratory conditions are also sensitive to SHS: stroke, exacerbations of chronic obstructive pulmonary disease (COPD), asthma attacks, upper and lower respiratory tract infection, and Sudden Infant Death Syndrome (SIDS). (U.S. Department of Health and Human Services, 2006)

In New Zealand, analysis of the 1981 and 1996 Census data showed that exposure to SHS in the home increased all cause mortality rates, (Hill et al., 2004) and mortality from cardiovascular and respiratory diseases. (Hill, 2003) Prior to the SEAA (2003), deaths caused by exposure to SHS in New Zealand were estimated at about 347 per year, 246 due to current and previous home exposures, 101 due to current and previous exposure at work, with considerable variation according to the assumptions used. Most of these were due to excess cardiovascular mortality among those exposed. On the basis of present exposures, it was estimated there would be about 325 (plausible range 174-490) deaths prevented in the future if all current SHS exposure in New Zealand ceased, and 70 deaths per year prevented if all SHS exposure at work ceased. (Woodward et al., 2001)

In the USA, it has been estimated that providing smokefree workplaces for the 31% of the population who work indoors in settings where smoking is allowed would prevent 1,500 myocardial infarctions and 350 strokes in the first year alone. (Ong et al., 2004) Additional benefits might occur if smokers quit or cut down the number of cigarettes smoked because of the law change, resulting in reduced SHS exposure for non-smokers outside of the workplace – in the home or in other settings where smoking is allowed.

It is therefore plausible that the occurrence of cardiovascular illnesses and mortality among non-smoking workers exposed to SHS in indoor workplaces in New Zealand would decline following the implementation of comprehensive smoke-free legislation. However, given the likely long-term nature of some health impacts and of reductions in overall smoking prevalence, along with continuing SHS exposure in other settings such as homes, and the high proportion of workplaces that were already smokefree before the SEAA (2003), the ability to demonstrate health impacts attributable to SHS reductions in the workplace is likely to be limited. The best way to demonstrate such effects may be by studying short term impacts like lung function and respiratory symptoms among the most heavily exposed groups such as bar-workers.

The most well-known study investigating population effects of smokefree legislation was undertaken in Helena, Montana, USA. Researchers analysed the numbers of admissions for acute myocardial infarction (AMI) to the only hospital in Helena before, during and after the repeal of local comprehensive smokefree legislation. They compared the data with the numbers of cases occurring over the same period among the population resident outside Helena where there was no smokefree law. (Sargent et al., 2004) There was a marked fall in AMI admissions in Helena during the period the law was in effect, whilst AMI admissions outside of Helena increased slightly during the same period. The fall in AMI admissions in Helena was reversed when the smokefree law was repealed, However, the study had a number of limitations: the total number of cases observed was small; the statistical approach to analysis did not account for the trend of increasing admissions over time; and the authors did not make any direct observations to measure how much exposure to SHS was reduced during the months when the law was in force.

More recently, other US researchers have reported a significant decrease in AMI hospitalisations among residents of Pueblo, Colorado, a geographically isolated city of 103,648 residents that introduced a Smoke-free Air Act in July 2003. Compared with the 18 months years before its implementation, there was a 27% relative risk reduction in AMI hospitalisations among residents within Pueblo city limits in the 18 months after, while no significant change was evident among residents outside the city, or in those of the adjacent county, after adjusting for the usual seasonal variation in AMI rates. (Bartecchi et al., 2006) A study from Italy found statistically significant reductions in AMI admissions in the six months after introduction of smokefree legislation in January 2005 compared to the period a year before, though this was restricted to persons under 60 years of age. There was no such

decrease in the six month period before the smokefree legislation relative to the equivalent period a year earlier. (Barone-Adesi et al., 2006)

Other studies have focused on the respiratory effects of smokefree laws. A study in San Francisco that examined the impact of a smokefree law on sensory (e.g. upper airway and eye irritation) and respiratory symptoms (e.g. wheeze and cough) and lung function among bar-workers, found large reductions in symptoms and small but significant improvements in lung function following introduction of the smokefree law. (Eisner et al., 1998) Another study found a 17% reduction in respiratory symptoms in bar workers from the Republic of Ireland following implementation of the smokefree law, but no such change among bar workers from Northern Ireland where there was no smokefree legislation. There were similar reductions in sensory symptoms in both groups. (Allwright et al., 2005) Staff working at 13 Norwegian pubs and restaurants had smaller reductions in lung function at the end of night-time work shifts after the introduction of smokefree legislation compared with the period before. (Skogstad et al., 2006) Finally, a study of bar workers in New York State found significant reductions in sensory symptoms, and non-significant decreases in respiratory symptoms over the year following implementation of the Clean Air legislation in this State. (Farrelly et al., 2005)

### **3.7. Smoking prevalence, tobacco consumption and smoking-related behaviours**

Reductions in smoking prevalence and tobacco consumption and changes in other smoking-related behaviours such as smoking uptake, quit attempts and quit rates, and socially-cued smoking (increased smoking in certain venues such as pubs and bars), are generally not the primary stated objective of smokefree laws. However, they are important potential indirect public health benefits.

Smokefree legislation may trigger decisions to cut down or quit in smokers by making smoking less socially acceptable, and by reducing the social cues and opportunities for smoking. (Chapman et al., 1999) This was supported by Australian research which found that socially-cued smokers <sup>f</sup> reported they were more likely to quit if there were smoking restrictions in social venues. (Trotter et al., 2002)

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<sup>f</sup> Smokers who smoke more in specific social settings – such as when out with friends in pubs and bars

Studies of the impact of smokefree policies in workplaces have generally supported an effect on smoking prevalence and consumption. For example, an analysis of 19 studies of smokefree workplaces found that 18 reported reduced daily cigarette consumption, and 17 reported declines in smoking prevalence (Chapman et al., 1999) A recent systematic review concluded that: *“smokefree workplaces not only protect non-smokers from the dangers of SHS exposure, they also encourage smokers to quit or to reduce consumption”*. In this review, introducing totally smokefree workplaces where there were no previous restrictions was associated with a reduction in smoking prevalence of 3.8%, and a reduction of three cigarettes per day per continuing smoker. (Fichtenberg et al., 2002) Effect sizes were about half this in workplaces where partial restrictions were already present.

Another review concluded that *“smokers who are employed in workplaces with smoking bans are likely to consume fewer cigarettes per day, are more likely to be considering quitting, and quit at an increased rate compared with smokers employed in workplaces with no or weaker policies”* (Brownson et al., 2002). More recently published studies are consistent with these findings. (Bauer et al., 2005) Tobacco industry internal documents reveal that they view smoking restrictions in public places as being one of the most important threats to cigarette consumption. (Siegel et al., 2005)

With regard to the impact of recent national level law changes, in Ireland adult smoking prevalence fell from 27% in 2002 to 24% in 2004. A survey of 640 smokers from Ireland found that approximately 46% reported that the new smokefree law had made them more likely to quit smoking, and 60% reported that they were more likely to cut down on the number they smoked. (Fong et al., 2005) Of smokers who had quit since the introduction of the legislation, 80% reported that the law helped them to quit, 88% said it helped them stay quit, and 34% reported they were more likely to use stop-smoking medications like nicotine replacement therapy (NRT). (Fong et al., 2005) Early reports suggest that the new smokefree legislation in Scotland has resulted in markedly increased registrations with the quit support service: “Smoking Advice Service”. (Brodie, 2006 ) Data from Italy also indicates that the smokefree law introduced in January 2005 has been associated with a 6.6% per capita decline in tobacco sales and increased NRT sales. (Galeone et al., 2006)

Finally, there is evidence from a number of cross-sectional studies indicating an association between restrictions on smoking in public places and uptake of smoking and youth smoking prevalence.(Chaloupka et al., 1999; Wakefield et al., 2000; Wasserman et al., 1991) More recently there has been higher quality evidence from a longitudinal study that smoking

restrictions are effective in reducing youth smoking rates. (Siegel et al., 2005) A plausible conceptual model for this effect is that smokefree legislation results in a perception of reduced adult smoking prevalence and strengthens social norms about smoking not being socially acceptable.(Siegel et al., 2005)

### **3.8. Economic impacts of smokefree legislation**

There have been numerous studies from Ireland, California, New York, Norway and others which have assessed the impact of smokefree legislation and smoking restrictions on a variety of economic indicators in the whole economy and by sector. These have mainly examined effects on the hospitality industry, particularly in bars and restaurants. Other studies have investigated impacts on the gaming industry, hotels and other aspects of the tourism industry.

Several independent systematic reviews of the literature have been published in the last four years. (Durkan et al., 2004; Ludbrooke et al., 2004; Scollo et al., 2004) Many studies of economic impacts have major weaknesses such as the failure to use objective outcome indicators, and failure to allow for economic and secular trends. Siegel suggested four criteria for identifying high quality studies: (Siegel, 1992) use of objective data; inclusion of all data points for several years before and all points after implementation; use of regression or similar methods to control for secular trends and random fluctuations; and appropriate control for overall economic trend.

All the above systematic reviews found that in higher quality studies smoking restrictions have been shown to have a neutral or weakly positive economic effect. For example, in the Scollo et al review, all the 21 studies which met all four of Siegel's criteria found a neutral or positive effect. Thirty-one studies funded by the tobacco industry included in the Scollo et al review were generally of poorer methodological quality (none met all of Siegel's quality criteria), rarely (3%) published in peer-reviewed journals and 94% concluded that there had been or would be a negative economic impact of smoking restrictions. (Scollo et al., 2003)

Data presented in the Royal College of Physicians report from Massachusetts, Delaware, California, and South Australia among others, all suggested that the effect of smokefree ordinances on restaurants and bars were broadly neutral or weakly positive. (Tobacco Advisory Group of the Royal College of Physicians, 2005a) In Ireland, where Smokefree legislation was implemented in March 2004, there was a 4.4% decline in bar retail sales during 2004, following a similar decline of 4.2% in 2003. However, in 2005, sales increased by 0.1%. Employment in the hospitality sector as a whole and in bars specifically increased

during 2005. Visitor numbers to Ireland increased by 5.0% in 2003, 3.2% in 2004 and 6.1% in 2005. (Source: Ireland Central Statistics Office).

### **3.9. Summary**

The international literature on the experience from smokefree legislation around the world is extremely positive from a public health and societal perspective. There is evidence from different settings, using a variety of measurement methods and study designs, that smokefree policies are highly effective in achieving the primary aim of reducing exposure to SHS and improving air quality in the workplace and other indoor public places. There is also some evidence of reduced short-term adverse health effects such as respiratory symptoms and impaired lung function, particularly among heavily exposed occupational groups such as bar workers. However, there is only limited and short-term follow up data on the impact on rates of morbidity and mortality among formerly exposed non-smokers. The data that are available generally suggests that there will be positive long-term health effects.

There is good evidence that smokefree policies are mostly supported by the public and key stakeholders, particularly following implementation. Compliance is generally high, and the enforcement measures and enforcement infrastructure required are modest.

The main secondary outcomes are changes in smoking behaviour, such as reductions in uptake and prevalence, reduced consumption, and increased quit attempts and successful quitting among smokers. There is convincing evidence that introducing individual workplace policies reduces consumption and prevalence within the affected workforce. There is preliminary evidence that comprehensive smokefree legislation may result in broader effects such as reduced 'socially-cued' smoking and increased motivation to quit among the population of smokers. However, it is not yet clear whether comprehensive smokefree legislation results in reduced prevalence and consumption at the population level, though initial findings from Ireland and elsewhere are encouraging. The lack of evidence is partly due to the methodological difficulties of designing studies that isolate the effect of legislation from the effects of secular trends and the impact of other tobacco control measures, and where there are no adequate control populations for comparison purposes. Also, there has only been a very limited follow-up period since national legislation was introduced in Norway and Ireland and other countries, so long term trends are not yet clear.

The evidence from high quality studies evaluated in systematic reviews is that the economic effects of smokefree legislation on the hospitality industry are broadly neutral or weakly

positive. This supported by the most recent evidence from countries which have introduced national level comprehensive smokefree legislation.

Finally, an aspect of the impact of smokefree legislation that does not seem to have been evaluated in the international literature, is the impact on disadvantaged, minority and indigenous peoples. Due to the higher prevalence of smoking that is commonly observed in these communities, they are particularly affected by the health effects due to active smoking and SHS exposure. In New Zealand, for example, smoking prevalence is much higher among Māori than Paheka, (Ministry of Health, 2005c) and prior to the implementation of the SEAA (2003) there was evidence of increased workplace exposure and smoking in the homes among Māori (see sections 2.2 and 7.3.2). The implementation of the SEAA (2003) was therefore an opportunity to provide novel data on the impact of smokefree legislation on an indigenous people.

## 4. Development of the evaluation approach

### Summary

This section describes the application of the evaluation approach described in section 1 to the evaluation of the SEAA (2003).

Objectives and guiding principles for the legislation were identified from the Act and other key documentary sources. The main aim of the aspects of the SEAA (2003) that are the subject of this evaluation, was to reduce SHS exposure among the workforce in indoor workplaces, by extending protection to workers still exposed to SHS in these settings after the SEA (1990).

Key guiding principles identified were firstly that the SEAA (2003) should promote equity in health by improving health among groups disproportionately affected by tobacco smoking and SHS exposure, such as Māori, Pacific peoples, and low income groups. Secondly, policies should be congruent with the principles and provisions of the Treaty of Waitangi, including Māori participation, active protection of Māori interests and participation of Māori organisations.

The Centers for Disease Control model for the evaluation of smokefree legislation and policies was adapted to the New Zealand context, and used to develop a logic model to underpin the evaluation, and the following information areas for the core process measures, and core (direct, anticipated) and non-core (indirect, possible) outcomes:

#### **Process evaluation:**

- Knowledge, attitudes and support for smokefree policies (core)
- Enforcement and compliance with smokefree policies (core)

#### **Outcome evaluation:**

- Reductions in exposure to SHS in the workplace (core, and principal outcome measure)
- Reductions in exposure to SHS in public places and private places such as homes (non-core)
- Reductions in health impacts due to active smoking and SHS exposure (core)
- Changes in smoking prevalence and smoking-related behaviours (non-core)
- Economic impacts (non-core)

#### **4.1. Identification of objectives and guiding principles of the smokefree provisions of the 2003 Amendment**

The SEA (1990) and the SEAA (2003) include three main objectives:

- 1. To prevent the detrimental effect of other people's smoking on the health of people in workplaces, or in certain public enclosed public areas, who do not smoke or do not wish to smoke there.*
- 2. To prevent young people who are being taught or cared for in registered schools or early childhood centres from being influenced by seeing other people smoke there*
- 3. To prevent the detrimental effect of others' smoking on the health of young people who are being taught or cared for in registered schools or early childhood centres*

The second and third objectives largely concern the impact of making schools and early learning centres completely smokefree. There is little further detail in the Acts about the objectives and guiding principles behind the SEA (1990) and subsequent SEAA (2003). Since the 2003 Amendment involved the extension of the provisions on smokefree workplaces and public places in the 1990 Act, it is reasonable to assume that the main short to medium term objective of the SEAA (2003) was: to reduce SHS exposure among the workforce in indoor workplaces, by extending protection to workers still exposed to SHS in these settings after the SEA (1990).

However, this revised objective for the SEAA (2003) describes only one facet of the objectives which could be reasonably attributed to the extension of the smokefree provisions in the SEAA (2003), and does not give the underlying principles and values. We therefore used documents from the New Zealand Ministry of Health, and other key documents such as the Health Select Committee report, supplemented where necessary by evaluation reports and studies from the international literature to determine a range of objectives, guiding values and principles, and to develop a logic model to guide the evaluation process.

Key documents accessed to identify process and outcome objectives included the five year plan for tobacco control in New Zealand, (Ministry of Health, 2005a) the Health Committee report on the SEAA (2003), (Health Committee of New Zealand Parliament, 2003) and the Ministry's Anniversary report describing the impact of the smokefree legislation after nine months. (Ministry of Health, 2005b) Guiding principles and values were identified from documents including: The Five Year plan for Tobacco Control in New Zealand; (Ministry of

Health, 2005a) The New Zealand Health Strategy; (Ministry of Health, 2000) The New Zealand Cancer Control Strategy; (Ministry of Health, 2003b) Māori Tobacco Control Strategy; (Ministry of Health, 2003a) He Korowai Oranga, the Māori Health Strategy; (Ministry of Health, 2002) and the Health Committee report into the Smoke-free Environments Amendment Bill. (Health Committee of New Zealand Parliament, 2003)

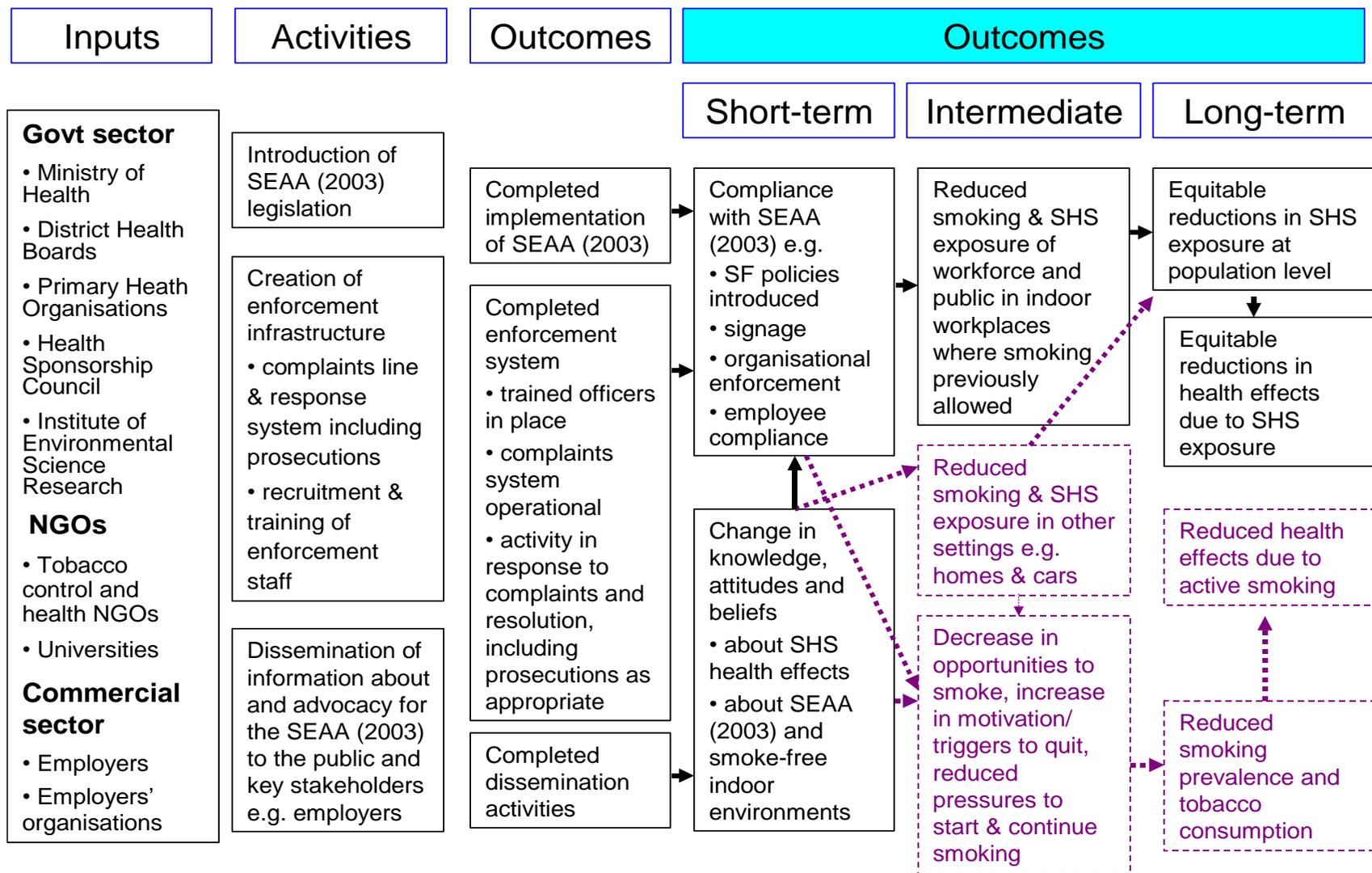
Guiding principles identified were firstly that the SEAA (2003) should promote equity in health and reduce disparities in health, by improving health among groups disproportionately affected by tobacco smoking and SHS exposure, such as Māori, Pacific peoples, and low income groups. Secondly, policies should be congruent with the principles and provisions of the Treaty of Waitangi, by ensuring Māori participation, active protection of Māori interests and participation of Māori organisations in policy development and implementation.

## **4.2. Development of a logic model for evaluation of the Smoke-free Environments Amendment Act**

The CDC logic model approach to programme evaluation (MacDonald et al., 2001) and goals and indicators for evaluating smokefree policy interventions (Starr et al., 2005a, 2005b) were adapted to develop a logic model for the evaluation of the SEAA (2003) (figure 4.2.1). The logic model was also informed by a logic model used for the evaluation of the smokefree legislation in Scotland, (Haw et al., 2006) and by the objectives and guiding principles we had identified for the SEAA (2003).

The logic model distinguishes **process** and **outcome** related indicators. Process indicators include activities and outputs. **Outcomes** are described in the sequence in which they are expected to occur. They are differentiated into **core** outcomes which are the direct, anticipated outcomes (solid black boxes) which relate to the main objectives of the legislation; and **non-core** outcomes which are indirect, possible outcomes (dashed purple boxes) which relate to secondary objectives. The non-core outcomes are particularly likely to be affected by multiple other determinants. For simplicity, the logic model excludes possible indirect economic outcomes, though these have been incorporated into the evaluation as non-core outcomes.

**Figure 4.2.1 Logic model for evaluation of the 2003 Smoke-free Environments Amendment Act**



Some indicators such as changes in knowledge and attitudes could be viewed as process measures (support for smokefree policies might be important for successful implementation) and/or outcome measures (increased knowledge of SHS effects and support for smokefree policies effects may be a benefit in themselves). For ease of drawing, they are included in figure 4.2.1 as outcomes. However, we have grouped these indicators with compliance and enforcement related indicators as process measures in the text.

### **4.3. Structure of the evaluation**

Key information areas for the process and outcome aspects of the evaluation were derived from the logic model, drawing on the categories included in the CDC model for smoke-free policy evaluations. (Starr et al., 2005a)

Of the CDC dimensions - the creation of smokefree policies - was not relevant, since in New Zealand the SEAA (2003) introduced compulsory smokefree indoor workplace policies. We added an assessment of economic impact to the CDC list. This is a possible, indirect outcome that is often evaluated in reviews of smokefree legislation and policies (see section 3.8). This is because opponents commonly cite the possible adverse economic consequences of smokefree legislation, particularly for the hospitality industry, as a reason for not introducing comprehensive legislation. This was certainly the case in New Zealand (see Sections 2.4 and 5.2.3). The final list of information areas included in the evaluation were:

#### **Process evaluation:**

- Knowledge, attitudes and support for smokefree policies (core)
- Enforcement and compliance with smokefree policies (core)

#### **Outcome evaluation:**

- Reductions in exposure to SHS in the workplace (core, and principal outcome measure)
- Reductions in exposure to SHS in public places and private places such as homes (non-core)
- Reductions in health impacts due to active smoking and SHS exposure (core)
- Changes in smoking prevalence and smoking-related behaviours (non-core)
- Economic impacts (non-core)

The evidence for each of these information areas in relation to the SEAA (2003) is now described. Each section starts with contextual information and a description of some ‘success indicators’. These are statements of what might reasonably have been expected to be observed if the SEAA (2003) had been successful within that information area. These success indicators were developed drawing on the CDC indicators, the logic model and the New Zealand context. There is then a description of the methods and results from the evidence available in each information areas. Finally, there is a critique of the evidence and discussion of the results.

## **5. Knowledge, attitudes and beliefs about second-hand smoke, smoke free workplaces and public places, and support for the Smoke-free Environments Amendment Act (2003)**

### **Summary**

This section describes the process evaluation relating to the degree of knowledge and beliefs about SHS, and support for the underlying principles and key provisions of the SEAA (2003).

The main sources of evidence were nationally representative surveys carried out by UMR Research and the Health Sponsorship Council (HSC) before and after implementation of the SEAA (2003). There was also a survey of a cohort of bar managers and owners conducted by the HSC. There were some limitations to the data, mainly low response rates in the surveys and loss to follow-up in the cohort study. However, response rates between surveys were probably comparable and data collection methods were largely constant over time, so the trends reported should be robust.

The principal finding was that there was strong and growing support for the SEAA (2003) and its underlying principles. This support included all population sub-groups, including smokers and bar managers and owners.

For example, by 2006, the population surveys showed overwhelming support (over 90% agreement, and 6% or less disagreement) for the right to live and work in a smokefree environment; and for indoor workers, including bar and restaurant workers, to work in a smokefree environment. There was also overwhelming support for smoking bans in bars and restaurants in the surveyed population. Support was similar among men and women, Māori and non-Māori, and across all income groups. Support was less strong among smokers. For example, by 2006 there was either roughly equal support versus non-support (UMR survey), or modest majority support for smokefree bars (HSC Monitor survey and bar managers study) among smokers; though support was greater for other smokefree provisions within the SEAA (2003).

## 5.1. Objectives and success criteria

There is no explicit objective that relates to this aspect of the evaluation in the Health Committee report on the Amendment Bill, (Health Committee of New Zealand Parliament, 2003) in the SEAA (2003) itself, (Department of Health, 2003) or in other Ministry of Health documentation.

However, increasing knowledge about the health effects of SHS, and changing attitudes to the acceptability of exposing non-smokers to SHS, are generally treated as important in developing support for the introduction of smokefree legislation, and thereafter for successful implementation. Evaluations of smokefree legislation in the international literature described in section 3.3 have assessed knowledge and attitudes to SHS, and smokefree legislation. The CDC programme for evaluation of smokefree policies includes increased knowledge about SHS and support for smokefree policies in its logic model for the evaluation of smokefree policies, and lists ten recommended indicators. (Starr et al., 2005a) The Ministry's evaluation report 'The Smoke is Clearing' describes the level of public support for the SEAA (2003), rights to smokefree workplaces, and smokefree hospitality venues among the New Zealand population and bar managers, (Ministry of Health, 2005b) suggesting that this is recognised by the Ministry as an important area for evaluation. This is supported by The Tobacco Control Plan which includes as an action point improving support for monitoring and surveillance of '*employer and employee perceptions of the Act's smokefree provisions*'. (Ministry of Health, 2005a)

It is therefore reasonable to infer that maximising support for the SEAA (2003) and the principle of providing smokefree workplaces and public places is a core **process indicator (or short term outcome measure)**, and hence it has been included in the Logic Model described in figure 4.2.1 guiding the evaluation of the SEAA (2003).

Success indicators <sup>g</sup> for this aspect of the evaluation are to demonstrate the following after implementation of the SEAA (2003):

- An increase among the general population and among smokers, different ethnic groups, and different income groups, in knowledge about the health risks from SHS, the degree of

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<sup>g</sup> In these and subsequent objectives the timescales are from the period prior to the implementation of the SEAA to the latest available data from the period after implementation.

support for the SEAA (2003) and the principles of protection of children, workers and other adults from SHS exposure in indoor workplaces (including in the hospitality sector) and other indoor public places.

- Strong majority ( $\geq 75\%$ ) public support for the SEAA (2003) and its principles of protection of children, workers and other adults from SHS exposure in indoor workplaces (including in the hospitality sector) and other indoor public places in the general population and among different ethnic groups, and different income groups.
- An increase in support for the SEAA (2003) and the principles of protection of children, workers and other adults from SHS exposure in indoor workplaces (including in the hospitality sector) and other indoor public places among key stakeholders such as employer and worker organisations, hospitality sector managers and owners.

## **5.2. Data sources and methodologies**

There are three main data sources for this aspect of the evaluation

### **5.2.1. UMR Research nationwide omnibus surveys**

This is a nationwide telephone survey of 750 adults aged 18 or over which has been carried out regularly since 1990. Questions on attitudes to smokefree public places have been included approximately every 6-12 months since April 2001, using common methodology and questions, allowing valid comparisons of trends. (UMR Research, 2006) The response rate was not available.

### **5.2.2. Health Sponsorship Council Monitor Surveys**

Four cross-sectional surveys with a stratified sample of people aged 15 years or above were conducted in February and March annually between 2003 and 2006 using Computer Assisted Telephone Interviewing (CATI). (Waa et al., 2006) The surveys included a stratified general population sample of approximately 1500 and a boosted Māori population sample of about 900 (500 in 2003). Participants in the general survey were contacted by random digit dialling in 2003 and 2004, and by random sampling from private household numbers in 2005 and 2006. The person with the next birthday present at the time of the call (2003 or 2004) or within the household (2005 and 2006) was invited to participate. The Māori sample was recruited by random sampling of individuals who self-identified as Māori on electoral rolls, and identifying household telephone numbers.

Questions on a range of topics related to smoking, SHS and the SEAA (2003) were included, with many questions common to several or all of the surveys.

Response was defined as the proportion of eligible people contacted who agreed to participate (consent rate) and the proportion of the estimated number of eligible people identified for inclusion who agreed to participate (response rate). In the general survey these ranged between 38-47% for consent rates and 29-38% for response rates and 39-79% consent and 35-63% response rate for the Māori sample from 2003-6 (2006 figures are provisional). (Waa et al., 2006) There were no obvious trends in response and consent rates over time, except that the Māori sample response rate was much lower in 2005-6 than 2003-4.

Results from these surveys have been reported in several HSC publications. (Gillespie et al., 2005; Waa et al., 2005; Waa et al., 2006) For this evaluation, we carried out additional analyses in which we weighted all the surveys to the age, gender and ethnicity (proportion of Māori and non-Māori) distribution of the 2001 census. This ensures that changes in the distribution of survey responses are not the result of changes in the age, gender and ethnicity distribution of the populations participating in the surveys.

Results are presented stratified by gender, ethnicity (Māori/non-Māori – there were insufficient numbers in other ethnic groups for meaningful comparisons), smoking status (smoker/non-smoker) and by level of household income. For the latter, subjects under 25 years were excluded on the basis that they were less likely to be heads of household, and may be less likely to report household income than older age groups. All the results quoted from the HSC Monitor surveys in this report are from these additional analyses unless stated otherwise. The full tables from these analyses are included in appendix I.

### **5.2.3. Health Sponsorship Council cohort study of bar managers and owners**

This cohort study included 541 bar managers recruited from a random sample of 705 eligible venues drawn from the 3191 licensed venues (hotels, taverns, country clubs and chartered clubs) on the New Zealand Liquor Licensing Authority list of premises in October 2004. Baseline data collection was in November 2004 (T1), with follow-up at five (T2) and 12 (T3) months. Data were collected using structured telephone interviews on characteristics of the venue, support for smokefree policies, perceptions of likely and actual economic impact, and perceptions of likely and actual customer compliance and enforcement workload. (Milne et al., 2006)

Two hundred and fifty-five (47%) bar managers out of the original 541 who were still in the study and had complete data at T1, T2 and T3 were the subject of an HSC report published in March 2006. (Milne et al., 2006) Of those not included in the analysis, 177 were no longer eligible by T3 because they no longer worked at the venue or the venue had closed down, and 109 were lost to follow-up. The bar managers still in the cohort at time T2 were broadly similar to those no longer in the cohort in gender, ethnicity, proportion who were venue owners, years in the hospitality industry, and degree of smoking restrictions and whether the venue had an outdoor smoking area pre the SEAA (2003) (Personal communication, Kiri Milne and Nigel Guenole). Those included in the analysis were older (14% aged 18-30 years in the cohort vs 38% in those lost to follow-up or ineligible), and were slightly less likely to be smokers (41 vs 49%).

## 5.3. Results

### 5.3.1. Knowledge and beliefs about health effects of second-hand smoke

There is little data with which to assess the current level and recent trends in the beliefs of New Zealanders about the health effects of SHS. A telephone survey of 200 randomly selected adults (80% male) in Wellington in 1997 found that most agreed that SHS exposure could increase the risk of cancer (76%), heart disease (57%), asthma (60%), cot death (69%), and respiratory problems (58%).

Another study conducted in late 1999 and early 2000 involved interviewing 435 hospitality industry workers. Most agreed that SHS could definitely (55%) or probably (8%) shorten other people's lives, with only 7% stating it could not. The proportion believing SHS increased the risk of specific diseases ranged from 31% for strokes to 53% for cot death, 61% for heart disease, 69% for cancer and 80% for asthma. (Jones et al., 2001)

Data from the National Research Bureau's surveys show an increasing proportion of people stating that they were 'very worried' about breathing second-hand cigarette smoke – 20% in 1996, and 27% in 2001. The proportion who stating that they were '*not worried at all*' fell from 46 to 38% from 1996 to 2001. (National Research Bureau, 1996, 2001)

More recent data are available from the HSC Monitor surveys, where participants were asked in 2003 whether they agreed that '*people's health can be damaged by other people's tobacco smoke*'. Ninety-one percent of subjects (including 84% of smokers) agreed with this statement and only 6% disagreed. Participants in the HSC survey between 2004 and 2006 were asked if they agreed or disagreed with the statement '*the dangers of passive smoking have been*

*exaggerated*'. Between 2004 and 2006, the proportion who disagreed with the statement increased from 63% to 71% (see table A1.1 in appendix I) - 49% among smokers and 76% among non-smokers. (Waa et al., 2006) The proportions disagreeing with the statement in 2006 were similar in Māori and non-Māori. Among the whole sample, women (77%) were more likely to disagree than men (65%), and there appeared to be a socio-economic gradient, with individuals from lower income households most likely to agree and least likely to disagree with the statement (table A1.2 in appendix I).

### **5.3.2. Support for the principle of not smoking around non-smokers**

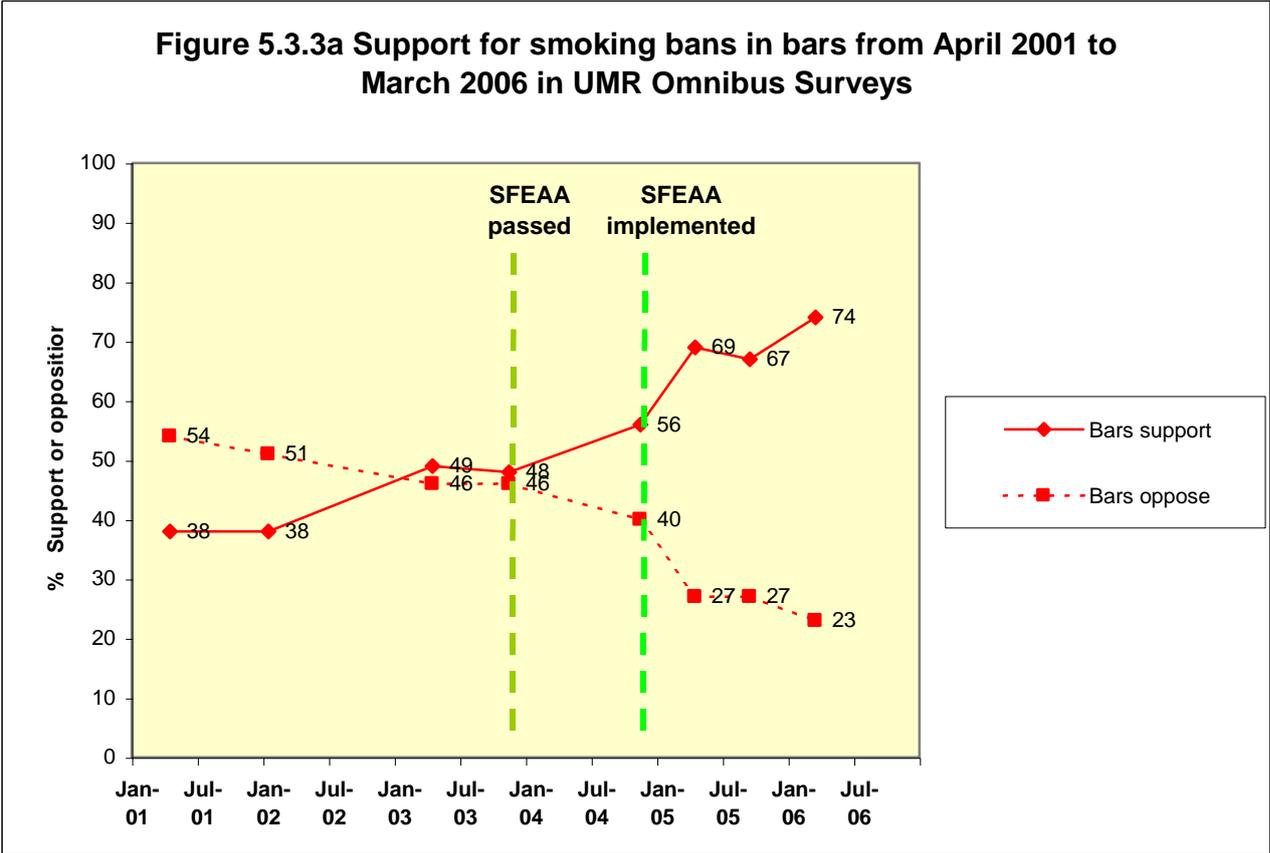
Data from the HSC Monitor surveys shows that there was overwhelming support (over 90% agreement and 6% or less disagreement) for the right to live and work in a smokefree environment and for the rights of indoor workers, including bar and restaurant workers to have a smokefree environment (see table A1.3 in appendix I). The support for these rights was substantial even before the SEAA (2003) implementation, but increased further in the 2005 and 2006 surveys. Support was equally strong among men and women, Māori and non-Māori, and across all income groups. By 2006, over 90% of smokers agreed with the general right, and specifically the rights of restaurant and other indoor workers, to work in a smokefree environment. There was 83% support among smokers for the right of bar workers to work in a smokefree environment, and 82% support for the right to live in a smokefree environment.

In the 2006 survey 96.5% of respondents disagreed with the statement that it was “*OK to smoke around children*”, including 90% of smokers (table A1.1 in appendix I). A lower proportion, 76%, disagreed with the statement that it was “*OK to smoke around non-smokers*” – with a large difference between non-smokers (82%) and smokers (44%).

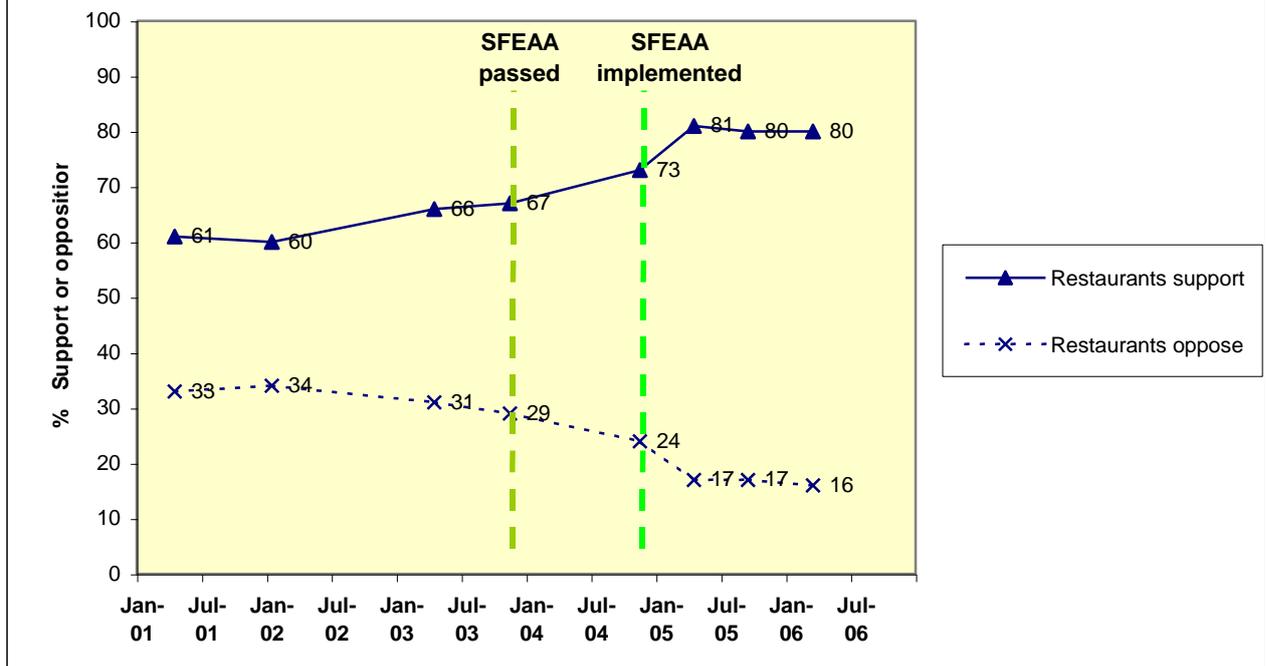
### **5.3.3. Support for smokefree policies in workplaces and public places and the Smoke-free Environments Amendment Act**

Two separate series of surveys show that support for smokefree restaurants and bars increased strongly between 2001 and 2006, particularly among smokers.

The proportion of respondents in the UMR Omnibus survey between 2001 and March 2006 supporting and opposing a complete ban on smoking in New Zealand restaurants and bars is shown in figures 5.3.3a and 5.3.3b. At the time the SEAA (2003) was passed in Parliament in December 2003, there was strong majority support for a total smoking ban in restaurants, but almost equal support and opposition to a total smoking ban in bars and pubs. However, in the year before implementation of the SEAA (2003), support increased and opposition decreased; a trend which has continued following implementation. There is now overwhelming support for smoking bans in both types of venue. In the latest survey for which data are available, support for totally smokefree bars was 80% among non-smokers, and was evenly split (48% support, 49% opposition) among smokers. The proportion of smokers approving has increased to 48% from 31% in September 2004.



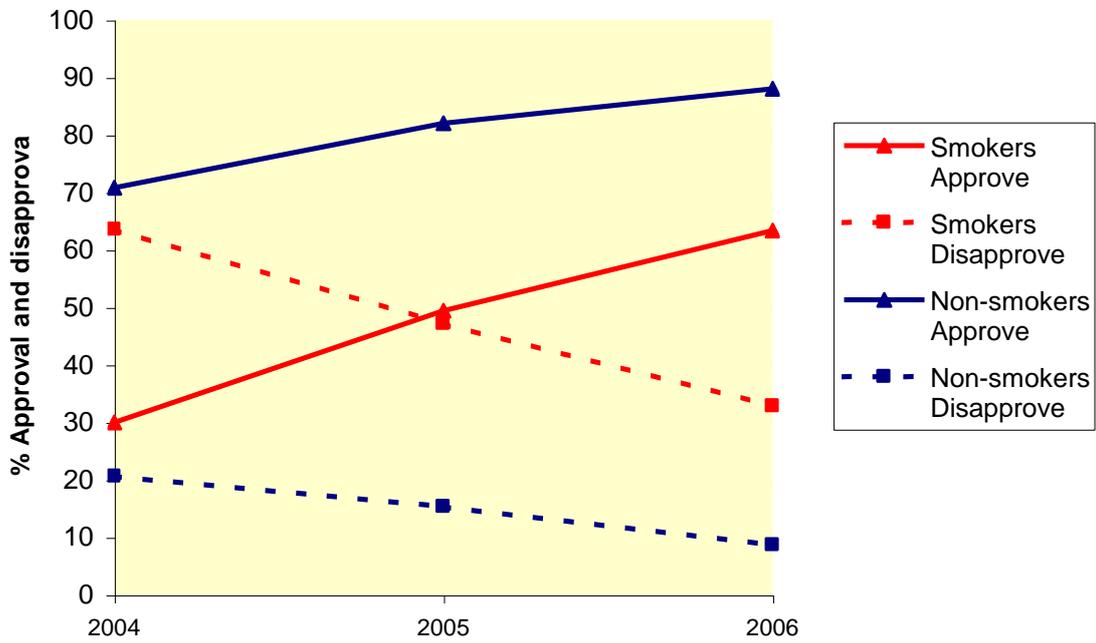
**Figure 5.3.3b Support for smoking bans in restaurants from April 2001 to March 2006 in UMR Omnibus Surveys**



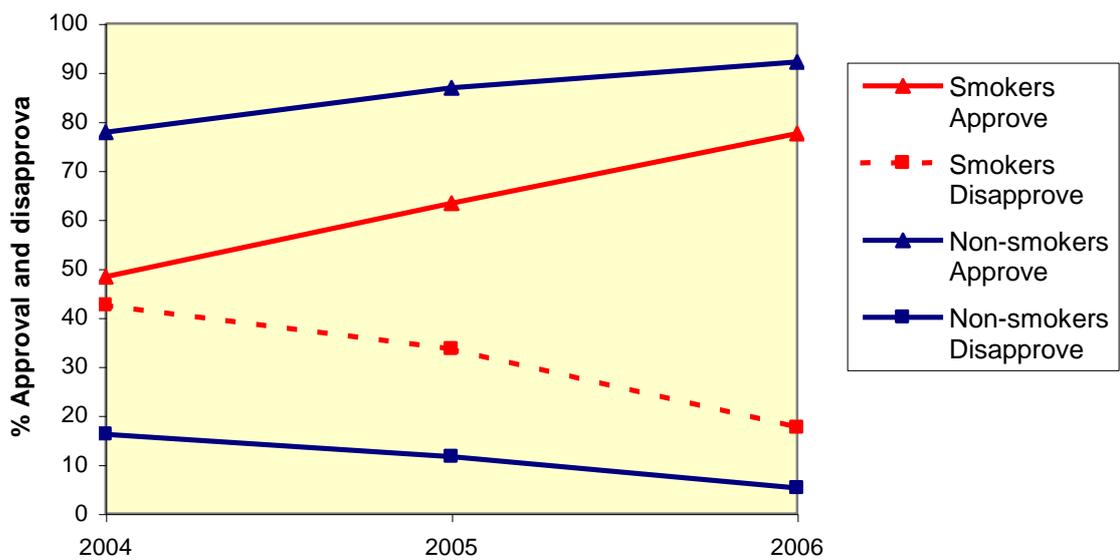
The support for smokefree restaurants in March 2006 was overwhelming among non-smokers (85%), and strong among smokers (63% support, 33% oppose). Support for smokefree bars was found among men (70%) and women (77%), rural residents (75%), all age groups, across all income levels and in Māori (68%) and non-Māori (74%). Support for smokefree restaurants was overwhelming in all these sub-groups.

The HSC Monitor surveys assessed pre-and post-implementation support for the SEAA (2003). Support for smokefree restaurants and bars was strong in 2004 - 73% and 64% respectively (table A1.5 in appendix I) - and increased substantially after implementation, reaching 90% for smokefree restaurants and 84% for smokefree bars by 2006. Support was similar among men and women and Māori and non-Māori, and across all household income groups. The increase in support was particularly striking among smokers. By 2006, 78% of smokers supported smokefree restaurants legislation (from 48% in 2004) and 63% supported smokefree bars legislation (from 30% in 2003) – see figures 5.3.3c and 5.3.3d.

**Figure 5.3.3c Support for Smokefree bar legislation among smokers and non-smokers in HSC Monitor Survey, 2004-6**



**Figure 5.3.3d Support for Smokefree restaurant legislation among smokers and non-smokers in HSC Monitor Survey, 2004-6**



Finally, in the bar managers cohort study, the proportion supporting ('strongly approve' or 'approve') smoking bans in enclosed areas of pubs increased from 44% at baseline to 60% in November 2005, 11 months after the SEAA (2003) was implemented. (Milne et al., 2006) Support in November 2005 was stronger among: non-smoker bar managers (67%) versus smokers (49%); urban (65%) versus rural (49%) venues; and among bar managers who perceived no (86%) or a positive (77%) economic impact compared with those who thought there had been a negative economic impact (40% support).

## **5.4. Discussion**

### **5.4.1. Critique of the evidence**

Each of the sources of evidence had strengths and limitations. The UMR surveys used standardised, and hence comparable, methods and questions at each data collection point. The sample is stratified on key demographic variables to ensure representativeness. However, individual surveys include a small numbers of subjects, so the precision of the estimates of attitudes and beliefs in the population is low, particularly for the sub-group analyses. The response rates for these surveys was not available.

The HSC Monitor surveys collected data on a large range of relevant variables. Over-sampling of Māori ensured that estimates of knowledge, attitudes, and behaviours among Māori have a high level of precision. Changes to the content of the interview schedules meant it was not possible to evaluate trends over time for some survey questions. However, the greatest problem, increasingly common in telephone based surveys, was that despite strenuous efforts to maximise recruitment, response rates were poor. Hence the results could be affected to some degree by selection bias, if for example respondents were systematically more or less positive about smokefree laws and the importance of protecting non-smokers. Such a bias, even if present, should not affect the trends observed as response rates were similar between surveys in the general population samples, though they did decline between 2003-4 and 2005-6 for the Māori sample.

The bar managers survey was a strong design, in which opinions were tracked in the same cohort of respondents over time, so possible biases due to differences in the sample between survey points do not apply. The study achieved a good initial response rate, but suffered from over 50% attrition overall. This was partly due to non-response, but mainly due to managers becoming ineligible because the business had closed or they were no longer working in the industry. Selection bias is therefore again a possibility, as the managers who remained in the

survey throughout may not be representative of the whole cohort. However, data on the bar managers who remained in the cohort at the first follow up suggests this was unlikely as there was little difference in their characteristics and those who were lost to follow up or no longer eligible except that they were older, and slightly less likely to be smokers at baseline.

#### **5.4.2. Conclusions**

Although there were some limitations in the data sources described above, key strengths were that the UMR and HSC Monitor surveys used largely common sampling and data collection methods, while the HSC study of bar managers reported data from the same sample followed over time. Therefore, the pattern that emerges from the trends in knowledge, attitudes and beliefs should be valid.

The consistent picture that emerges is of strong and growing support for the New Zealand smokefree legislation and its underlying principles across all population groups, including smokers. Data on the knowledge of the health effects of SHS was less clear, mainly because this was not assessed in detail in the available surveys. Therefore, most of the success indicators described in section 5.1 have been met. Indeed, even for the least well supported component of the SEAA (2003) - making bars and pubs smokefree - there is now evidence of strong support in the general population and among non-smokers. Among smokers the data suggest either roughly equal support versus non-support (UMR survey) or a majority supporting smokefree bars (HSC Monitor survey and bar managers study).

## 6. Compliance and enforcement

### Summary

This section describes the process evaluation relating to the enforcement activities and compliance with the SEAA (2003).

The main sources of evidence were: three studies which observed compliance in bars and pubs in 2005-2006; the Ministry of Health complaints database; and qualitative interviews with representatives of employers, union and the hospitality industry; tobacco control NGOs; Ministry officials; local enforcement officers; and Māori stakeholders. The major limitation to the observational evidence was that it was mainly from urban pubs, with little or not data from other workplaces. Evidence of compliance from the complaints database, has inherent limitations since it is influenced by the public's knowledge of the legislation and their propensity to make a complaint.

Observed compliance in pubs and bars was close to 100%. Enforcement occurred largely through local enforcement officers in District Health Boards in response to complaints from the public to the Ministry's freephone complaints line. Most complaints concerned smoking on licensed premises. The number of complaints fell rapidly after the first month, with less than 20 per month since October 2005. Most complaints were resolved through letters, telephone calls and visits by enforcement staff. Only five resulted in prosecutions. Anecdotal reports suggest that there may be greater non-compliance in licensed premises in more remote rural areas, and in smaller businesses with a high proportion of smokers.

Stakeholders interviewed were mostly positive about the SEAA (2003). The legislation was seen as effective at protecting staff from SHS, and was mostly accepted, even among Hospitality Association of New Zealand members who had opposed its introduction. Interviewees welcomed the focus on SHS exposure in workplaces and schools, and praised the role of NGOs in implementation. Māori stakeholders were supportive of the legislation and the process of implementation. Ongoing problem areas identified included confusion over the definition of non-enclosed outdoor areas, lack of resources for enforcement, and non-coverage of workplaces such as prisons and residential homes and care establishments.

## 6.1. Objectives and success criteria

Compliance can refer to the compliance of employees with workplace smokefree policies, the public and customers with smokefree policies in workplaces that they visit (e.g. hospitality industry settings) and public places; and of employers in the degree to which they promote and enforce workplace policies with staff, customers and visitors.

The SEAA (2003) does not state explicit objectives relating to compliance and enforcement. However, the SEA (1990) and SEAA (2003) include a series of provisions relating to the enforcement of the smokefree components of the Amendment. (Department of Health, 1990, 2003) The importance of enforcement and compliance is demonstrated by one of the required actions in the Tobacco Control Plan being to *'enforce smokefree environments legislation'* as well as to: *'review the current level of service provided by District Health Boards for monitoring and enforcing all aspects of the Smoke-Free Environments Act 1990'* and to *'Identify resources required to enforce new smokefree legislation'*. (Ministry of Health, 2005a) The Ministry's report 'The Smoke is Clearing' included data on the number of complaints to the national SEAA (2003) complaints database and the number of prosecutions or prosecutions pending for infringement of smoking in indoor workplaces. (Ministry of Health, 2005b) Finally, opponents of smoke-free legislation often claim that the legislation will be impossible to enforce, and this was true among publicans and HANZ in New Zealand. (Price et al., 2006)

This suggests that maximising compliance and achieving rigorous enforcement are core **process objectives** of the SEAA (2003). Further support for this conclusion comes from the CDC document on goals for evaluating tobacco control policies, which includes a series of suggested outcomes relating to enforcement and compliance. (Starr et al., 2005a) There is also general agreement that the value of legislation depends on its implementation. (Jacobson et al., 1999) This is supported by evidence from the international literature. Several evaluation studies including descriptions of the intention to comply and degree of compliance with smokefree legislation from self reports, inspections data, complaints lines data, prosecutions for non-compliance, and the burden and costs of enforcement related activity (see section 3.4). (Directorate for Health and Social Affairs, 2005; Office of Tobacco Control, 2005b; Skeer et al., 2004; Weber et al., 2003)

Success indicators for this aspect of the evaluation are to demonstrate the following after implementation of the SEAA (2003):

- High levels of compliance (>95%) with the implementation of smokefree indoor areas in all workplaces, and in specific settings such as the hospitality industry, assessed by:
  - Self-reported compliance from workers, customers and employers
  - Evidence from direct observation of employee and employer compliance through inspections of workplaces
  - Small and declining number of calls over time to the complaints helpline
- Satisfactory compliance levels as assessed by key stakeholders in the enforcement process and front line enforcement staff
- Minimal levels of sustained non-compliance to the SEAA (2003), assessed by:
  - Unresolved complaints investigated by the Director General
  - Number of repeat complaints about workplaces following investigation by the employer, Director General or subsequent to prosecution
  - Number of prosecutions pending or brought in response to persistent non-compliance

## **6.2. Data sources and methods**

### **6.2.1. National Research Bureau survey**

The NRB survey was commissioned by ASH. It involved direct observation of the number of smokers present indoors in 193 bars randomly selected from pubs and bars in 20 urban centres across New Zealand. It was conducted between 6-8pm on Friday evenings in April 2005. (ASH NZ, May 2005) This was compared with findings from a survey of the same bars in July 2004, pre-SEAA (2003) implementation.

### **6.2.2. Institute of Environmental Science and Research Bar Customers Cotinine Study, 2004-5**

This study is described more fully in section 7.2.2. It involved direct observation of the numbers of smokers during three ten minute periods over a three hour data collection period in 30 randomly selected bars in Auckland, Wellington and Invercargill in the Spring and Winter of 2005. (Lea et al., 2006)

### **6.2.3. University of Otago air quality surveys in pubs and bars, June 2006**

Two studies of indoor air quality mainly in pubs, bars and restaurants carried out in 2006 are described more fully in Section 7.2.7 and in appendix III. These studies included direct observation of the number of patrons and numbers smoking (holding lit cigarettes) at three time points over a 30 minute data collection period. The first study was conducted in 16

Wellington bars and restaurants in the Central Business District (CBD). The second study was performed in nine rural pubs in the Wairarapa and eleven bars in central Wellington.

#### **6.2.4. Health Sponsorship Council cohort study of bar managers and owners**

This cohort study describing the views of bar managers and owners over a one year period before and after the SEAA (2003) implementation. (Milne et al., 2006) It was described in Section 5.2.3. This study included a question about how frequently participants had seen patrons smoking inside their venue in the last month.

#### **6.2.5. Ministry of Health complaints database**

Data were obtained from the Ministry of Health database of complaints received relating to the SEAA (2003), for the period 10<sup>th</sup> December 2004 to 24<sup>th</sup> April 2006, from all sources. The database was intended to capture all complaints nationally. Complaints received by District Health Board (DHB) staff were sent to the Ministry and entered onto the database.

Complaints received directly by the Ministry (usually through the special 0800 number for inquiries and complaints about the SEAA (2003)) were logged directly onto the database.

#### **6.2.6. Number of prosecutions for non-compliance with the Smoke-free Environments Amendment Act (2003)**

Information on prosecutions was obtained from the Ministry of Health, and checked by a search of the Factiva media database (New Zealand region) for the period December 2004-August 2006. The search terms, 'bars', 'pubs', 'court', 'prosecution', and 'smoking' were used.

#### **6.2.7. University of Otago Stakeholder Review Study**

This study was conducted especially for this review. The aim was to document enforcement activities, and investigate the attitudes, beliefs, experiences and perceptions of a range of stakeholders about the process of implementation, enforcement and compliance with the smokefree aspects of the SEAA (2003). The study is described in full in appendix II.

Data were obtained using a variety of methods and from various sources including interviews with key stakeholders and officials in June-August 2006, a survey of New Zealand print media coverage of the issues using the Factiva database ([www.factiva.com](http://www.factiva.com)), from employer and hospitality industry websites, and from examination of a District Court judgment on the prosecution of a publican under the SEAA (2003). The stakeholder interviews included: 14

representatives of national or regional interest groups in the commercial sector (including HANZ and union officials); eight officials involved with development and enforcement of the legislation based within national and regional health organisations (including smokefree enforcement officers); three representatives of health NGOs with an interest in tobacco control; and eight Māori interviewees from each of the other three groups. Further detail is in appendix II.

## **6.3. Results**

### **6.3.1. Enforcement methods and dissemination activities associated with implementation of the 2003 Smoke-free Environments Amendment Act**

The SEAA (2003) included the requirement (section 15(2)) for employers receiving complaints relating to SHS exposure in the workplace to investigate within 20 working days, and if not resolved within 40 working days refer to the Director General of Health; and for the Director General of Health to appoint Enforcement Officers and investigate complaints referred by Enforcement Officers (section 16).

The total Ministry of Health budget for the implementation of the SEAA (2003) (from December 2003 on), including extra funds given to DHBs, was \$1.5 million (excluding GST). (Gillespie, 2006) This included funding for 17 extra full time staff for smokefree work by DHBs. At national and DHB levels, much staff time was required during 2004 for dissemination activities to prepare the public and employers for the SEAA (2003), and over the next year for follow up on questions and complaints from enforcement staff and employers, and to support local enforcement activity. Four to six full-time equivalent staff were required in the Ministry of Health for this purpose, and at least 25 full-time equivalent staff in the DHBs. (Rothwell, 2006)

The Ministry of Health established a national freephone number in December 2004 to which anonymous complaints about violations of the SEAA (2003) could be made. The Ministry of Health forwarded details of these complaints to the Public Health Units of DHBs, who were the local enforcement agency. The Units also received calls directly. Designated enforcement officers from the Public Health Units acted in response to the complaints, generally working with employers and venue operators to achieve their resolution. Prosecutions were rare (see section 6.3.6), though for a few premises, subsequent closure for other reasons was a reason for lack of legal action.

The methods used to inform key stakeholders about the SEAA (2003) and the health promotion campaigns are described in section 2.4. In addition, from December 2003, there were considerable efforts to build cooperation between Ministry and stakeholders, including HANZ, Clubs NZ and the NZ Returned Servicemen's Association. From early 2004, the Ministry of Health and HSC established committees of stakeholders to aid implementation. These included separate committees for workplaces, schools, clubs, and for other licensed premises. The 'workplace' stakeholder committee included representatives of Business NZ, Employers Association, unions, the Occupational Safety and Health service of the Ministry of Labour, and the Ministry of Health. Employment lawyer Alistair Sheriff was contracted by the Ministry to give advice on and help in creating information resources for workplaces. One of the outputs of the committee was an information sheet for employers and licensees.

The licensed premises committee created a definition of what "*all reasonably practical steps to ensure that no person smokes*" would be for licensed or other premises with employees. This definition was put on the Ministry of Health website and included in a leaflet sent to smokefree officers and to all licenses in September 2004. It includes requirements for:

- Staff to communicate with anyone smoking inside
- Staff to require smoking patrons who refuse, to leave
- Removing ashtrays
- Signage about the no-smoking policy

The summary of this leaflet was quoted by Justice Abbott in the first prosecution of a publican under the Act, (Abbott T, 2005b) and he commented: "*although the information brochure has no legal status, it is relevant that its content was the result of lengthy and intensive consultation between the Ministry and other interested parties, in particular HANZ*".

The national freephone call centre also functioned as an enquiry line for queries about the SEAA (2003) until early 2006. This was contracted by the Ministry, who trained six of the staff, and composed scripts for 'frequently asked questions'. for queries about the SEAA (2003). The communication effort also included attendance at multiple meetings/ conferences, including the Clubs NZ AGM, the HANZ conference and regional meetings, Liquor Licensing Authorities, Auahi Kore meetings around NZ, and Smokefree and Auahi Kore conferences.

One problem which emerged, was how to define an enclosed and non-enclosed workplace. A Ministry of Health expert group, which included architects and a ventilation engineer, developed a booklet for publicans and others in the hospitality industry with examples of complying and non-complying areas. However, there was persisting confusion (including often among DHB staff) and the expert committee subsequently developed a calculator which was made available on the internet in September 2005. Members of the expert committee carried out training on use of the guidelines with HANZ and smokefree officials. Joint HANZ/smokefree officer teams subsequently carried out advisory site visits.

### **6.3.2. Direct observation of compliance**

In the NRB survey conducted in April 2005, five out of 193 bars (3%) had smokers present. This compared to 183 (95%) in July 2004. Smokers represented only 0.23% of the total patrons present at the bars (less than one in 400). Most of the smoking found in the 2005 NRB survey was in only one bar, where six out of 18 people were observed smoking. (ASH NZ, May 2005)

The ESR study counted patrons and smokers in 30 bars in Auckland, Wellington and Invercargill. Out of 9610 patrons seen in the two visits to each bar after the SEAA (2003) implementation, one was observed smoking, in a Wellington bar. (Lea et al., 2006) In the Wellington and the Wairarapa indoor air quality studies, none of the 3038 patrons and staff observed at the 28 pubs and bars and eight restaurants at the three observation points were smoking indoors (though the same individual could be counted three times if they were present throughout the observation period). One person was observed smoking outside of the observation period inside a rural pub, as the investigators left. In contrast, smoking was frequently observed in specified outdoor smoking areas at 6.9% of people in these areas at the observation times (table 6.3.2).

**Table 6.3.2 Observed smoking at bars and restaurants in Wellington and Wairarapa\***

Type of venue (n)	Location	Number of people smoking ** (%)	Total people observed at three observation times per venue **
Bar areas (n=8)	Wellington CBD	0	966
Restaurants (n=8)	Wellington CBD	0	846
Rural pubs (n=9)	Wairarapa	0	345
Bars (n=11)	Central Wellington	0	881
<b>Total</b>		<b>0</b>	<b>3038</b>
'Outdoor' smokers' areas in bars (n=4)	Wellington CBD	124 (6.2%)	1986
'Outdoor' smokers areas in restaurants' (n=4)	Wellington CBD	21 (17.5%)	120
<b>Total</b>		<b>145 (6.9%)</b>	<b>2106</b>

Further methodological details and results are in Appendix III

\*\* Observation data were collected on arrival, at 15 minutes and at 30 minutes. A person smoking was defined as a person holding a lit cigarette at the data collection time.

### 6.3.3. Indirect observation of compliance

Participants in the HSC bar managers' cohort study were asked '*Thinking of the past month, how often would you say you saw patrons smoking inside your venue (even if was just to light up their cigarette)?*'. In May 2005, 14% said that they saw smoking on several, most or all shifts. Thirty six percent reported seeing smoking very rarely, and 50% not at all. In November 2005, 8% said that they saw smoking on several, most or all shifts, 31% reported seeing smoking very rarely, and 60% not at all. (Milne et al., 2006)

### 6.3.4. Self-reported workplace exposure to second-hand smoke

Another indication of compliance comes from the HSC Monitor survey data. By 2006, about 8% of adults in employment continued to report exposure to SHS indoors at work. These data are described in detail in section 7.3.2.

### 6.3.5. Ministry of Health complaints database findings

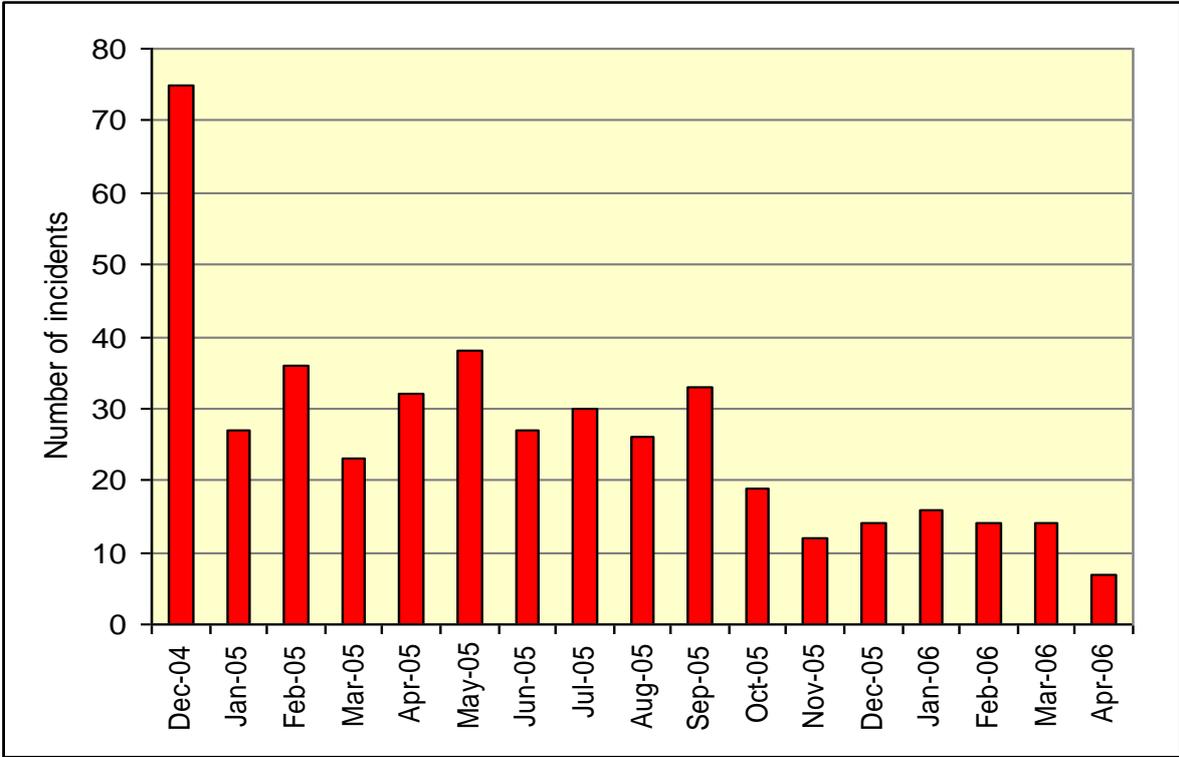
From 10<sup>th</sup> December 2004 to 24<sup>th</sup> April 2006, 571 complaints relating to the SEAA (2003) were logged with the complaints database. Those not relating to smoking in smokefree areas were removed (e.g. those about sales to minors). This left 480 complaints about 395 premises,

with 50 premises having more than one complaint. The latter included 33 with two, 11 with three, and six with four or more (these six premises had 36 complaints between them).

There was limited information about the nature of the venue for each complaint. Over half (270, 56%) of the complaints were about smoking in licensed premises, most of which were probably bars and pubs, but some would have been cafes or restaurants. Only 29 (6%) were definite complaints about smoking in cafes or restaurants. Another 119 (25%) were about smoking in other workplaces (factories, warehouses, lunchrooms etc), 39 (< 9%) concerned smoking in transport or other retail venues, and 23 (<5%) in health, education, or gambling venues or work vehicles.

The trend in complaints over time is shown in figure 6.3.5. Complaints are dated using the reported date of the incident rather than the date when the complaint was received. This shows a general trend downwards in the post-SEAA (2003) implementation period. There was an initial peak of 75 complaints in December 2004, followed by about 25 per month between January and September 2005, and then less than 20 per month since October 2005.

**Figure 6.3.5. Complaints about smoking in smokefree areas recorded on the national database between December 2004 and April 2006**



### **6.3.6. Number of prosecutions for non-compliance with the Smoke-free Environments Amendment Act**

By September 2006, only five licensed premises, out of over 9000, had been prosecuted and/or brought before the Liquor Licensing Authority for persistent non-compliance with the SEAA (2003). One employer was convicted in a District Court for allowing smoking in a ventilated smoking room, and the conviction was upheld on appeal to the High Court in September 2006. (New Zealand Press Association, September 30, 2006) All the prosecutions were laid by mid-2005, and no new complaints since then have led to prosecutions.

Successful District Court prosecutions were conducted against publicans in Timaru and Levin, in December 2005 and March 2006. A publican in Diamond Harbour near Christchurch avoided a court hearing in July 2005 by placing his company into voluntary liquidation. A fourth publican, in Cambridge, had his license removed for three weeks by the local Liquor Licensing Authority, for activity including allowing smoking. A further court conviction (from a prosecution brought by the police) occurred when an unlicensed ‘garage’ bar was operated, partly for smokers.

The judgement in the first prosecution (Timaru, December 2005) provided clear statements about the responsibilities of publicans under the SEAA (2003). The statements including support for the Ministry’s interpretation of the phrase “*all reasonably practical steps*”. (Abbott T, 2005b) Judge Abbott commented that: “*There is no reason why a licensee should not deal with a smoking patron in the same way as he or she would deal with a drunken or disorderly patron.*” He also explicitly stated that where a breach of a new law occurred with continued defiance after warnings, no ‘honeymoon’ period after the law’s introduction could be considered. (Abbott T, 2005a) However, at least two hotels demonstrated clear and continued defiance of the SEAA (2003) from December 2004, (Hayman, 2004; Nelson Mail, 2004; Timaru Herald, 2004, 2005) without commensurate and timely action by the Ministry.

### **6.3.7. Results of the stakeholders analysis**

#### ***General background, actions and statements before December 2004***

In the period before the vote on the SEAA (2003), the public statements of employer and hospitality industry organisations generally strongly opposed the proposed legislation. (Thomson et al., 2006) Opposition was strongest, and the potential for non-compliance was perceived as greatest, among traditional pubs and pubs in rural areas. For example, HANZ presented evidence on its website expressing doubt about the dangers of SHS, (Hospitality

Association of New Zealand, 2001) and claimed that smokefree policies for bars had caused a downturn in bar business elsewhere. (Hospitality Association of New Zealand, 2003; Robertson, 2001) HANZ also produced media releases that suggested there would be non-compliance with smokefree bar policies, (Hospitality Association of New Zealand, 2002b) and that New Zealand bars would lose money because of the policies. (Hospitality Association of New Zealand, 2002a) In media coverage relating to the smokefree bar law, before the implementation in 2004, a major theme was reporting fears among publicans of lost profits and enforcement problems. (Thomson et al., 2004)

### ***Successes of the SEAA (2003) and its implementation***

There were many positive comments about the SEAA (2003) made in the stakeholder interviews. Aspects of the implementation which were most praised were efforts to gain the cooperation of stakeholders, and to communicate information about the Act. A number of interviewees commented on the Ministry's good long-term relationships with health NGOs. This facilitated the involvement of NGOs and the contribution of their expertise and staff resources during the development and implementation of the SEAA (2003). The importance of the NGO sector in the initial passage of the SEAA (2003) was noted in interviews with politicians conducted in a study by Price and Allen. (Price et al., 2006)

The legislation was generally accepted as effective as a health promotion measure, because public perception of SHS as a serious health issue had increased, due to the government being seen to have taken the issue seriously. Support for the focus in the SEAA (2003) on workplaces was another strong theme. Interviewees felt this ensured that employers and courts saw the SEAA (2003) as an extension of the Health and Safety in Employment Act.

Many interviewees including Māori stakeholders, union officials and employer organisation representatives, acknowledged the Act had successfully extended protection from SHS in the workplace for large numbers of people. They reported widespread support for smokefree indoor workplaces amongst the groups that they represented and were in contact with. The complete coverage of school facilities and grounds, for all hours and days, was strongly supported. Interviewees mentioned almost universal public support of this, and positive feedback from schools. Editorial comment during 2001 to 2005 in New Zealand newspapers about the smokefree bars policy generally became more positive after December 2004. (Thomson et al., 2006)

The six HANZ representatives reported a reasonable level of acceptance of the SEAA (2003) by their members. They agreed that the 'level playing field' approach, with no exceptions for any type of hospitality industry activity, had facilitated and created support for the SEAA (2003) by HANZ and others. HANZ representatives commented positively on some aspects of the SEAA (2003) such as reduced cleaning costs and a better environment for staff and customers. A statement on the HANZ website from November 2005 noted that implementation had mostly gone very smoothly, with customers accepting the new legislation. (Robertson, 2005) However, problems relating to loss of trade were still raised (see below), and the interviews indicated that the rights of staff to work in a smokefree environment were still not accepted by some licensees.

Newspaper coverage also indicated increasing acceptance of the change by licensees. While two articles focused on reports from HANZ regional presidents on difficulties for traditional pubs, others mentioned positive feedback, more diners, and few enforcement problems. (Thomson et al., 2006)

### ***Impact of communications about the SEAA (2003)***

Interviewees from the health sector commented positively on the information provided by the Ministry, HSC and others, to the public and employers about the dangers of SHS and about the impending SEAA. However, most of the six HANZ representatives interviewed remained either unsure or unconvinced of the evidence of risks from SHS, suggesting that communication to this sector needed to be more effective.

### ***Perceived compliance and operation of the complaints and enforcement mechanisms***

District health Board smokefree officers reported that they worked collaboratively with employers and venue operators to resolve complaints, generally through letters, phone calls and/or visits by smokefree officers. However, many stakeholders reported widespread perceptions of non-compliant workplaces, about which complaints had not been made to officials. This was particularly among small businesses where most staff were smokers, and where the workplace was not accessed by the public.

Smokefree officers reported pressure from the public, HANZ and hospitality venue managers to enforce the SEAA (2003). HANZ members and hospitality venue managers were concerned that the level playing field policy would be undermined by publicans who persistently allowed smoking, and many complaints to enforcement officers were from

hospitality venue managers concerned about smoking on other hospitality premises. Other complaints were from publicans who had provided attractive outside places for smokers, and saw other publicans who allowed smoking inside as eroding the value of that work.

### ***Implementation problems raised by stakeholders***

The main implementation problems raised were uncertainties about the definition of ‘enclosed and non-enclosed workspaces’, the partial or non-coverage of some premises and groups of workers, insufficient staff resources for enforcement and preventive education, the slowness of prosecutions of non-compliant businesses, difficulties with outdoor smoking areas, and costs of implementation to employers.

Interviewees from the commercial and health sectors mentioned confusion amongst employers and enforcement officials about *definitions of non-enclosed and enclosed workspace* under the SEAA (2003). Problems identified included insufficient focus on defining ‘open spaces’ before implementation. There were continuing difficulties even after dissemination of the calculator, due to its availability only over the internet, and it providing information which conflicted with the original information booklet. However, HANZ statements suggest that the current definition is now accepted, at least by the Association.

*Partial or non-coverage of some premises* such as prisons and rest homes was also reported as causing some difficulties and confusion. For example there were uncertainties about whether and how rest-home workers who have to work in smoking rooms should be protected from SHS. Practical difficulties were reported in preventing staff from smoking, when patients were allowed to smoke in smoking rooms by the SEAA (2003).

*Insufficient staff resources* was frequently raised as a problem. Interviewees thought that during 2004-5 reactive work on complaints and inquiries prevented more proactive, educational or strategic level work by DHB staff. They also complained about lack of leadership and commitment of resources within DHBs, which was ongoing. This resulted in insufficient numbers of staff and support for frontline smokefree officers. The problem was exacerbated during late 2004 by the delayed arrival of information about the SEAA (2003) from the Ministry. District Health Board smokefree enforcement staff also complained of lack of dedicated staff at the Ministry of Health to address their concerns during the period of greatest implementation work in 2004-2005.

*Lack of or delayed prosecutions of offenders* was often described as problematic. Smokefree officers and HANZ interviewees were concerned about delays in laying charges against

persistent licensee offenders. These made it harder for the smokefree officers to work constructively with licensees who complied with the legislation, and made it harder for these licensees to resist pressure from some smokers to allow smoking. For example, delays were cited in laying the first charges against a publican from February to April 2005, and high profile defiance of the SEAA (2003) from December 2004 by two hotels, (Hayman, 2004; Nelson Mail, 2004; Timaru Herald, 2004, 2005) without commensurate and timely action. Interviewees identified a lack of a criminal law focus within the Ministry as the problem, with a perception that the Ministry generally used the law to limit risks rather than as a tool for action. They commented that there was insufficient enforcement advice in the Ministry, with no experienced criminal lawyer available in-house.

*Problems related to smoking in doorways, entrances and outdoor areas visible to or used by the public* were also discussed. Interviewees (including publicans and enforcement officers) commented that smoking in the entrances of workplaces was a common source of complaint, as it could result in tobacco smoke moving inside, and be unpleasant for others using the entrances. Others noted that smoking may have increased in outdoor public areas surrounding bars, and that the conjunction of smoking and drinking was now more clearly apparent to children. For some publicans, the addition or extension of outdoor areas created problems with security and the management of underage drinkers.

Employers raised the issue of *costs relating to implementation of the SEAA (2003)*. These included: staff costs for reviewing and implementing policies and for retraining; costs for advice from lawyers and architects; and costs for physical changes. The latter included providing, extending and improving outdoor areas, and losses from the installation of ventilation systems during 2001-2003. Some HANZ representatives described negative ongoing business costs such as reduced turnover, increased outdoor heating costs, and reduced productivity due to staff going outside to smoke. Reduced turnover was perceived particularly among more traditional and rural pubs, and for premises which could not provide outdoor accommodation. However, interviewees also reported the benefits of decreased cleaning costs, decreased damage from cigarette burns to carpets and furniture, and better working conditions for themselves and staff.

Less frequently mentioned were problems with the application of the law to work vehicles and taxis.

### ***Impact of the Smokefree Environments Amendment Act (2003) on Māori***

The interviews with Māori stakeholders indicated that the SEAA (2003) was generally supported by Māori, and had enabled a new level of discussion about smokefree homes and about banning tobacco sales. Māori stakeholders felt that Māori involvement in the initiation and progression of the Bill through Parliament was strongly supported by the Auahi Kore network and Māori politicians. Smokefree environments continue to be a key political platform for the Māori Party. There was anecdotal evidence of increased uptake of cessation activities within DHBs, and increased work for Aukati Kai Paipa workers.

Māori stakeholders described close collaboration with groups such as ASH during implementation. Generally, Māori health workers had sufficient access to information on the changes, due to their affiliations with Auahi Kore networks and groups such as Te Reo Marama (the Māori Smokefree Coalition). One interviewee felt there had been much work to get the message across to Māori audiences including; Te Reo Marama posters, marae smokefree resources, iwi radio panui, and “*loads of hui*”. However, another interviewee described insufficient information available for Māori communities in te reo Māori (particularly spoken te reo Māori), and a lack of information for marae. This was thought particularly inappropriate, given the high smoking prevalence among Māori.

There were also concerns over the level of staff resources and increased workload for health staff. Māori stakeholders also reported confusion over the definition of ‘outdoor areas’, and expressed concerns about smoking in outside spaces becoming normalised, and the role modelling effects this might have. One Māori health manager was disappointed by the lack of coverage of some indoor areas, particularly on marae, in the SEAA (2003). However, this was in contrast to other Māori interviewees, who felt the approach was appropriate, as whānau, hapū and iwi needed to drive this change themselves.

## 6.4. Discussion

### 6.4.1. Critique of the evidence

There is no active monitoring of compliance with the SEAA (2003) in workplaces in New Zealand. This contrasts with, for example, the programme of workplace inspection visits carried out as part of the Irish smokefree legislation.

The evidence from direct observation of workplaces was confined largely to bars and pubs, though these are generally agreed to be the most likely venues in the hospitality sector where compliance may be a problem. Also, although the surveys included large numbers of pubs and patrons observed, the data were largely restricted to venues in the major population centres, and apart from the pubs surveyed in the Wairarapa did not include rural pubs and bars. The data is also limited to discrete ‘snapshot’ surveys. There is no ongoing system of monitoring compliance through direct observation. The bar managers survey is limited to self-reported broad perceptions of compliance at specific time points in pubs and bars; though it generally supports the high levels of compliance found in the direct observation studies. For the rest of the hospitality industry there is little evidence available, other than the restaurants included in the University of Otago survey in Wellington; though anecdotally compliance is reported as high.

For workplaces outside of the hospitality sector, there is no direct observation data available. There is some self-reported exposure data from employees included in the HSC Monitor surveys (see section 7.3.2). The lack of data from other workplaces was particularly worrying, given the perception of participants in the stakeholder interviews that non-compliance was common in some types of workplaces – particularly small businesses with a high proportion of smoking employees.

The other main source of evidence on compliance comes from the complaints line data. This is a limited source of information. Firstly, it is likely to under-estimate the level of non-compliance, since probably only a small proportion of violations will be reported. Secondly, the decreasing numbers of complaints over time observed may not accurately reflect compliance trends – if the propensity of the public and workforce to complain in response to violations is changing over time. For example, willingness to complain might increase over time if smoking in enclosed spaces becomes increasingly socially unacceptable. It equally could decrease if people became less inclined to complain, for example due to perceived lack

of effective action resulting from previous complaints, or reducing awareness of the complaints line number as publicity campaigns cease.

The low number of prosecutions gives little information about compliance. They are subject to the same limitations as complaints. They are also highly influenced by the willingness of the authorities to prosecute, which the stakeholders interviewed for this evaluation thought was low. In addition a number of premises went out of business before prosecutions were mounted, further limiting the number of prosecutions.

The stakeholder review study provides more in-depth qualitative data on issues relating to enforcement and compliance. A broad range of interviewees were included, so a good range of views and experiences should have been captured. However, it remains possible that the participants were unrepresentative of the groups of stakeholders from which they were drawn, and hence the findings do not give an accurate picture. This was particularly true where HANZ, employer organisation and union officials and representatives were asked to comment on the views and experience of their members – as they may have had a distorted understanding of their views. Also, not all potential stakeholder groups were represented. For example, there were no interviewees from the prison, residential home or psychiatric institution sectors.

#### **6.4.2. Conclusions**

The available information suggested that the process of dissemination of information and support for implementation the SEAA (2003) mostly worked well. However, there are some continuing problems of lack of staff resources and confusion over the definition of enclosed and non-enclosed outdoor areas, as well as with implementation in premises such as rest homes which have partial exemptions to the SEAA (2003).

The limited evidence available from direct observation, self-reports of experiences of compliance, number of cases to the complaints line and number of prosecutions is consistent with, but does not prove, high compliance with the smokefree provisions of the SEAA in most workplaces, including in the hospitality industry (2003). However, the evidence was incomplete and anecdotal reports suggest that there may be greater non-compliance in some workplaces, for example, in licensed premises in more remote rural areas, and in smaller businesses with a high proportion of smokers. Evidence described in section 7.3.2 suggests continuing SHS exposure in the workplace largely affects men, in non-office settings.

Enforcement of the SEAA (2003) occurs in a reactive fashion, with no ongoing active monitoring of compliance. The enforcement infrastructure appears to be working well, though it has the inherent limitations of a passive enforcement system reliant largely on unsolicited complaints. The failure to take rapid action to prosecute persistent and determined non-compliers early on in the implementation period was a frequent complaint from those involved in enforcement, and by other key stakeholders. This contrasts with the decision to prosecute in Galway, Ireland in response to deliberate challenges to the smokefree legislation, only four months after implementation. (Tobacco Advisory Group of the Royal College of Physicians, 2005b)

A strong theme from the stakeholder interviews was that compliance occurs because the public, employees and employers find that they enjoy and benefit from smokefree places. This experienced *reality* probably explains why compliance was better than might have been expected, from the views held before implementation by the public and key stakeholders, such as bar managers and hospitality industry representatives. The generally positive process indicators for enforcement and compliance for the SEAA (2003) are in contrast to the disastrous scenarios foretold by some opponents prior to implementation.

There are two major unresolved issues suggested by the evidence presented in this section. The first is the extent of compliance in workplaces not covered by studies to date – particularly non-office based small businesses, and more rural and remote pubs and bars. Assessing this will require more active monitoring, and further investigation and enforcement efforts. The longer term solution to compliance in these venues may depend not only on improved monitoring and compliance, but also on the continued lowering of smoking prevalence in the general population, and the continued denormalisation of smoking and SHS exposure.

The other unresolved problem is of smoking in semi-enclosed spaces or near entrances to buildings. Solutions to the problems of smoking outside workplaces that were suggested by interviewees in the stakeholder study included having a required distance from building openings for smoking, and requiring no smoking in areas where food or drinks are served (as has been introduced for example in Queensland. (Queensland Health, 2006)

## 7. Reducing Secondhand Smoke exposure

### Summary

This section describes the outcome evaluation for the principal objective of the SEAA (2003), which was to equitably reduce SHS exposure in indoor workplaces among those still exposed after the 1990 SEA. It also describes the evidence for the non-core objective of reducing SHS exposure of the general population in other settings, particularly in homes.

The main sources of evidence were the HSC Monitor surveys (2003-6), National Year 10 Smoking surveys (2001-5), the Institute of Environmental Science Research (ESR) Bar Customer Cotinine (a biomarker of SHS exposure) study, and levels of fine particles (PM<sub>2.5</sub>) in the University of Otago air quality monitoring studies. The main limitations to the evidence were: lack of biomarkers and air quality data from non-hospitality workplaces; lack of data on biomarkers of exposure among the hospitality sector workforce; and reliance on self-reports for data on SHS exposure in homes.

Prior to the SEAA (2003) at least 20% of the adult workforce was exposed to SHS in the workplace, with higher exposure among Māori and blue-collar workers. The greatest SHS exposure was among workers in the hospitality sector. The ESR study found that SHS exposure during visits to pubs and bars reduced by about 90% post-SEAA (2003). In the University of Otago air quality studies the mean fine particulate levels in bars and restaurants were similar to those in the outdoor air, and far lower than found in international studies from venues where smoking was allowed. Self-reported SHS exposure indoors at work in the previous week fell from around 20% in 2003, to 8% in 2006 among employed adults. There were greater reductions among Māori. Workplace exposure in 2006 was highest among men, and workers in blue collar jobs such as labouring and operating machinery.

Self-reported SHS exposure in the home in the HSC surveys fell from 20% in all households (42% of households with one or more smokers) in 2003, to 9% (30% of households with one or more smokers) in 2006. Reductions in self-reported SHS exposure in Māori households were more marked. In the Year 10 survey, children's reporting of smoking in the home decreased, but to a lesser degree.

### 7.1. Objectives and success criteria

The SEAA (2003) does not explicitly state objectives relating to the reduction of SHS exposure through implementation of the smokefree provisions of the Amendment. However, this is implied by the main stated aim being: *'to prevent the detrimental effect of other people's smoking on the health of people who do not smoke'*. (Ministry of Health, 1990, 2003c) This could not be achieved without reducing SHS exposure. The SEAA (2003) also directs that, subject to certain exemptions, employers must ensure that all indoor workplaces are smokefree.

Other documents make the objective of reduced SHS exposure more explicit, and make it clear that extending the protection from SHS within indoor workplaces is the **principal, immediate objective of the SEAA (2003)**. Thus the National Health Committee report into the Smoke-free Environments (Enhanced Protection) Amendment Bill stated that the aim of the bill was: *"to extend the protections for workers, volunteers and the public in the Smokefree Environments Act 1990 particularly against exposure to second-hand smoke..."*. (Health Committee of New Zealand Parliament, 2003). The Ministry of Health's Tobacco Control Plan states as an objective: reducing the proportion of indoor workers exposed to environmental tobacco smoke during working hours to zero by 2006 (from 17% in 2001).

It also states as broader outcomes which could be achieved: reducing the general population's exposure to SHS in workplaces and enclosed public places, hospitality venues, crowded outdoor places, sporting venues, clubs, marae, and private homes and cars, and of children's exposure to SHS in homes and cars. (Ministry of Health, 2005a) However, reducing exposure in homes, cars and other non-workplaces was not an immediate and direct objective of the SEAA (2003), and hence is not a primary success criterion against which the SEAA (2003) should be evaluated. Rather it was a possible indirect impact and subsidiary aim of the Act, though very welcome if it occurred. Its profile as a success indicator was raised when a Health Minister in the UK suggested that making workplaces smokefree would cause the displacement of smoking and increase smoking in homes. (Reid, 2005)

Further evidence that reducing SHS exposure was a key objective of the Ministry of Health is provided by the Tobacco Control Plan listing of required actions: evaluating levels of exposure to second-hand smoke in hospitality venues, and reviewing the appropriate options for routine surveillance of SHS exposure in workplace settings in relation to improving support for monitoring, surveillance and evaluation. (Ministry of Health, 2005a) The Ministry's 'The Smoke is Clearing' evaluation report included data about the proportion of workers reporting SHS exposure in their workplace, the proportion of adults reporting SHS

exposure in the home, and biomarkers of exposure to SHS among customers in bars. (Ministry of Health, 2005b) Evidence on SHS exposure in the workplace was frequently included in international evaluations of the impact of smokefree legislation (see section 3.5), and five outcome indicators are included within the CDC evaluation framework for smokefree policy evaluation. (Starr et al., 2005b)

We have therefore adopted the following as success indicators for this aspect of the SEAA (2003) implementation:

- To substantially reduce the proportion of the New Zealand workforce reporting SHS exposure in indoor workplaces
- To substantially reduce indoor workplace exposure among all population groups including Māori, Pacific peoples, and low income workers (core)
- To substantially reduce self-reported SHS exposure among workers in the hospitality sector (core)
- To substantially reduce self-reported SHS exposure in indoor workplaces among workers in other sectors with high SHS exposure after the SEA (1990) e.g. non-office workers (core).
- To demonstrate substantial reductions in biomarkers of SHS exposure among non-smoking customers and workers in the hospitality sector (core).
- To substantially improve air quality indicators in indoor workplaces, including in the hospitality sector and other sectors with high SHS exposure after the 1990 Act to close to or the same as levels seen in smokefree venues (core).
- In comparison to before introduction of the SEAA (2003), to demonstrate no change or a reduction in levels of SHS exposure in private homes and other settings where SHS exposure commonly occurs such as in private cars among all population groups including children, adults, Māori, Pacific peoples, and low income groups (non-core).

## **7.2. Data sources and methods**

### **7.2.1. Hair nicotine study among bar and restaurant workers**

Al-Delaimy et al studied 117 workers (71 non-smokers) from 62 restaurants and bars in Auckland and Wellington between 1997 and 1999. (Al-Delaimy et al., 2001) The investigators measured hair nicotine levels, a marker of nicotine exposure over the preceding weeks and months. They compared hair nicotine according to where the workers worked (restaurant or bar) and the smoking policy in place at the workplace.

### **7.2.2. Institute of Environmental Science and Research Workplace Salivary Cotinine Study, 2000**

This ESR study compared SHS exposure in workers in the hospitality industry and among Government office workers by measuring the increase in salivary cotinine level from before starting work to the end of the shift or working day. (Bates et al., 2001) Cotinine is the main metabolite of nicotine and represents exposure to nicotine (and therefore to active smoking or SHS exposure) in the previous 24 hours approximately. For non-smokers any increase in cotinine observed should be due solely to SHS exposure. The study recruited 42 non-smoking volunteers who worked in bars and restaurants, and 50 who worked in Government Departments and Ministries. All worked in Wellington. Ten of the hospitality workers were in venues which were smokefree, 20 where smoking was allowed in designated areas only, and 12 in venues with unrestricted smoking. All government workers were in non-smoking offices.

### **7.2.3. National Research Bureau Surveys 1989-2001**

The NRB studies conducted in 1989, 1991, 1996 and 2001 included questions on self-reported SHS exposure in the workplace. (National Research Bureau, 1989, 1991, 1996, 2001) The 1989, 1991 and 1996 surveys also included questions on SHS exposures in the home and details on the workplace smoking policy. They therefore provided information on baseline data and trends in SHS exposure at work and in the home prior to the SEAA (2003) implementation. The surveys recruited a demographically representative sample of adults aged 15 years and over from households included in regional telephone directories, and collected data using telephone interviews. Response rates in the NRB surveys were around 60-70%, varying with the methods used to define non-responders.

#### **7.2.4. Institute of Environmental Science Research Bar Customer Cotinine Study, 2004-5**

This was a before-after study in which two pre-implementation and two post-implementation measurements of SHS exposure were made in 30 randomly selected bars in Auckland, Wellington and Invercargill in 2004 and 2005. It followed on a pilot study carried out in three Wellington bars, showing this was an effective measurement approach. (Woodward et al., 2005) The investigators assessed SHS exposure by measuring salivary cotinine levels in five non-smoking volunteers who lived and worked in non-smoking environments, prior to and after spending an evening in each pub on a Friday or Saturday night. (Lea et al., 2006) Pubs were each assessed twice in winter and spring 2004, before implementation of the SEAA (2003); and twice more on the same month and day of the week in 2005 (to minimise the impact of variations in exposure by season or day of the week) after implementation. Cotinine has a half life of 16-19 hours in the body. The peak cotinine level would therefore have occurred 3-4 hours after leaving the venue and hence the changes in cotinine observed are likely to be an underestimate of actual SHS exposures. (Lea et al., 2006)

#### **7.2.5. Health Sponsorship Council Monitor Surveys, 2003-2006**

The HSC Monitor surveys described in section 5.2.2 included a range of questions assessing self-reported SHS exposure in the workplace and the home. Data on smoking in cars was not collected in all the surveys and is not reported. The main results are reported in the text, and further tables are in appendix I. All results are from the additional analysis weighted to the 2001 census unless stated otherwise.

#### **7.2.6. The National Year 10 Smoking Surveys, 2001-2005**

The National Year 10 Smoking survey is a cross-sectional survey of 14-15 year old children, which was first performed in 1992, and has been conducted annually since 1997. Data collected includes pupils' smoking, parental smoking and SHS exposure in the home since 2001. Data is collected anonymously using self-completion questionnaires. Since 1999 the survey has aimed to recruit all year 10 students, (Christophersen, 2003) and between 1999 and 2005 averaged over 30,000 participating students per year from over 300 out of about 450 eligible schools. This represents more than 70% of all eligible schools and year 10 students. (Scragg, 2006)

### **7.2.7. University of Otago air quality surveys in pubs and bars and other indoor workplaces and public places, April-June 2006**

Members of the smokefree evaluation team in Wellington led two studies to assess indoor air quality in New Zealand workplaces and public places.

The first study in May/June 2006 was carried out as part of a global comparison study including a range of venues in 20 countries. (Hyland et al., 2006) Air quality was assessed unannounced using battery-operated real time aerosol monitor (TSI SidePak AM510 Personal Aerosol Monitor – TSI, Inc., St. Paul, USA) carried in a small bag to assess average levels of respirable particles (PM<sub>2.5</sub>) every minute, as has been reported in other studies from around the world. (Edwards et al., 2006; Repace, 2004; Travers et al., 2004) In New Zealand the venues were pubs, bars, restaurants, offices, bus and train stations, buses and trains, and an airport in Wellington. The venues included eight bars (some as part of restaurants) and eight restaurants randomly selected from the Wellington CBD. Indoor air quality was assessed for a 30 minute period on a Friday or Saturday evening in each pub or restaurant. The number of customers and smokers in the pubs was assessed at 15 minute intervals.

In the second study, air quality was assessed nine rural pubs in the Wairarapa and eleven urban pubs and bars in central Wellington in June 2006 using similar methods to those used in the first study. The bars were selected from those listed in the Yellow Pages directory. In the Wairarapa more rural, traditional pubs or taverns were purposively selected for inclusion, and in Wellington a random selection was made from bars that, judged by their name, were not primarily food serving or ‘adult entertainment’ establishments. A fuller account of the methods used and results from the second study is provided in appendix III. The findings from both studies will be published in a forthcoming journal article.

## **7.3. Results**

### **7.3.1. Smoking policies in the workplace**

In the 1996 NRB survey, (National Research Bureau, 1996) of those in paid employment who worked mainly indoors, 70% worked in officially (meaning not clarified) smokefree premises, and 15% in unofficially (meaning not clarified) smokefree premises, only 14% worked in a workplace where smoking was allowed in their workspace (National Research Bureau, 1991)). The proportion of ‘blue collar’ workers who worked at premises where smoking occurred in their workspace was 28% in 1996. In the 1999 NRB survey, 84% of adults reported working in a workplace where there were ‘restrictions’ (unspecified) on smoking,

and 14% in workplaces with no restrictions. (National Research Bureau, 1999) There was little difference in the proportion with restrictions by ethnicity, but only 9% of workers in indoor office environments reported no restrictions versus 18% in non-office indoor workplaces. (National Research Bureau, 1999)

In the 2004 HSC monitor study, just before the SEAA (2003) was implemented, 72% of respondents in employment worked in workplaces where no smoking was allowed indoors, 22% in workplaces where smoking was allowed in set areas, and 6% reported unrestricted smoking. Among Māori subjects, 9.6% reported unrestricted smoking in the workplace.

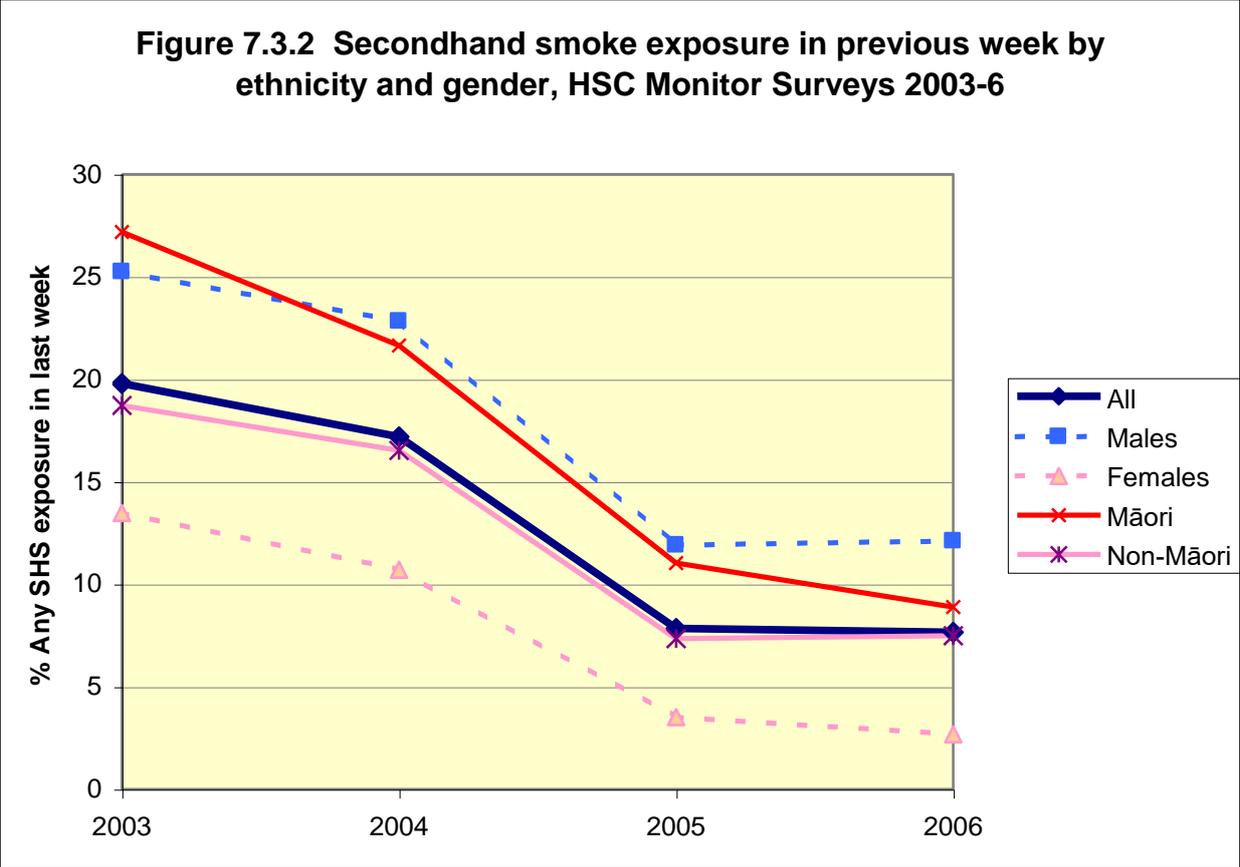
### **7.3.2. Self-reported exposure in the workplace**

The NRB surveys found that in 1989, prior to the implementation of the SEA (1990), about 31% of adults reported SHS exposure during working hours, and about 50% during lunch and tea breaks. In 1991 this had reduced to 21% during working hours and 36-39% during breaks. (National Research Bureau, 1989, 1991) During the next decade reported SHS exposure remained fairly static. For example, in 1996 19% of respondents reporting work-time exposure and 36% during breaks; (National Research Bureau, 1996) and by 2001 17% exposed in work-time, 33-34% during breaks. (National Research Bureau, 2001) Importantly, there were persisting differentials in smoking by ethnicity and occupational status – with 28% of Māori and 29% of blue collar workers reporting exposure during work-time in the 1996 survey (24% and 25% respectively in 2001) and 53% of Māori (47-51% in 2001) and 49-50% (45-49% in 2001) of blue collar workers reporting exposure during breaks in 1996. (National Research Bureau, 1996, 2001)

The HSC Monitor surveys from 2003-6 included extensive data on self-reported exposure to SHS in the workplace. Data are available for all four years for the proportion of all those in paid employment reporting SHS exposure in the last 7 days (table A1.7, appendix I). The proportions of workers by gender and ethnicity who reported any exposure to SHS indoors in the last 7 days is shown in figure 7.3.2. The proportion of adults in paid employment reporting exposure to SHS was 20% in 2003, 17% in 2004 and then dropped markedly to less than 8% in 2005 and 2006. Men remained far more likely to report exposure than women (12 vs 3% in 2006), but the difference between Māori and non-Māori that was present, particularly in 2003, had largely disappeared by 2006.

In the 2004-6 surveys, additional data were available about whether a subject had worked in the last week and if so, if they had only worked outdoors. Table A1.8 in appendix I shows the

proportion reporting SHS exposure among those in employment, and who had worked in the last week, but excluding subjects who had worked only outdoors. About 8% reported any exposure, with a large difference between men (12%) and women (3%), but little difference between Māori and non-Māori. Data on household income was available for 2004-6. Table A1.9 (appendix I) shows that there was no clear gradient in workplace SHS exposure by



household income during this period.

Data from a detailed analysis of SHS exposure among different groups of people who were employed and had worked in the last seven days is now available from the 2006 HSC Monitor survey. (McGough et al., 2006) Persons employed in labouring (17.3%), machinery operation/driving (17.1%), or technician/trade (15.3%) occupations were most likely to report exposure, and professionals (2.6%), clerical workers (3.8%) and workers in community or personal services (3.4%) the least (table 7.3.2). Five subjects reported exposure in healthcare settings, four of whom worked in residential homes. Exposure was most common in workplaces with between two and 15 employees (7.2%), and least common in larger

workplaces (5.5% 15-20 employees, 4.9% >20 employees), though the differences were small.

**Table 7.3.2: Reported second-hand smoke exposure by occupational group in 2006 HSC Monitor Survey (ANZSCO standard)**

Occupational Category (n)	Number exposed to SHS	% of workers exposed (N = 1611)
Manager (n=180)	11	6.1
Professional (n=417)	11	2.6
Technician or trade (n=230)	35	15.2
Community or personal service (n=198)	10	3.4
Clerical and administrative (n=212)	8	3.8
Sales (n=132)	13	9.8
Machinery operator or driver (n=76)	13	17.1
Labourer (n=156)	27	17.3
Refused (n=10)	2	20.0*
Overall (N=1611)	130	8.1

\* This proportion is based on fewer than 30 respondents.

Of the 111 SHS exposed subjects who had worked five or more days in the last week, 50% reported exposure on five or more days, 14% on 3-4 days and 35% on 1-2 days. Exposure occurred whilst working, during breaks and whilst entering and leaving buildings, most reporting a combination of two or more of these. Only five (3.8%) subjects reported SHS exposure only whilst entering and leaving buildings. These data suggest most of these workers were truly exposed to indoor SHS exposure at work, and the majority were exposed on most days.

### **7.3.3. Biomarkers of exposure among the workforce and others exposed in workplaces**

Two studies were conducted prior to the SEAA (2003) implementation. Al-Delaimy et al found that among non-smoking bar and restaurant staff, there was a clear relation between the type of smoking policy (unrestricted, 50% smokefree, and totally smokefree) and hair nicotine levels. (Al-Delaimy et al., 2001) Geometric mean levels were over eight times higher in workers in workplaces with unrestricted smoking and over three times higher in workers from workplaces that were 50% smokefree, compared to workers from totally smokefree workplaces. In the ESR workplaces study from 2000, the median increase in salivary cotinine

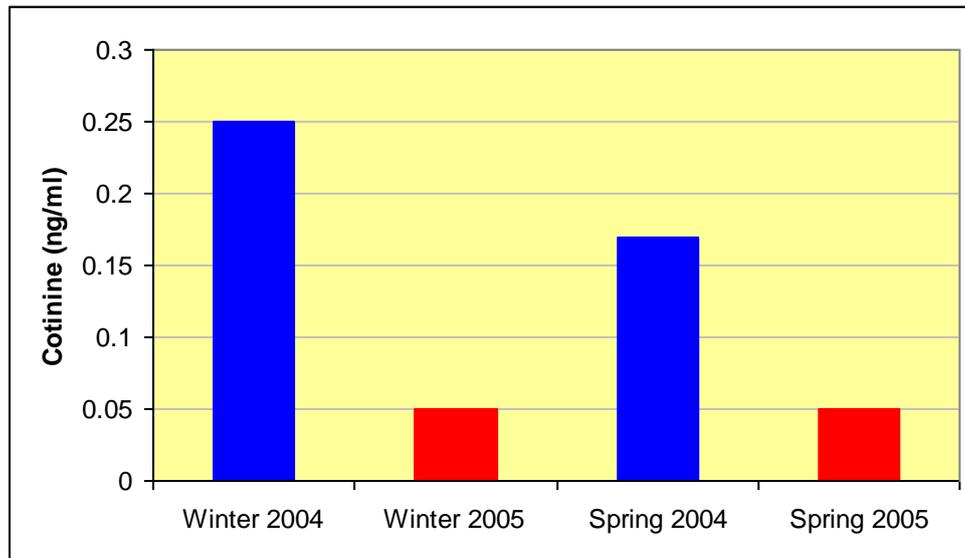
levels varied from 0.02 ng/g in the workers in government offices and smokefree restaurants and pubs, to 0.7 ng/g in the hospitality venues with designated smoking areas, and 1.8 ng/g in hospitality venues with no smoking restrictions. (Bates et al., 2001)

These two studies provided local data confirming that hospitality industry workers pre-SEAA (2003) were highly exposed to SHS, even in workplaces which restricted smoking to designated smoking areas. These data added to the international literature which found the same (see section 3.5).

Only one study has assessed biomarkers of SHS exposure before and after the SEAA (2003) implementation. In the ESR bar customers survey, salivary cotinine was measured in volunteers before entering the bars and after spending about 3 hours in the bar. (Lea et al., 2006) The mean salivary cotinine increase pre-SEAA (2003) was 0.76 ng/ml in winter and 0.54 ng/ml in spring 2004 (mean increase 0.66 ng/ml). This was similar to the increase seen in bar workers from pubs and restaurants with partial smoking restrictions in the 2000 ESR study. The mean increase post-implementation was 0.10 ng/ml in winter and 0.07 ng/ml in spring 2005 (mean 0.08 ng/ml). This represents a 90% reduction in SHS exposure after the SEAA (2003) was implemented.

An interesting finding from the ESR study was a decrease in the mean cotinine level of the volunteers prior to visiting the bars. This was 0.25 ng/ml in winter 2004 and 0.17 in summer 2004 before the SEAA (2003), but decreased to 0.05 ng/ml in winter and spring 2005 after the Act was implemented (figure 7.3.3). As all the participants were non-smoking volunteers who reported no regular SHS exposure in the home or at work, this provides evidence of a general reduction in SHS exposure in other settings such as public places.

**Figure 7.33 Cotinine levels among volunteers prior to data collection in ESR bars study**



#### **7.3.4. Air quality in workplaces and other public places**

There were no data available on air quality from workplaces available prior to implementation of the SEAA (2003). Summary data from bar areas, pubs and restaurants included in the University of Otago air quality survey are shown in table 7.3.4. In the hospitality industry venues from the Wellington CBD included in the NZ arm of the Global Air Quality Study, the mean PM<sub>2.5</sub> in eight bar areas was 22 µg/m<sup>3</sup> and in the eight restaurants was 14 µg/m<sup>3</sup>.

In the additional study of air quality in pubs and bars in Wellington and the Wairarapa, the mean indoor level for fine particulates was 17 µg/m<sup>3</sup> in the rural pubs in the Wairarapa. The level of PM<sub>2.5</sub> indoors was less than 25 µg/m<sup>3</sup> in all except one pub. In this pub the mean level was 66 µg/m<sup>3</sup> outside and 63 µg/m<sup>3</sup> inside; a rubbish fire was observed burning outdoors and an open fire indoors. In the urban bars in Wellington, the mean PM<sub>2.5</sub> level was 13 µg/m<sup>3</sup> inside.

**Table 7.3.4 Fine particulate levels inside bars and restaurants in the two University of Otago air quality studies in Wellington and Wairarapa, 2006 (for recorded one minute sampling over 30 minute periods in each venue for PM<sub>2.5</sub> in µg/m<sup>3</sup>)\***

Type of venue (n)	Location	Mean	Median	Minimum	Maximum
Bars (n=8)	Wellington CBD	22	19	10	56
Bars (n=10)**	Wellington CBD	13	8	2	94
Restaurants (n=8)	Central Wellington	14	13	2	37
Rural pubs (n=8)**	Wairarapa	17	10	1	109

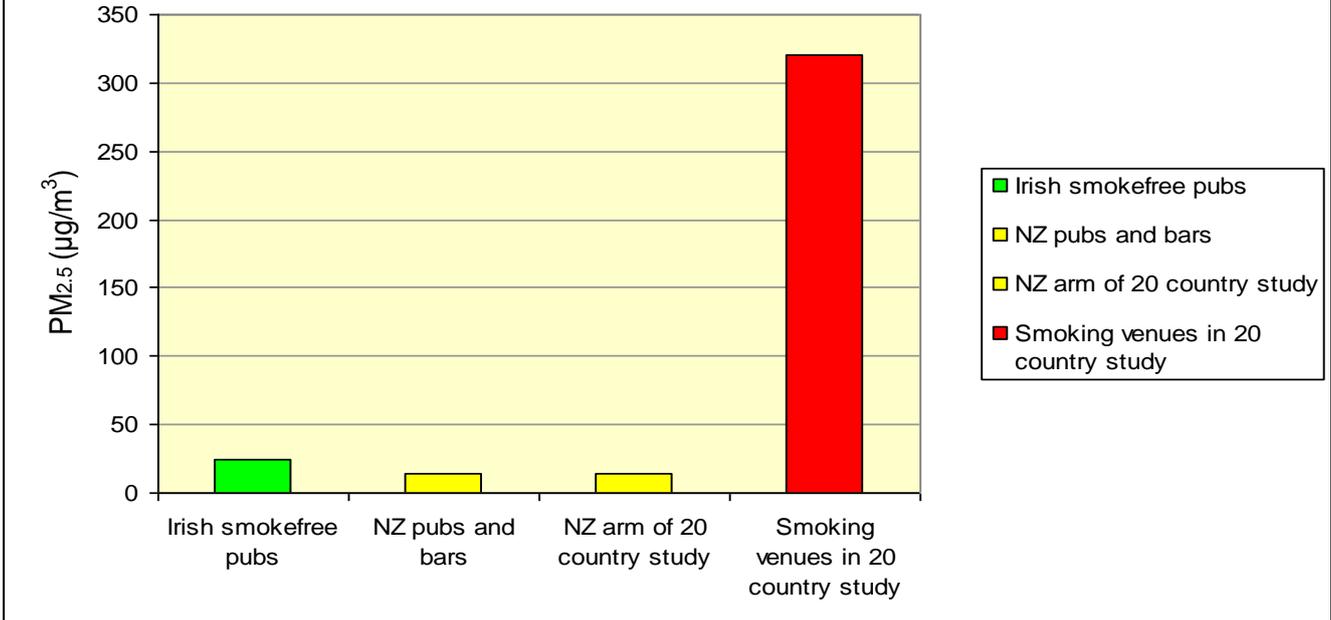
\* Further methodological details and results are presented in Appendix III and will be published in a forthcoming journal article.

\*\* Data collection at one site was not properly stored on the machine and at another site was invalidated by the use of a smoke machine used to generate 'atmospheric effects' in one bar.

The levels recorded in these studies are far below recorded in pubs and other hospitality venues in other countries where smoking was allowed – for example, a mean of 98-324 µg/m<sup>3</sup> in 51 hospitality venues (mainly bars) in three US studies, (Repace, 2004; Travers et al., 2004; Waring et al., 2006) and a mean of 286 µg/m<sup>3</sup> in a study from 64 pubs in north west England. (Edwards et al., 2006) Levels in the smokiest pubs in the north west England study reached over 1000 µg/m<sup>3</sup>.

In the 20 country global comparison, 873 venues of all types where smoking was allowed were included from other countries. The mean PM<sub>2.5</sub> levels in these venues was 321µg/m<sup>3</sup>. In the indoor venues in New Zealand, the mean level was 14 µg/m<sup>3</sup> (see figure 7.3.4a), and was 25 µg/m<sup>3</sup> in 29 smokefree Irish pubs. (Hyland et al., 2006; Mulcahy et al., 2005)

**Figure 7.3.4a Respirable particles in smokefree venues in New Zealand studies and venues with smoking in 20 country comparison study**



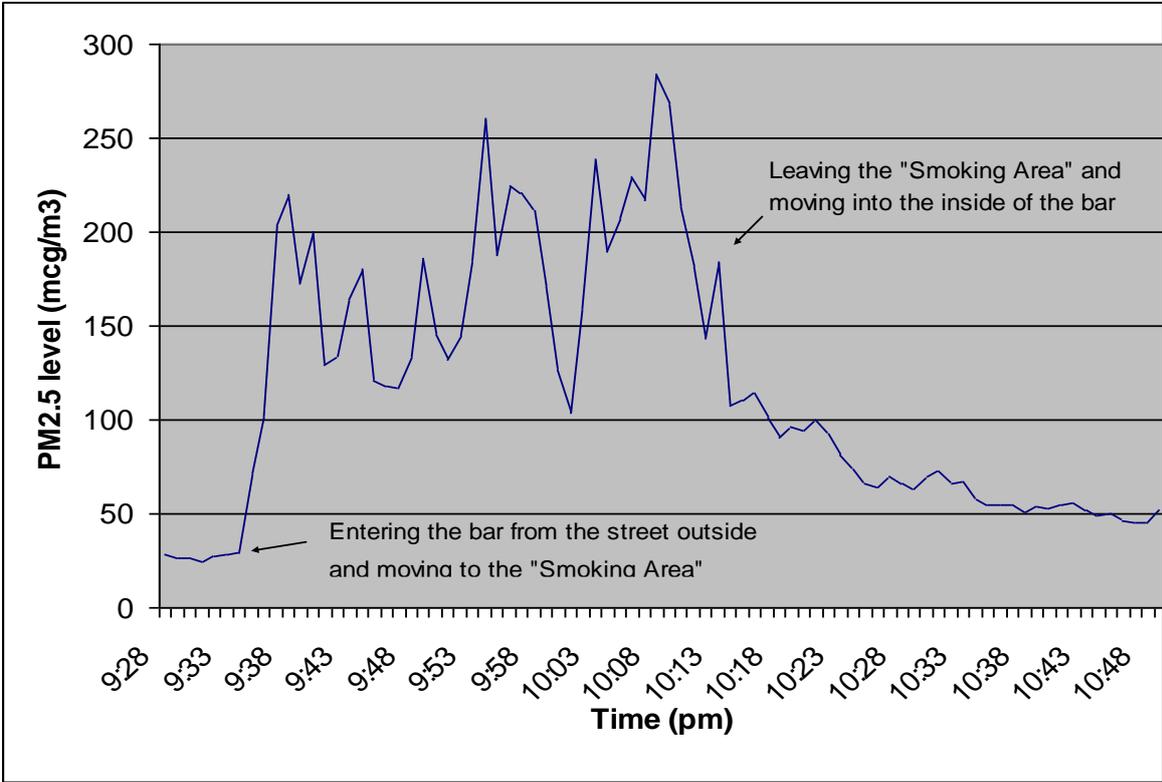
As an approximate indicator of the potential health hazards from different levels of PM<sub>2.5</sub>, in the US EPA air quality index, a level of < 15 µg/m<sup>3</sup> is described as ‘good’ air quality, 16-40 µg/m<sup>3</sup> as moderate, and levels over 65 µg/m<sup>3</sup>, 150 µg/m<sup>3</sup> and 250 µg/m<sup>3</sup> described as ‘unhealthy’, ‘very unhealthy’ and ‘hazardous’ respectively. (Environmental Protection Agency, 2005) <sup>h</sup> The World Health Organization guidelines for annual mean and 24 hour mean PM<sub>2.5</sub> levels are 10 µg/m<sup>3</sup> and 25 µg/m<sup>3</sup> respectively. (World Health Organization, 2005) The mean levels across the 20 venues in the pubs and bars study and the mixed indoor venues in the New Zealand arm of the 20 country study were therefore within the EPA ‘good’ air quality definition, and within the WHO 24 hour mean advisory level for PM<sub>2.5</sub>. This is in sharp contrast to the levels found where pubs are not smokefree.

Finally, during the air quality studies, some preliminary data were collected on air quality in outdoor areas. A selected example of the air quality in a semi-enclosed “smoking area” in a Wellington bar/restaurant is shown in figure 5.3.3c. It indicates that the fine particulate level in this “smoking area” was around six times higher than the outdoor air and three to four times higher than in the non-smoking areas indoors. This was despite the indoor area having

<sup>h</sup> Note the EPA levels are described in relation to mean levels over a 24 hour period. Air quality standards for PM<sub>2.5</sub> over shorter periods are not available.

relatively high levels, probably influenced by burning candles, cooking fumes and possibly second-hand smoke movement from the “smoking area”.

**Figure 7.3.4b Fine particulate levels (PM<sub>2.5</sub>, µg/m<sup>3</sup>) at a Wellington bar/restaurant – outside the venue, in the outdoor “smoking area”, and indoors (non-smoking)\***



\* This bar/restaurant was purposefully selected as it had a semi-enclosed “smoking area” that was unlikely to be substantially influenced by ambient wind and had significant smoker numbers (range 6-20 smokers at the 15 minute assessment points). The outside smoking area was over 10 metres from the nearest road.

**7.3.5. Self-reported exposure in homes**

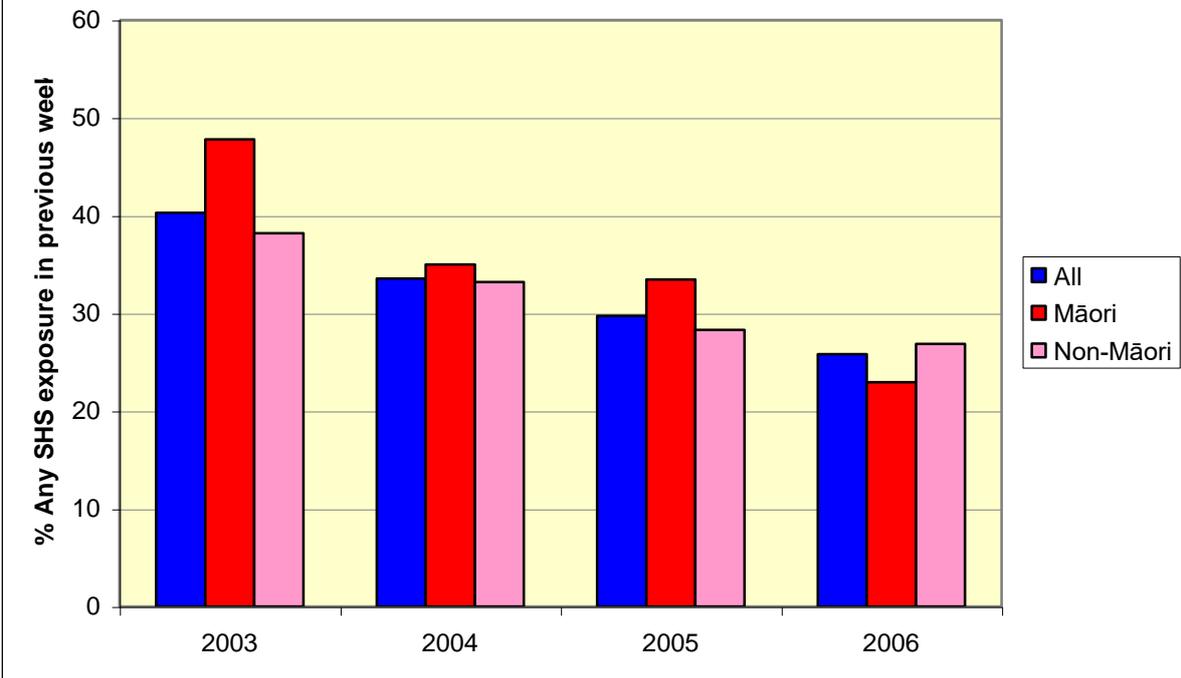
In the NRB surveys, the proportion of adults reporting regular smoking in the home was 26% in 1989, 25% in 1991 and 28% in 1996, i.e. there was little evidence of change during this period. Exposure was higher for Māori (48% in 1996) and Pacific Islander (34% in 1996) households compared with European/other households (24% in 1996). (National Research Bureau, 1996)

The HSC Monitor surveys from 2003-6 included questions on SHS exposure in the home during the previous week. Detailed results for all households, all households with one or more children, all households with one or more smokers, and all households with one or more smokers and one or more children are displayed in tables A1.10 and A1.11 in appendix I. The

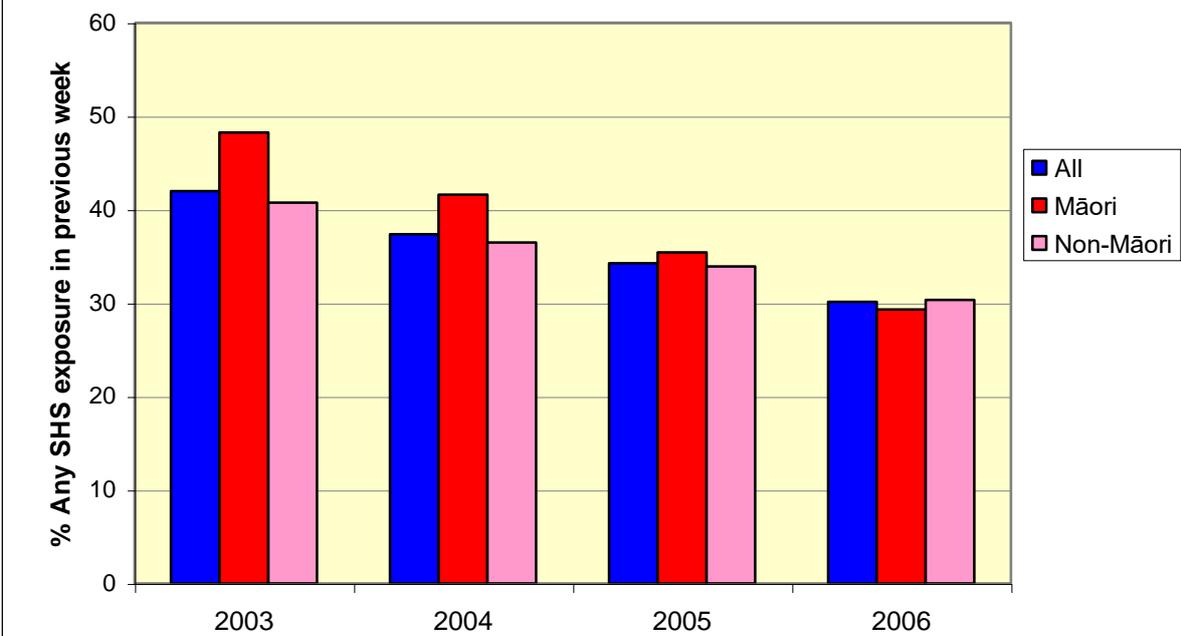
overall picture from all households and all households with one or more children is of a steady reduction of any reported SHS exposure in the home. This trend was present prior to the SEAA (2003), but importantly continued afterwards. The same reducing trend was present in the proportion reporting SHS exposure in the home for five or more days. The proportion of all households reporting any smoking in the home reduced from 20% to 9% between 2003 and 2006, and from 22% to 9% in all households with children. Exposure was greater in Māori households, though the differential between Māori and non-Māori households, which were large in 2003, decreased absolutely but not relatively by 2006.

There were similar consistent trends seen with large reductions in any reported smoking in the home in the previous week in households with one or more smokers – from 42% in 2003 to 30% in 2006 in all households, and from 40% to 26% in households with one or more children (figures 7.3.5a and 7.3.5b). These figures also show that the higher rate of reported smoking in the home of Māori households with one or more smokers in 2003 had been abolished by 2006. Therefore the residual higher SHS exposure in the home among *all* Māori subjects (not just those in homes with smokers) by 2006 may be attributable simply to higher rates of smoking in Māori households, and no longer partly due to higher rates of smoking inside within Māori households with one or more smokers, as was the case in 2003.

**Figure 7.3.5a Secondhand smoke exposure in the home in all households with one or more smokers and one or more children**

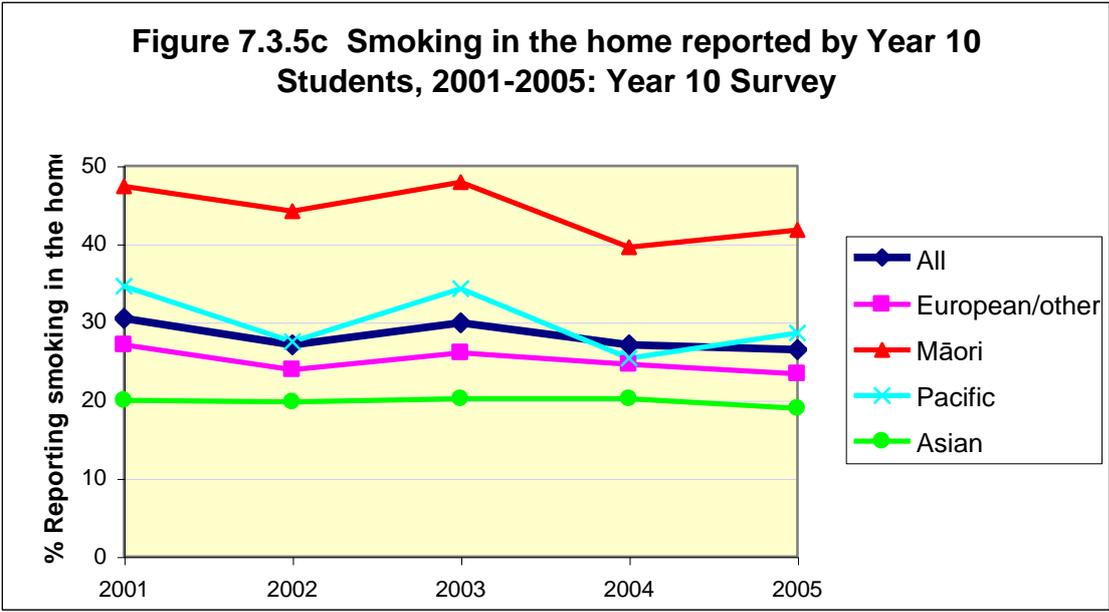


**Figure 7.3.5b Secondhand smoke exposure in the home in all households with one or more smokers**



Largely the same patterns, though with generally smaller changes in percentages, were seen in the self-reported smoking policies in the home in the HSC Monitor data (tables A1.12 and A1.13, appendix I). For example, in all homes with one or more smokers, the proportion of homes which were reported as being smokefree (i.e. no smoking allowed anywhere indoors) increased from 58-60% pre SEAA (2003) to 63% in 2006, and in homes with one or more smokers and one or more children, from 63-64% pre-SEAA (2003) to 70% in 2006. Again, there were much larger increases in the proportions of the homes of Māori smokers which were reported as having smoking bans between 2003 and 2006. For example, for homes with one or more smokers and one of more children in 2003, 59% of Māori smoker’s homes and 65% of non-Māori smoker’s homes were reported as smokefree, by 2006 this differential had reversed with 74% of Māori smoker’s homes and 68% of non-Māori smoker’s homes being reported to be smokefree.

In the Year 10 Smoking survey, the percentage of students reporting that smoking occurred in their home decreased significantly from 30.5% in 2001 to 26.5% in 2005 (Scragg, 2006), though the trends are not yet clear cut. The proportion reduced from 27.1% in 2004 pre-SEAA (2003) implementation to 26.5% in 2005. Figures for 2006 were not available. Differences in smoking in the home are apparent between ethnic groups, with Māori children reporting higher exposure rates (figure 7.3.5c). There was also a clear socio-economic gradient in SHS exposure in the home. For example, in 2005 37% of year 10 students in Schools in decile 1-2 (schools in the most disadvantaged areas) reported smoking in the home, compared with 17% of students in decile 9-10 schools. (Scragg, 2006)



## 7.4. Discussion

### 7.4.1. Critique of the evidence

The quality of the data for this aspect of the evaluation was generally high. The low response rate and possible selection bias that could result in the HSC Monitor surveys was described in section 5.2.2. The Year 10 Smoking surveys and NRB surveys had higher response rates. The methods of data collection for the ESR cotinine studies, and the indoor air quality studies appeared reasonably robust.

The greatest problem was gaps in the available data. All except the ESR and University of Otago Air Quality surveys relied on self-reported data on SHS exposure and smoking policies in workplaces. The Year 10 Survey used self-reported data from children, which might be more or less valid than that from adults. Furthermore, in the HSC Monitor surveys, the data on the settings and jobs in which exposure was most common came from a relatively small number of subjects.

There were also no biomarker data or self-reported SHS exposure data from heavily SHS exposed groups such as hospitality workers post-implementation – though the findings of the volunteer-based before after cotinine study in bars were probably generalisable to the workers in those venues. There was also no pre-SEAA (2003) data on air quality in indoor workplaces, though this could be inferred from numerous studies in other countries carried out in workplaces where smoking is still allowed. There was little post- SEAA (2003) objective data other than from a limited range of mainly hospitality settings in the Wellington area and the Wairarapa.

There was also only self-reported data on SHS exposure in the home. Given the context of the implementation of the SEAA (2003) and the accompanying publicity about SHS, and the mass media campaigns on smokefree homes (see below), it is possible that the changes in self-reported SHS exposure in the home and increased reporting of smokefree home policies was partially or wholly due to a reluctance to admit that smoking occurred in the home, particularly around children. Therefore supporting data on trends in biomarkers of exposure such as cotinine levels among children and other non-smokers would have been reassuring, though the reduction in baseline cotinine levels in the volunteers in the ESR study was encouraging.

#### **7.4.2. Conclusions**

Although the absolute levels of SHS exposure may have been underestimated in the HSC Monitor survey data, due to possible selection bias, the trends found in these surveys are likely to be largely robust. These data demonstrated that self-reported SHS exposure in the previous week following implementation of the SEAA (2003) more than halved to around 8%. The marked narrowing of the gap between Māori and non-Māori in the proportion reporting workplace SHS exposure was particularly striking. However, there was evidence that exposure to SHS may still occur among a substantial minority of the male workforce - at least 12% and probably a fair degree higher, given possible under-reporting and that this figure represented exposure over only the previous week. The data suggest that this was most common among men doing manual work in industrial settings, and slightly more common in smaller workplaces. This supported the findings from the stakeholder interviews.

Data from the biomarkers and air quality studies were highly positive – with levels of fine particulates that were much lower in New Zealand hospitality venues than in studies of levels in pubs and restaurants where smoking is allowed; (Edwards et al., 2006; Gee et al., 2006; Repace, 2004; Siegel et al., 2003; Travers et al., 2004) and there was evidence of marked reduction in the change in biomarkers of SHS exposure in volunteers visiting pubs after the SEAA (2003) compared to before implementation. It is reasonable to assume that similar evidence of reductions in SHS exposure would be found among hospitality industry staff, though given their possible exposure to SHS in semi-enclosed outdoor smoking areas, or due to drift of SHS indoors, this should be confirmed. Therefore the evidence suggests that the main objectives and success indicators of the SEAA (2003) were at least partially met.

However, the findings also implied that ultimate objective of reducing workplace SHS to negligible levels, as stated in the Ministry's Tobacco Control Plan, had not been achieved by 2006. Evidence of continued exposure, particularly of men in industrial settings, means that further investigation and enforcement activities are required in those settings. The evidence on air quality and biomarkers levels in the hospitality industry, although compelling, was from a limited range of areas; and further research in additional areas would be justified to confirm these findings. Preliminary evidence of high SHS levels in semi-enclosed outdoor smoking areas in the air quality studies suggests that this, and the potential problem of smoke drifting from such areas and doorways to indoor areas should be investigated further.

Reducing exposure to SHS in the home and other non-workplace settings was not a core objective or success indicator for the SEAA (2003), but demonstrating that there was no

displacement of smoking from the workplace and social settings resulting in increased SHS exposure in the home, as had been suggested by John Reid the UK Secretary of State for Health, was an important secondary indicator of success.

Attributing observed changes in smoking in the home to the SEAA was made more difficult by evidence suggesting existing trends of reducing exposure in this setting and due to concurrent health promotion campaigns run mainly by the HSC, sporadically from 2001 and more regularly 2004 and 2006 promoting smokefree homes.

For example, in April 2004, the HSC launched a series of three smokefree homes commercials, focusing on protecting children in the home from SHS. The first drew attention to the health risks of SHS exposure (asthma, chest infections and glue ear) for children, and the second to the need to protect children from SHS. The messages were *'If someone smokes inside, everyone gets a share'* and *'If you smoke, please, take it outside'*. The third commercial using the same imagery of children exposed to SHS encouraged smokers who wanted to stop to call the Quitline. The campaign was supported by print and radio advertising, and resources such as posters, leaflets and stickers. These campaigns were supported by print resources produced by NGOs such as ASH, the Smokefree Coalition, Cancer Society, Asthma and Respiratory Foundation and Te Reo Marama. Smoking cessation services, such as Aukati Kai Paipa (which has operated since 2000) also promote smokefree homes. ASH ran a campaign *'Mind if I smoke, care if I die'* in 2003-3. The World Smokefree day was promoted every May between 2001 and 2005 with the theme *'Let's clear the air'*.

As well as affecting actual smoking behaviour in the home, these campaigns may have contributed to changes in social norms, making smoking in the home became less socially acceptable, and resulting in reduced willingness to report such behaviour in surveys.

However, if at least some of the reported reductions in SHS exposure in the home were real, it is difficult, and perhaps somewhat meaningless, to separate out the effect of the SEAA (2003) and the health promotion campaigns. This is particularly so, as some of the smokefree media campaigns were probably run because smokefree legislation was being introduced i.e. they could be seen as an indirect outcome of the SEAA (2003).

Overall, the HSC Monitor survey data suggested that there were substantial *reductions* in smoking in the homes occurring before the SEAA (2003), and that these trends have continued since. There was absolutely no evidence of smoking increasing in the home as a result of reduced opportunities to smoke in the workplace and in hospitality settings. Possible

exaggeration of the decrease due to reduced willingness to report smoking in the home is supported by the more modest reductions reported in home SHS exposure reported by children in the Year 10 Smoking Survey. There was also encouraging evidence from the HSC Monitor surveys that differentials in SHS exposure in the home between Māori and non-Māori had reduced, and that remaining differences were due to higher smoking rates among Māori, rather than greater smoking in the home by Māori smokers. However, this was less evident in the Year 10 Students Smoking survey data.

Due to the persisting uncertainties about the degree of SHS exposure due to non-compliant workplaces, and the size of the reductions in smoking in the home and extent of differential between Māori and non-Māori households, obtaining objective evidence, for example through studies using biomarkers of exposure should be a priority for future research.

## 8. Impact on Health

### Summary

This section describes the outcome evaluation for the health impacts of the SEAA (2003).

No data were available for this aspect of the evaluation other than from a study carried out as part of this evaluation by a team at the University of Auckland. This involved an analysis of routinely collected hospital information from July 1996 to December 2005, to investigate whether there was a significant change in admission rates from the long term trends after implementation of the SEAA (2003).

Hospitalisation rates for acute asthma, acute stroke, unstable angina, and exacerbations of chronic obstructive pulmonary disease were lower in the 12 months after implementation of the SEAA (2003) relative to the preceding 12 months; but these findings were not confirmed in a more rigorous analysis which adjusted for longer term trends and other potential influences on hospitalisation rates. There was therefore no clear evidence that the hospitalisation rate for these health outcomes reduced in the first 12 months after implementation of the SEAA (2003).

Possible reasons for the failure to demonstrate a significant change in health outcomes include: changes in exposure to the other causes for these conditions masking the effect of changes in SHS exposure; the limited amount of disease attributable to SHS exposure for these conditions (e.g. in comparison to active smoking); that the SEAA (2003) only directly addressed smoking in the workplace, whereas much SHS exposure occurs in the home and other private settings; and that the SEAA (2003) could only reduce SHS exposure among workers still exposed to SHS indoors in the workplace, a minority by 2004.

There is strong evidence that SHS exposure results in adverse health effects. There is good evidence that implementation of the SEAA (2003) has reduced SHS exposure in the workplace, and probably in other settings. Therefore, despite the failure of the hospitalisation study to demonstrate unequivocal health benefits, possibly due to limitations in the study design, it is likely that health benefits due to the SEAA (2003) have occurred and will continue to accumulate over time.

## Objectives and success criteria

The compelling evidence that SHS exposure adversely affects health was summarised briefly in section 3.6. However, there are good reasons why demonstrating an impact of the SEAA (2003) on health outcomes is problematic. These include: the long term nature of causation for some conditions (e.g. lung cancer); the multifactorial aetiology of many conditions linked to SHS exposure; the often limited attributable risk from SHS exposure (e.g. in comparison to active smoking for heart disease, stroke and exacerbations of chronic obstructive pulmonary disease (COPD)); and that smoke-free legislation, as in New Zealand, commonly addresses only smoking in the workplace, whereas much SHS exposure occurs in the home and other private settings. Discernible health impacts in the New Zealand context were even less likely because the SEAA (2003) only reduced SHS exposure among the minority of workers still exposed to SHS indoors in the workplace in 2004. The CDC document also notes that links between intermediate outcomes such as smoking-related behaviours and health outcomes are well established, so that positive impact on behaviours can be assumed to be followed by positive health outcomes. (Starr et al., 2005b)

For these reasons, health impacts are not included in the list of outcome indicators proposed by CDC for the evaluation of smokefree legislation and policies. (Starr et al., 2005a) Assessment of health impacts have rarely been included in evaluations of smokefree legislation, other than to investigate relatively short-term health indicators such as respiratory symptoms and function among the most heavily exposed occupational groups such as hospitality workers. (Allwright et al., 2005; Eisner et al., 1998; Skogstad et al., 2006)

However, reducing health effects attributable to SHS exposure in the indoor workplaces was clearly the ultimate long term aim of the SEA (1990) and the SEAA (2003), as expressed in the first objective: “*To prevent the detrimental effect of other people’s smoking on the health of people in workplaces, or in certain public enclosed public areas, who do not smoke or do not wish to smoke there.*” (Department of Health, 1990, 2003) One of the five core objectives in the Ministry’s 2004-9 Tobacco Control Plan is also to ‘*prevent harm to non-smokers from second-hand smoke*’. (Ministry of Health, 2005a)

The impact of the SEAA (2003) on health was therefore included in the evaluation logic model (figure 4.3.1). Health impacts were not anticipated as being easily discernible with the exception of improvement in the respiratory health of non-smoking workers in hospitality settings. An impact on the health of this group could be reasonably anticipated given evidence

of their very heavy exposure to SHS and the evidence of health impacts from other countries (section 3.6).

We therefore developed the following health-outcome success indicators for the SEAA (2003) evaluation:

- In comparison to before introduction of the SEAA (2003), demonstrate in occupational groups heavily exposed to SHS before the SEAA (2003) clinically meaningful improvements in sensory and respiratory symptoms, and/or indicators of respiratory function and respiratory morbidity (core)
  
- In comparison to before introduction of the SEAA (2003) demonstrate decreases in incidence, hospital admission or mortality on appropriately adjusted trends for conditions related to SHS exposure (core), including:
  - Stroke, acute myocardial infarction and unstable angina in adults
  - Severe asthma attacks and exacerbations of COPD in adults
  - Upper and lower respiratory tract infections in children
  - Sudden infant deaths

## **8.1. Data sources and methods**

### **8.1.1. University of Auckland Smoke-free Environments Amendment Act (2003) health impacts study**

This study used an analysis of routinely collected hospital information for a range of conditions that are potentially sensitive in the short term to a change SHS exposure to investigate the health impact of the introduction of the SEAA (2003). The hypothesis was that compared with the period before the introduction of the SEAA (2003), measurable decreases in hospital admissions for a range of conditions with known associations to SHS exposure would be detectable within the year after the law change. The methods and findings are described in full in appendix IV.

Information on hospital admissions from July 1996 to December 2005 was used. This gave over eight years of information from before the law change. All of December 2004 was treated as being post SEAA (2003) to give one full year of data post-implementation. Patients aged 15 years or over whose primary cause of admission was acute myocardial infarction

(AMI), acute stroke, unstable angina, acute asthma, and exacerbations of COPD<sup>i</sup> were included. Illnesses that rarely result in hospital admission such as mild forms of illness (e.g. upper respiratory tract infections) or sudden fatal events (e.g. sudden infant death) were excluded. Information was not available on the small number of patients who were admitted to hospital but not yet discharged on 31<sup>st</sup> December 2005, so these were excluded. Annual and monthly hospitalisation rates were estimated using the estimated resident population for the years 1996 to 2005 as the denominator.

Analysis included graphing of annual hospitalisation rates, and a statistical test for changes in admission rates for each condition between one year before and after implementation of the SEAA (2003). A more complex Poisson regression model was used to model long term trends of hospitalisation rates from 1997-2005, and to test for changes in trends following introduction of the SEAA (2003), after adjustment for seasonal variations and changes in population structure.

## 8.2. Results

### 8.2.1. University of Auckland Smoke-free Environments Amendment Act (2003) health impacts study

**Acute myocardial infarction:** rates of admission due to AMI increased throughout 1997-2005, and between the year before and after the SEAA (2003) was implemented. However, there was no significant change in the level of increase in AMI following implementation of the SEAA (2003) in the Poisson adjusted model using the full eight year dataset.

**Unstable angina:** rates of admission decreased during the study period, and there was a significant fall in rates in the year following implementation of the SEAA (2003). However, this fall was not significant after adjustment in the Poisson model. It was possible that cases of angina were increasingly being classified as AMI cases over time, due to the availability of more sensitive diagnostic tests. Therefore, the total number of unstable angina plus AMI admissions was analysed. The sum of these two events gave non-significant results in the year before the SEAA (2003) and year after comparison, and after adjustment in the Poisson model.

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<sup>i</sup> All patients discharged from hospitals before July 1999 with COPD as either the primary or the secondary diagnosis were included, as before 1999 patients with pneumonia on a background of COPD were assigned a primary diagnosis of pneumonia, with COPD as the secondary diagnosis.

**Acute stroke:** admissions for acute strokes were relatively stable year to year, though there was a significant fall in rates in the year following implementation of the SEAA (2003) relative to the preceding year. However, the fall in stroke admissions after implementation of the SEAA (2003) was not significant after adjustment in the Poisson model.

**Acute asthma:** admissions for acute asthma were relatively stable. There was a significant fall in the year after implementation of the SEAA (2003) relative to the preceding year. The fall in asthma admissions post SEAA (2003) was not significant after adjustment in the Poisson model.

**Exacerbations of COPD:** admissions were very low in 1997 and 1998, for reasons that are unclear, and then increased markedly from July 1999. There were 636 (9%) fewer admissions in the year after the legislation change, partially due to a large number of hospitalisations in September 2004. The risk reduction was significant compared to the previous year but not after adjustment in the Poisson regression model. The number of COPD admissions increased each winter without a significant drop after the legislation.

## **8.3. Discussion**

### **8.3.1. Critique of the evidence**

The only available evidence on health impacts came from the University of Auckland hospitalisation rates study. There was therefore no evidence about the impact of the SEAA (2003) on the health of heavily exposed workers left exposed to SHS in the workplace after the SEA (1990). There was also no data on rates of illness due to conditions related to SHS exposure which affect children such as respiratory tract infections, glue ear and sudden infant death. Such data are only available through specifically commissioned studies, or from primary care or special disease registers. Such sources are not readily accessible, and seldom complete timely. Finally, there was no data on cause-specific mortality for SHS-related conditions.

A weakness of the hospitalisation rate study is the lack of a comparison group. It is therefore possible that changes in other disease-promoting or preventing factors could have contributed to the lack of changes observed post implementation of the SEAA (2003). Only a limited number of potential confounding factors were included in the analyses. There was no information about whether patients were smokers, nor about their exposure to SHS. Lack of data on mortality for the conditions studied meant that a reduction in the overall severity of disease following implementation of the SEAA (2003) could not be ruled out, though this

seems very unlikely. Reduced severity might result in reductions in mortality and improved out of hospital survival, resulting in no or minimal change in observed hospitalization rates.

However, the study also had many strengths. Data were available from the whole population of New Zealand over more than eight years, and therefore numbers were large, and the power of the study high. Available data from the hospitalisation rates study should be objective since it was routinely collected clinical data, and ascertainment of outcome could not be biased by knowledge of the study hypothesis. There was no evidence of changing definitions of outcomes other than possibly between AMI and unstable angina (the increasing use of troponin as a diagnostic test may have increased the diagnosis of AMI and reduced the diagnosis of unstable angina), or of methods of collection and recording of data in the period following implementation of the SEAA (2003). The methods of analysis were rigorous and allowed for seasonal variations, underlying trends (based on many years of data collection) and changes in population structure. There were no other obvious confounding variables that had changed between the pre and post-implementation period.

### **8.3.2. Conclusions**

There was some evidence of a reduction in hospitalisation rates for acute asthma, acute stroke, unstable angina, and exacerbations of COPD in the 12 months after implementation of the SEAA (2003) relative to the preceding 12 months; but these were not confirmed in a more rigorous analysis that adjusted for long-term trends and other potential influences on hospitalisation rates. There was therefore no clear evidence of a decline in the rate at which people were hospitalised for these health outcomes in the first 12 months following the introduction of the SEAA (2003).

Reasons why it might be difficult to demonstrate health impacts after a short period of implementation were described in section 8.1. In brief, firstly, all the conditions included in this study have a multifactorial aetiology. There were a number of other possible causal or provocative factors (notably active smoking) that may have become more or less frequent over the study period. Secondly, SHS exposure in general, and SHS exposure in the workplace in particular, have a relatively weak, though still important, association with these conditions. In addition, by the time of the SEAA (2003) implementation, workplace SHS exposure was probably only a small proportion of overall SHS exposure in the New Zealand population, as most workplaces were already smokefree, and most SHS exposure occurred in the home and other private settings (although the SEAA (2003) probably reduced SHS exposure in these settings also – see section 7.3.5). Therefore, the proportion of these

conditions that were caused by indoor SHS exposure in the workplace at the time of the SEAA (2003) implementation was probably modest. This would make it more difficult to show an effect on hospitalisation rates from the SEAA (2003), particularly over the short timescale for which data were available post-implementation.

An alternative study design would have involved examining changes in hospital admissions and short term health impacts among highly exposed groups, such as workers in the hospitality industry.

In conclusion, the health impact study did not detect a significant effect of the SEAA (2003) on the rate of hospitalisations for adult cardiovascular and respiratory diseases. This does not mean that there was no health benefit. Rather, a more likely explanation is that analyses of this kind are not sufficiently sensitive to detect health impacts in the general population, particularly where there has been only a small change in overall SHS exposure in the study population, and there is continuing SHS exposure in other settings, and possible changes in other more influential factors such as a decline in active smoking.

There is strong evidence from other study types that SHS exposure has adverse health effects. (U.S. Department of Health and Human Services, 2006) Evidence presented elsewhere in this report (section 7) strongly suggests that reductions in SHS exposure in the workplace, and probably in other settings, occurred after implementation of the SEAA (2003). Other similar studies from Italy and the US have shown a significant impact on AMI admissions of smokefree legislation. (Barone-Adesi et al., 2006; Bartecchi et al., 2006; Sargent et al., 2004) It is therefore reasonable to assume that health benefits due to the SEAA (2003) have already occurred within the New Zealand population, and that these benefits will continue to accumulate over time.

## 9. Smoking-related behaviour

### Summary

This section describes the outcome evaluation for the non-core objective of changing smoking prevalence and smoking-related behaviours.

The main sources of information were: data from Quitline on the number of caller registrations and nicotine replacement therapy (NRT) cards issued in relation to expenditure on television advertisements which promoting smoking cessation; HSC Monitor survey data on smoking behaviour in pubs and bars, restaurant and nightclubs (socially-cued smoking); Year 10 Smoking survey data on reported parental smoking prevalence; and data on supermarket tobacco sales and the amount of tobacco released onto the New Zealand market. A major gap in the data was the lack of up-to-date information on adult smoking prevalence.

For a six-month period after the law change, there was evidence of increased quitting-related behaviour, with increases in caller registrations and in the issuing of NRT exchange cards through Quitline. These findings were much stronger when adjusted by expenditure on television advertising promoting smoking cessation, though promotion of the Quitline was reduced in the six months after implementation of the SEAA (2003). This suggested that an opportunity to maximise the numbers of smokers quitting was missed. There was evidence that socially-cued smoking (smoking more than normal) in bars, nightclubs, casinos and cafés substantially declined between 2003-4 and 2005-6.

Youth smoking rates decreased significantly between 2004 and 2005 but in line with long-term trends. There was a small reduction in reported parental smoking between 2004 and 2005. The *per capita* release of tobacco onto the New Zealand market (a marker for overall consumption) was fairly constant from 2003-5, with no evidence of any change in 2005 following implementation of the SEAA (2003). There was a small decline in tobacco supermarket sales after the law change though this represents only a small proportion of the tobacco market, and may represent the continuation of long-term trends.

## 9.1. Objectives and success criteria

The overarching aim for the Ministry of Health is to reduce smoking prevalence and tobacco consumption. Thus, the Tobacco Control Plan includes the goal of significantly reducing levels of tobacco consumption and smoking prevalence, reducing smoking initiation and promoting smoking cessation. (Ministry of Health, 2005a) It sets specific targets for reductions in smoking prevalence among all adults, 15-19 year-olds, per capita adult consumption of tobacco, children, children in low socioeconomic status (SES) schools, adults in low SES households, and among Māori.

The SEAA (2003), however, does not state objectives relating to changes in smoking prevalence, tobacco consumption and smoking-related behaviours. The international experience is that core objectives for smokefree legislation are generally stated in relation to reducing SHS exposure and the related health effects, not the effects on smoking prevalence. Observing an impact on overall smoking prevalence and consumption within a year to eighteen months of implementation of the SEAA (2003) is probably unlikely given that most workplaces were already smokefree by 2003, and effects on uptake and cessation through changes in social norms and opportunities for smoking are likely to be more long term.

However, international evaluations of the impact of smokefree legislation have often included an assessment of the impact on smoking prevalence, initiation and quitting, and smoking prevalence and per capita consumption. Smoking behaviour indicators are included in the CDC document as long term outcomes of smokefree policies. Plausible theoretical mechanisms, and some empirical data for reduction in smoking prevalence have been suggested through the effect of smokefree legislation as a quit trigger, denormalising smoking, reducing socially-cued smoking and decreasing opportunities for smoking. (Fichtenberg et al., 2002; Trotter et al., 2002) Reflecting this perspective, the Ministry's 'The Smoke is Clearing' report included data on trends in Quitline callers and registrations, number of cigarettes and amount of loose tobacco released for consumption, and socially-cued smoking in bars. (Ministry of Health, 2005b)

We have developed the following as success indicators for the SEAA (2003) evaluation. All are non-core, since they are not the immediate purpose of the SEAA (2003). In addition, changes in smoking behaviour are influenced by a wide range of other determinants, and any effects on smoking behaviour attributable to smokefree legislation may only occur over the medium to long term.

- In comparison to before introduction of the SEAA (2003), demonstrate an increased proportion of smokers who report positive motivation to quit, making one or more quit attempts in the last year, and successful quit attempts.
- In comparison to before introduction of the SEAA (2003), demonstrate an increase in registrations and calls to Quitline, and in the uptake of nicotine replacement therapies.
- In comparison to before introduction of the SEAA (2003), to demonstrate a reduction in the proportion of smokers who state that they smoke more when in hospitality venues and/or an increase in the proportion who state that they smoke less when in hospitality venues.
- In comparison to before introduction of the SEAA (2003) to demonstrate a reduction in the overall prevalence of adult smoking.
- In comparison to before introduction of the SEAA (2003) to demonstrate a reduction in the prevalence of smoking among Māori, Pacific peoples, low income groups, schoolchildren and young adults.
- In comparison to before introduction of the SEAA (2003) to demonstrate a decrease in the per capita retail sales or release for consumption of cigarettes and loose rolling tobacco in relation to appropriately adjusted trends.

## **9.2. Methods and data sources**

### **9.2.1. Quitline data**

The New Zealand Quitline is national free-phone service that provides support for quitting smoking from trained advisors. It also distributes printed information on quitting and distributes “exchange cards” that allow users to obtain heavily subsidised NRT in the form of patches or gum. Demographic data are collected on each person registering with the Quitline Service along with data on the distribution of NRT exchange cards. The agency that purchases television advertising time for the Quitline (Graham Strategic) collects data on advertising purchasing costs (including by campaign and by type of advertisement). For this report, data were collected and analysed by six-month periods (four before the SEAA (2003) and two after). We adjusted the data by the level of expenditure on TV adverts promoting smoking cessation by the Quit Group, as there is evidence that the number of calls to the Quitline are highly sensitive to such advertising. (Wilson et al., 2005a)

### **9.2.2. HSC Monitor surveys and Year 10 Smoking surveys**

Data on socially-cued smoking comes from the HSC Monitor surveys described in section 5.2.2. Data on the reported prevalence of smoking by parents is from the National Year 10 Smoking surveys (Scragg, 2006) described in section 7.2.6.

### **9.2.3. Tobacco released for sale**

Data on tobacco and cigarettes released to the New Zealand market ('released from bond') comes from Statistics New Zealand on a quarterly basis (Tobacco Products Released for Consumption series). Figures are calculated from production for domestic consumption, plus imports less re-exports. The data comprise the number of cigarettes released, plus the amount of loose tobacco. The latter is converted to 'cigarette equivalents' at 1 million cigarettes per tonne. There are also data on quarterly supermarket cigarettes sales, which were purchased by the Asthma and Respiratory Foundation from a market research company (AC Nielsen).

## **9.3. Results**

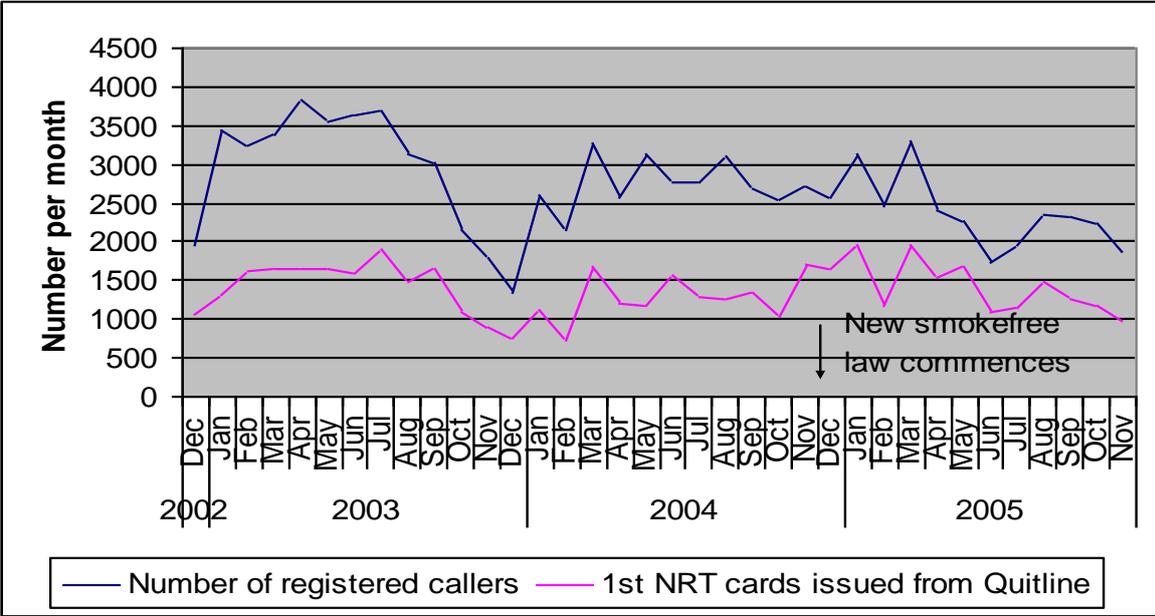
### **9.3.1. Changes in quitting behaviour**

A previous study reported that implementation of the SEAA (2003) was associated with a statistically significant increase in the number of new callers registering with the New Zealand Quitline, and in the dispensing of NRT "exchange cards". (Wilson et al., 2005b) In particular, there was an increase in caller registrations in the 35-44 year age group ( $p=0.01$ ). Week-by-week analyses showed significantly increased caller registration rates in the week of the law change and in the subsequent week (even though it was the week before Christmas). However, these analyses were limited to analysis of data over a two-month period (December-January) compared with the same period a year prior to the introduction of the new law.

For this report, we analysed more extensive and more recent data from the Quitline. This is shown in figure 9.3.1a. The figure suggests that the usual summer dip in caller registrations and issues of NRT exchange cards disappeared in December 2004/January 2005 when compared to the previous two years. Indeed, caller registrations per month were elevated compared to the preceding year, for every month from December 2004 to the end of March 2005 (and until the end of May 2005 for the issuing of the NRT exchange cards). This pattern was despite greatly reduced television advertising expenditure on promoting the Quitline in the six months from Dec 2004 to May 2005. Expenditure was less than half the level of

expenditure in the two six month periods before and in the six months after wards, due to preparations for revising the Quitline Service to callers.

**Figure 9.3.1a Monthly caller registrations with the Quitline and nicotine replacement therapy exchange cards issued by the Quitline**



Analysis by six-month period indicated a general decline in caller registration rates compared to the baseline period (see table 9.3.1a). However, the rates did increase in the six months before and six months after the law change (relative to the directly preceding and subsequent six-month periods). Similarly, there were significantly elevated rates of issuing NRT cards for the six-month period after the law change (table 9.3.1b). This increase was also not maintained after May 2005.

The proportion of callers who were Māori varied little over the three year period studied – 19.1 to 22.3% for the six half yearly periods (table 9.3.1a). There was little change in the proportion of Māori callers after implementation of the SEAA (2003).

**Table 9.3.1a Caller numbers registered with the Quitline per six month period, 2002-5**

Six-month time period*	Number of registered callers	Call rate per 100,000 smokers#	Rate ratio (95% CI)	% of callers who were Māori
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December 2002 to May 2003	19,398	2955	1.0 (Reference)	20.7
June 2003 to November 2003	17,396	2650	0.90 (0.88 – 0.92)	22.3
December 2003 to May 2004	15,072	2296	0.78 (0.76 – 0.79)	19.1
June 2004 to November 2004	16,614	2531	0.86 (0.84 – 0.87)	19.4
<b>December 2004*</b> to May 2005	16,119	2455	0.83 (0.81 – 0.84)	19.3
June 2005 to November 2005	12,424	1892	0.64 (0.63 – 0.65)	19.6

\* Month that the new law came into force.

\*\* Rates are based on an estimated total population of smokers in New Zealand aged 18 years and over of 656,489 (based on rates from the 2002/2003 NZ Health Survey and 2004 population data estimates).

**Table 9.3.1b Trends in issuing first NRT exchange cards from the Quitline**

Six-month time period*	1st NRT exchange cards issued from the Quitline	Issue rate per 100,000 smokers#	Rate ratio (95% CI)**
December 2002 to May 2003	8,968	1366	1.0 (Reference)
June 2003 to November 2003	8,656	1319	0.97 (0.94 – 0.99)
December 2003 to May 2004	6,619	1008	0.74 (0.72 – 0.76)
June 2004 to November 2004	8,174	1245	0.91 (0.88 – 0.94)
December 2004 to May 2005	9,937	1514	<b>1.11 (1.08 – 1.14)</b>
June 2005 to November 2005	7,101	1082	0.79 (0.77 – 0.82)

\* A small proportion of these exchange cards would have been issued to people who had first registered with the Quitline in the preceding six-month period.

\*\* Statistically significant results for elevated rates are bold.

# See footnote on calculation of rates in the preceding table.

Caller registrations, per dollar of advertising directly linked to smoking cessation, showed even higher increases of around four times in the six months after the law change, relative to the baseline period – see table 9.3.1c. The same pattern was apparent for the issuing of NRT exchange cards, with over four times higher levels per advertising dollar compared to the baseline period.

**Table 9.3.1c Caller registrations and NRT exchange cards issued by television advertising expenditure linked to smoking cessation by the Quit Group**

Six-month time period	Caller registrations		NRT exchange cards issued	
	Per \$1000 expenditure*	Expenditure-adjusted rate ratio**	Per \$1000 expenditure*	Expenditure-adjusted rate ratio**
December 2002 to May 2003	10.5	1.0 (Reference)	4.8	1.0 (Reference)
June 2003 to November 2003	9.9	0.94 (0.92 – 0.96)	4.9	1.02 (0.99 – 1.05)
December 2003 to May 2004	17.5	<b>1.67 (1.63 – 1.70)</b>	7.7	<b>1.58 (1.54 – 1.64)</b>
June 2004 to November 2004	17.3	<b>1.66 (1.62 – 1.69)</b>	8.5	<b>1.76 (1.71 – 1.82)</b>
<b>December 2004 to May 2005</b>	41.2	<b>3.94 (3.86 – 4.02)</b>	25.4	<b>5.25 (5.10 – 5.40)</b>
June 2005 to November 2005	13.2	<b>1.26 (1.23 – 1.29)</b>	7.5	<b>1.56 (1.51 – 1.60)</b>

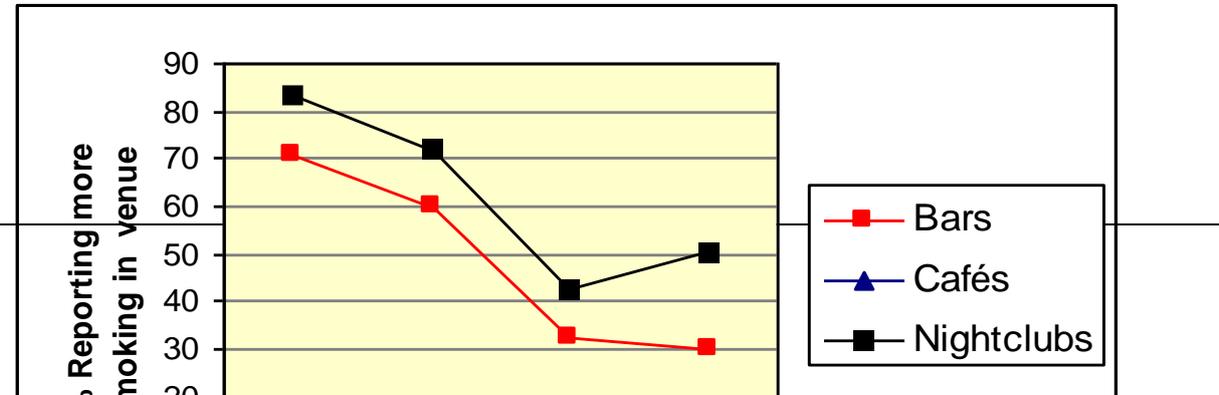
\* Based on Quit Group expenditure on television advertising promoting smoking cessation. For the six periods (starting December 2002 to May 2003) the expenditure was: \$1,852,000; \$1,762,000; \$863,000; \$958,000; \$391,000; and \$943,000.

\*\* Statistically significant results for elevated rates are in bold. The month that the new law came into force is also in bold.

**9.3.2. Changes in self-reported socially-cued smoking levels**

The HSC Monitor surveys collected information on the degree of smoking among smokers in nightclubs, bars, cafes and restaurants relative to the normal amount they smoked. There were large and statistically significant reductions for smoking in all of the four settings between 2004 and 2005. (Waa et al., 2005) These analyses have been updated with data from 2006. The results are shown graphically in figure 9.3.2, and are reported in more detail in tables A1.14-1.16 in appendix I.

**Figure 9.3.2 Trends in respondents reporting smoking “more than normal” relative to their normal smoking level - in a range of hospitality settings, 2003-6**



Corresponding figures over the same period showed a large increase in the proportions of smokers who reported smoking none or less than normal in these venues. For example, the proportion stating that they smoked less than normal or not at all in bars and pubs increased from 12.6% in 2003 to 45.9% in 2006 (table A1.15, Appendix I).

**9.3.3. Smoking prevalence trends**

The main source of data currently on adult smoking prevalence at the national level in New Zealand is from surveys conducted by AC Nielsen. However, this data has not yet been published for 2005, and currently only extends up to 2004. (Ministry of Health, 2005c)

The Year 10 Smoking survey data indicate that daily smoking prevalence and total smoking prevalence (at least monthly) among year 10 students declined in 2005 relative to 2004 (table 9.3.3a, figure 9.3.3a). (Scragg, 2006) The differences in prevalence between 2004 and 2005 were all statistically significant. The decline is part of a long-term downward trend - all the prevalences in table 9.3.3a from year 2001 onwards were statistically different from those for 1999 - as was the increase in this group of students for having “never smoked” from 31.6% to 49.4%.

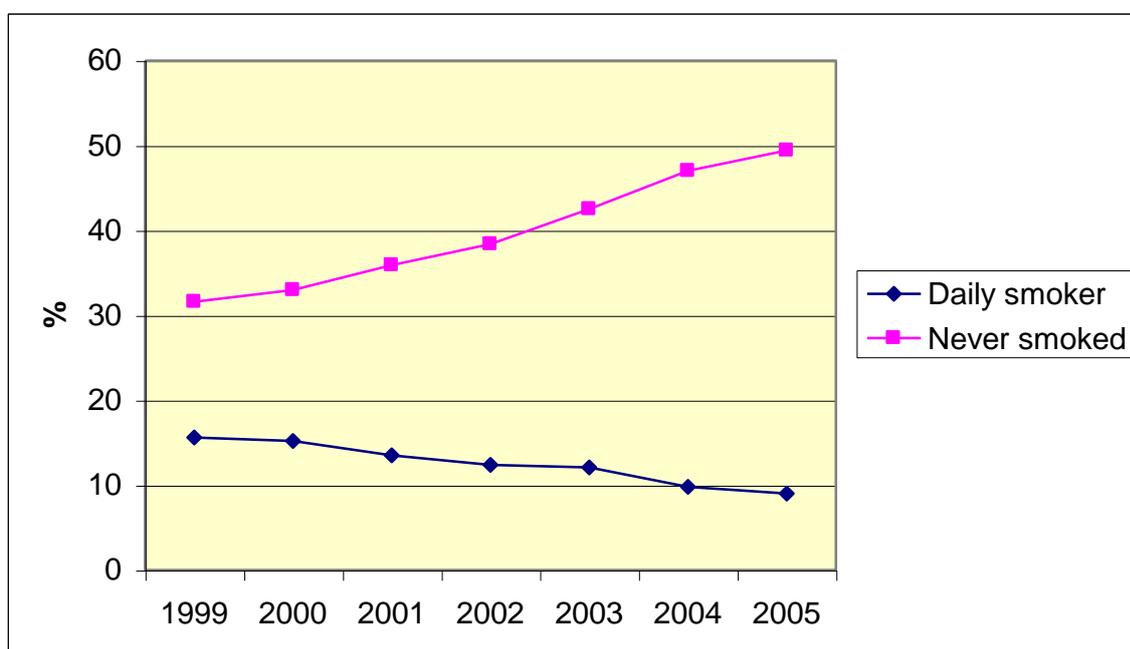
**Table 9.3.3a Trends in smoking prevalence among year 10 students. Source: (Scragg, 2006).**

Year	Daily smoker (%)	At least monthly smoking (%)	Never smoked (%)
1999	15.6	28.6	31.6
2000	15.2	27.9	33.0
2001	13.5	24.8	35.9
2002	12.4	22.1	38.4

2003	12.1	20.7	42.5
2004	9.8	17.6	47.0
2005	9.0*	16.8*	49.4*

\* All the values for 2005 are statistically significantly different from 2004 [for daily smoking: RR= 0.92 (95%CI=0.88 – 0.96); for at least monthly smoking: RR=0.95 (95%CI=0.92 – 0.99); for never smoked: RR=1.05 (95%CI=1.03 – 1.07)]. (Calculations prepared for this report).

**Figure 9.3.3a Trends in smoking prevalence among year 10 students. Source: (Scragg, 2006)**



Year 10 Smoking survey participants were also asked to report on the smoking status of their parents. This gives an estimate of changes in adult (parental) smoking between 2004 and 2005. The data indicated a statistically significant decline between 2004 and 2005 in the proportion reporting that both parents smoked, but not one parent smoking (table 9.3.3b). There was also a statistically significant increase in the proportion who reported that neither parent smokes. These differences appear more marked between 2004 and 2005 than between 2001 and 2004 (figure 9.3.3b). Indeed, there were no statistically significant differences between the preceding period of 2003 and 2004 except for a small statistically significant *increase* in the proportion of students reporting both parents smoked.

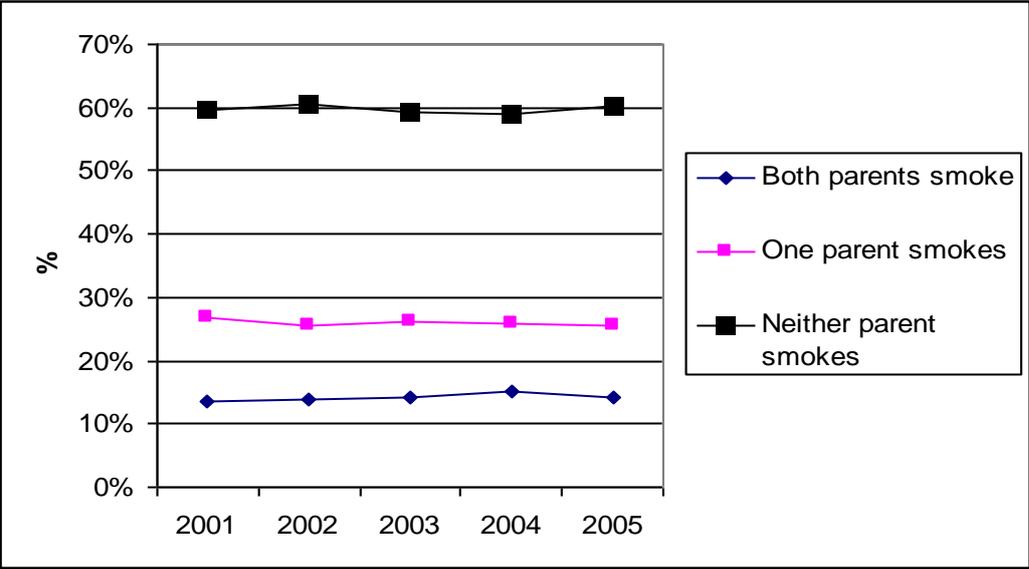
**Table 9.3.3b Year 10 student responses to questions about parental smoking. Source: (Scragg, 2006)**

Year	Answering yes (N)	Total responses to survey	Answering yes (%)	Odds ratio*
<b>Both parents smoke</b>				
2004	4764	31,576	15.1%	1.0 (Reference)
2005	4636	32,376	14.3%	0.94 (0.90 – 0.98)
<b>One parent smokes</b>				
2004	8185	31,576	25.9%	1.0 (Reference)
2005	8243	32,376	25.5%	0.98 (0.94 – 1.01)
<b>Neither parent smokes</b>				
2004	18,627	31,576	59.0%	1.0 (Reference)
2005	19,497	32,376	60.2%	1.05 (1.02 – 1.09)

\* Statistically significant differences in bold (with these calculations performed by us for this report). Odds ratios were used as the proportions answering yes or no were mutually dependent.

**Figure 9.3.3b Year 10 student responses to questions about parental smoking, 2001-5.**

Source: (Scragg, 2006)

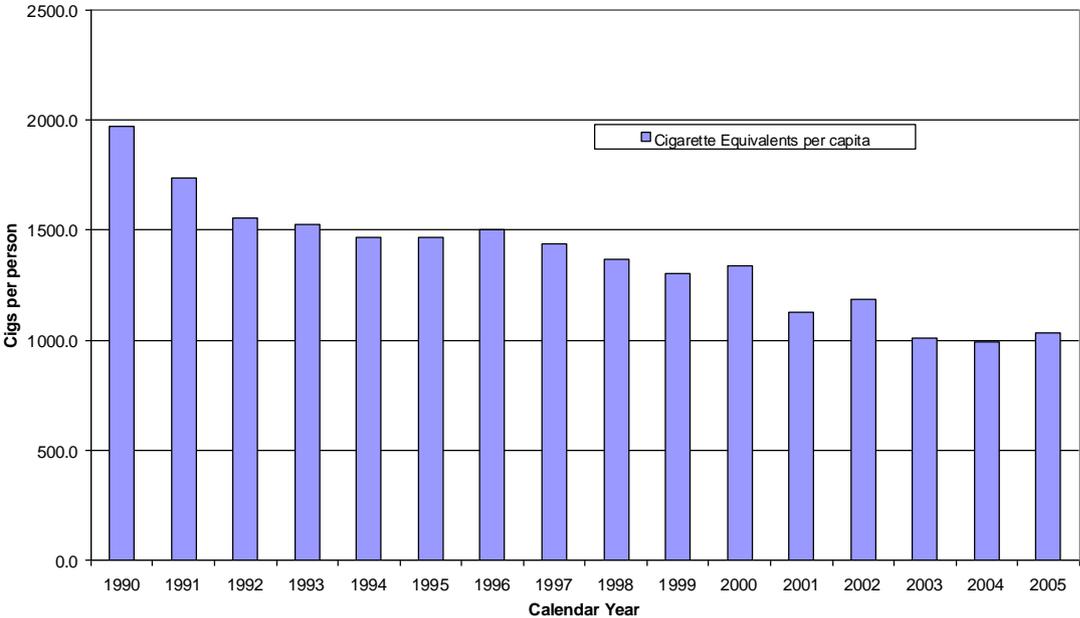


**9.3.4. Consumption trends from tobacco use and sales data**

The trends in tobacco and cigarette sales by supermarkets have been described in a previous report. (Asthma and Respiratory Foundation of New Zealand, 2005) The AC Nielsen data indicates lower quarterly supermarket sales for the four quarters following implementation of the SEAA (2003) relative to comparable quarters prior to the new law. In the first three quarters of 2005, there were 488,000 fewer packets of tobacco and cigarettes sold than in the first three quarters of 2004. This represents an overall reduction of 3.2%, equivalent to an annualised rate of 4.3%.

The annual amount of tobacco and cigarettes released *per capita* onto the New Zealand market is displayed in figure 9.3.4a. Figure 9.3.4a shows relative stability in tobacco released for consumption *per capita* through the 1990s, followed by what appears to be a significant fall from 2000 to 2003, and then again relative stability between 2003 and 2005. It is apparent from the source data (not shown) that loose tobacco is increasing as a proportion of the total, perhaps because roll-your-own cigarettes could be cheaper, and/or smokers are able to economise in the face of rising prices by making thinner ‘roll-your-owns’.

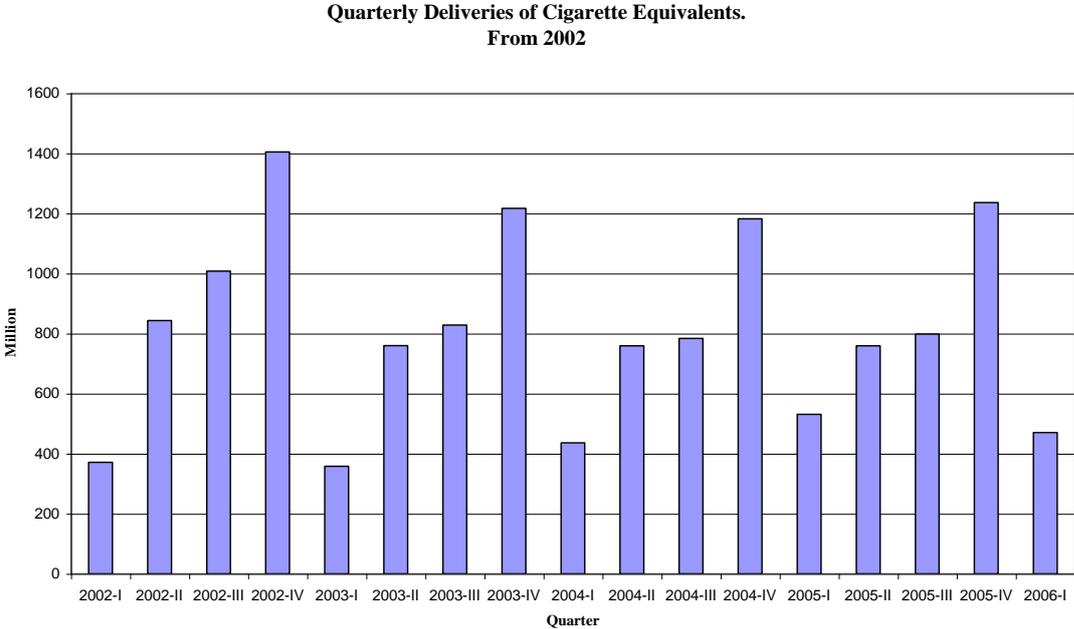
**Figure 9.3.4a *Per capita* annualised tobacco and cigarettes released onto the New Zealand market, 1990-2005 (Estimated resident population aged > 15 yrs)**



Source: Statistics New Zealand

The pattern of release of tobacco on a quarterly basis is highly seasonal with the fourth (December) quarter release generally being several times greater than that for the first quarter. Presumably this is partly due to release of tobacco before the annual indexation rise in tobacco taxation rates occurs in December, and partly in anticipation of Christmas and holiday sales, and to build up retail stocks against the summer holiday close-down. Quantities released fall sharply in the March quarter. There appears to be a small increase in the release of tobacco in the first quarter of 2005 compared to the preceding two years, but this is not maintained in subsequent quarters in 2005 (figure 9.3.4b).

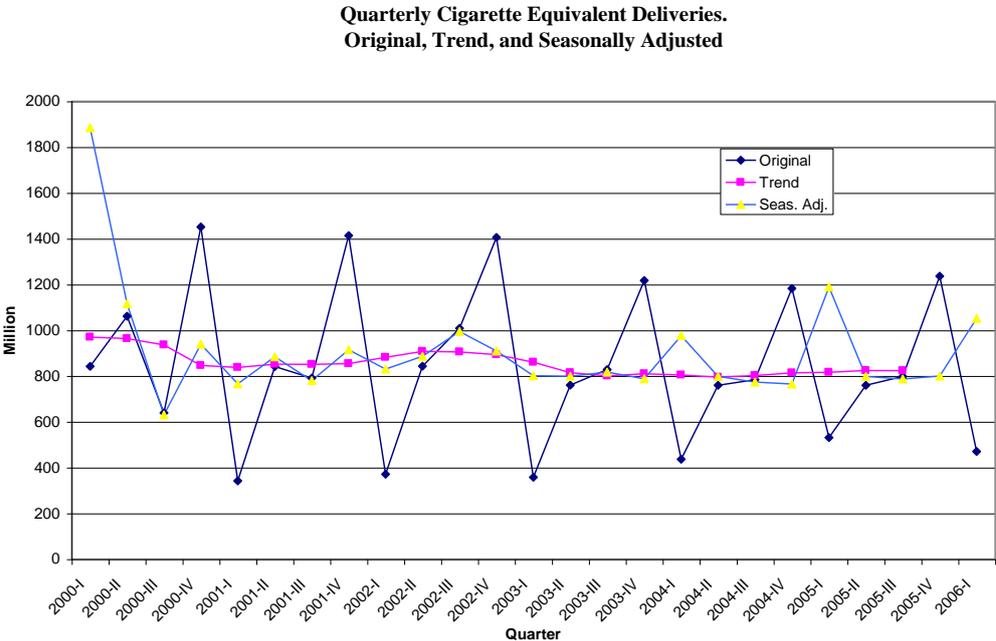
**Figure 9.3.4b Tobacco and cigarettes released onto the New Zealand market based on quarterly data (“released from bond”), 2002-2005**



Source: Statistics New Zealand

Seasonal adjustment was carried out to assess whether there was any unusual patterns in the quarterly release of cigarettes and tobacco around the time of the SEAA (2003) implementation. The results (figure 9.3.4c) suggest that slightly lower than normal amounts of tobacco were released for the December quarter of 2004, and higher than normal amounts for the March quarter of 2005.

**Figure 9.3.4c Seasonal adjustment of Quarterly series of cigarettes released for**



**consumption, 2000-2005**

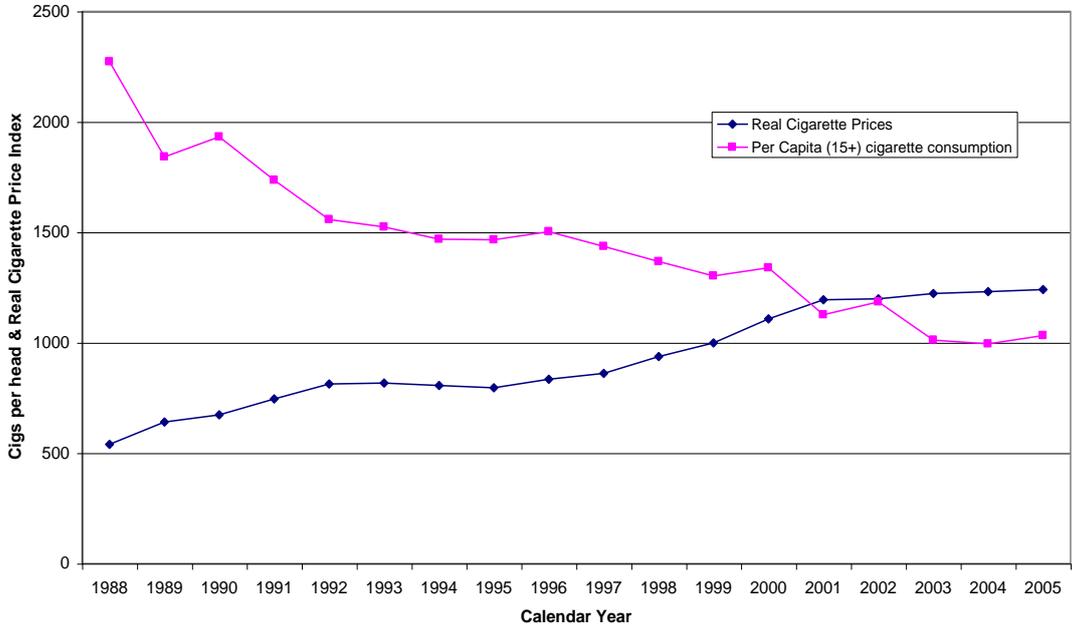
**9.3.5. Consumption trends in relation to prices and affordability**

In interpreting consumption figures, it is important to take into account changes in the price and affordability of cigarettes, as consumption is sensitive to changes in these factors. Together, price and income determine the overall ‘*affordability*’ of a product. Changes in price are stronger influences on demand than income. There is around three times greater ‘demand elasticity’ for price. (Thomson et al., 2000)

Real average incomes per person have been increasing in recent years (2.1% per annum, 2000-4), though more slowly in 2005 (1.2%). Therefore the effect of increasing real average incomes on promoting demand would have been fairly similar during 2000-5, though possibly slightly less in 2005. Data on the annual level of retail prices of cigarettes and tobacco relative to the All Groups Consumers Price Index (CPI) shows that cigarettes prices were about 20 percent higher in 2005 relative to all consumer prices than they were in the base period of June 1999. Most of this increase occurred before 2003, and the increase since 2003 has been modest. There was about a two percent increase in 2003, and less than one percent in 2004 and 2005.

Figure 9.3.5 shows annualised cigarettes and tobacco release in relation to the real price of cigarettes. The around 15% increase in cigarette prices relative to the CPI between 1999 and 2003, was associated with decreases in cigarettes released onto the market, and very likely therefore with reduced per capita consumption. From 2003-5, there were only small increases in cigarette prices relative to CPI, and these were partly offset by increases in real income. During this period there was little change in cigarettes released onto the market.

**Figure 9.3.5 Per capita annualised tobacco and cigarettes released onto the New Zealand market and cigarette prices relative to the Consumers Price Index, 1988-2005**



## 9.4. Discussion

### 9.4.1. Critique of the evidence

Data were available to assess changes in most of the success criteria described in section 9.1. However, there were no data available on motivation to quit and prevalence of quit attempts and quit rates among smokers. In addition, there was very few data available about changes in smoking-related behaviours and prevalence among Māori.

All the evidence described in this section comes from uncontrolled data showing trends over time, with limited data on the many possible confounding influences which may have affected overall smoking prevalence, tobacco consumption, and quitting behaviour. These include the

level of news media coverage of tobacco and health issues and the degree of promotion of smoking cessation services. For Quitline data specifically, call rates and registrations have been shown to vary seasonally, and be affected by television-based media campaigns, changes in access to NRT, media publicity about smoking hazards, and the impact of major international events; (Grigg et al., 2003; Wilson et al., 2002a; Wilson et al., 2002b; Wilson et al., 2005a). Therefore with any changes observed in prevalence, consumption and quitting behaviour in relation to the SEAA (2003) implementation, there is a problem of valid attribution of causation.

Limitations with the HSC Monitor data due to poor response rates were discussed in section 5.4.1. The reported trends will probably not be affected by these problems.

The results suggesting a decline in prevalence of smoking among year 10 students between 2004 and 2005 are hard to interpret given the long-term decline in youth smoking. Evidence of reductions in the proportion of children reporting both parents smoking between 2004 and 2005 should also be treated with some caution, particularly if accuracy of reporting changed over time. For example, implementation of the SEAA (2003) and other changes reducing the social acceptability of smoking may have increased the rate of “social desirability bias”, where students report less than the true prevalence of parental smoking. Also, if parental smoking inside the home selectively reduced (relative to smoking in other settings) over time, students may have become less aware of their parents smoking than previously. Finally, demographic changes could have had an effect. For example, the decline in the prevalence of parental smoking in the Auckland DHB between 2001 and 2005 (from 37.0% to 30.3%) was partly attributed to the increasing proportion of Asian students (whose parents are less likely to smoke). (Scragg, 2006)

The release of tobacco products onto the New Zealand market is the best available measure of trends in consumption over time<sup>j</sup>. However, the figures are for the release of tobacco onto the market each quarter. They are not a direct measure of sales or consumption over the same quarter. Hence, the figures may be distorted by increased or decreased releases of tobacco from warehouses in response to changing retail stocks. Their usefulness for assessing the impact of tobacco control interventions like the SEAA (2003) on consumption is therefore

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<sup>j</sup> An alternative source is the Household Economic Survey, but this is known to seriously under-report household spending on cigarettes by 50 percent or more. (Thomson et al., 2000)

very limited in the short-term (quarter to quarter or year to year), though probably valid over longer periods. It is possible that the apparent small increase in *per capita* release of tobacco to market in 2005 (figure 9.3.4a) represented reduced releases in anticipation of the SEAA (2003) at the end of 2004, followed by a compensatory increase as stocks ran low. The greater release of tobacco in the first quarter of 2005 relative to the equivalent quarters in 2002-4 and 2006, and the smaller amount released in the last quarter of 2004 compared with 2002-3 and 2005 (figure 9.3.4b) supports this interpretation. Supermarket sales have similar limitations and also represent only one part of the retail sector that supplies tobacco, so also only provide limited evidence of overall tobacco sales and consumption. Data on tobacco sales through other retailers such as dairies and convenience stores, or petrol stations was not available.

#### **9.4.2. Conclusions**

The introduction to this section noted that changes to tobacco consumption, smoking prevalence and smoking-related behaviours are non-core outcome indicators, and that large changes were unlikely in the short term, and were less likely for the SEAA (2003) since most workplaces were already smokefree by 2004.

However, there was strong evidence of changes in quit attempts and socially-cued smoking. Evidence from the Quitline data suggests that there were increases in caller registrations and the issuing of NRT exchange cards in the six-month period following the SEAA (2003) implementation. This pattern was much stronger when account was taken of the marked reduction in television advertising expenditure by the Quit Group on smoking cessation during early 2005. These findings are consistent with the previous New Zealand work using data from a shorter time period. (Wilson et al., 2005b) The caller registration rate (unadjusted for advertising expenditure) also increased in the six-month period prior to the law change. This may have been related to the media campaign on smokefree homes that was run from April 2004, and the media campaign on the new smokefree legislation that was run in late 2004 (see section 2.4). The results are consistent with the international data on the impact of smokefree laws on smoker behaviour (see section 3.7).

The HSC Monitor survey data trends strongly suggest that the SEAA (2003) impacted on the level of socially-cued smoking in various hospitality settings. This is plausible given that going outside to smoke may require interruption of indoor social activities and enduring adverse environmental conditions (e.g. when the weather is poor and the facilities are poor). However, this impact may be eroded over time as hospitality venues provide more attractive and comfortable outdoor smoking areas (e.g. with seating and heating, and better protection

from the weather). These results are consistent with the international literature suggesting socially-cued smokers are more likely to quit if there are smoking restrictions in social venues. (Trotter et al., 2002)

Evidence of impact on prevalence and consumption was, as expected, less clear. There was some evidence that smoking prevalence among year 10 students and their parents may have reduced following implementation of the SEAA (2003). However, as well as the problems of attribution described above, changes in student's smoking prevalence may simply reflect the continuation of longer term trends, and changes in reported parental smoking may reflect the effects of changing accuracy of reporting and other influences.

Similarly, the effect of the SEAA (2003) on *per capita* consumption from the data on tobacco released into the New Zealand market was unclear. Interpretation is complicated by problems with fluctuations in the data described above, and the many other possible concurrent influences on consumption. These include tobacco prices, affordability, media campaigns, availability of smoking cessation therapies, and media news items on smoking-related health risks. Overall there was no obvious effect of the SEAA (2003) observed in this data. The decline in quarterly tobacco sales data by supermarkets was consistent with an impact of the new law on the levels of consumption. However, the observed annualised rate of decline of 4.3% in supermarket sales following implementation of the SEAA (2003), was similar to the long-term trend in tobacco consumption in cigarette equivalents per adult New Zealander. This averaged a 3.2% decrease per year for the 10-year period from 1995-2004 and 5.2% per year for the 5-year period 2000-2004. (Ministry of Health, 2005c).

An issue that emerged from analysis of the Quitline data in relation to advertising spend promoting smoking cessation, was the apparent missed opportunity to maximise the impact of the SEAA (2003) on quitting behaviour. Introducing widespread restrictions on smoking in workplaces and public places was likely to have been an important trigger for smokers to quit. It would have made sense to increase the promotion of smoking cessation support and the availability of subsidised NRT through the Quitline, and to have ensured that Quitline had the resources available to deal with the increase in calls. None of this happened, and indeed promotion of smoking cessation support was substantially lower in the six month period after implementation of the SEAA (2003).

In conclusion, the effects of the SEAA (2003) on smoking prevalence and consumption were not yet clear, and where there were observed reductions, these may have simply reflected the

continuation of long-term trends. There was evidence of a reduction in socially-cued smoking – with smokers smoking less in key hospitality settings after the law change. There was also evidence that for a six-month period after the law change there were increased quitting-related behaviours (caller registrations with the Quitline and use of NRT).

## 10. Economic impacts

### Summary

This section describes the outcome evaluation for the non-core objective of the SEAA (2003) having positive or neutral economic effects in the hospitality industry and wider economy.

The main sources of information were routinely collected economic activity data from Statistics New Zealand website, as annual and quarterly time-series. This included data series on retail sales and employment by sector. Other data included economic activity data relating to construction in the hospitality industry and tourism numbers. Data on patronage of hospitality industry venues was available from the HSC Monitor surveys, and on problem gambling from the problem gambling helpline and counselling data. Additional analysis of the retail sales data was carried out to adjust for the effect of long-term trends.

Data from the HSC Monitor surveys revealed little change in the reported patronage of bars and pubs between 2003-4 and 2005-6. There has been a downward trend in retail sales in bars and clubs since 2002. There was probably a modest additional reduction (around 4%) in retail sales of bars and clubs in the first quarter of 2005, with some evidence of displacement to liquor retailers for home sales. However, the effect was not sustained, and subsequent figures were in line with pre-existing trends. Patronage and sales for cafes and restaurants have increased steadily since 2002. The rate of increase was maintained or possibly slightly greater after implementation of the SEAA (2003). Trends in employment in these hospitality sectors largely mirrored the retail sales data.

There is no useful information on expenditure on construction on shelters to meet smokers' needs, nor on possible bankruptcies caused by the new Act. There was evidence of decreased expenditure on gambling, and large falls in the numbers accessing the problem gamblers helpline and face-to-face counselling services in 2005. The number of overseas visitors and their expenditure increased in 2005, though the increase in numbers of visitors was less than the long term trend.

## 10.1. Objectives and success criteria

For the purposes of this document, economic impacts exclude those on the tobacco product manufacture, distribution and specialist tobacco retailing sectors. Neither the SEAA (2003) nor the Tobacco Control Plan state objectives for economic impacts of smokefree legislation. Indeed where smokefree legislation and ordinances have been introduced around the world, we are unaware of any example where the objectives have been framed in relation to economic impacts. The CDC model for evaluation of smokefree policy interventions does not include indicators of economic impact. (Starr et al., 2005a)

However, the threat of negative economic impact of smokefree legislation as an unintended side-effect, particularly on the hospitality sector, is a frequent claim of opponents wherever its introduction is debated around the world; and this was true for New Zealand also (see sections 2.4 and 6.3.7). For example, HANZ video-linked the director of the California Licensed Beverage Association into their 2001 Annual General Meeting, where she claimed there were 29-30% reductions in customer numbers and jobs. (Price et al., 2006)

Therefore, evaluation activity of smokefree legislation has often documented economic impacts to assess whether the predicted negative economic effects occurred. In line with this trend, 'The Smoke is Clearing' included data on trends in revenue in the hospitality trade, reported patronage of hospitality venues, and bar managers' and owners' perceptions of economic impact of the SEAA (2003). (Ministry of Health, 2005b)

Indicators most commonly used in international studies of the economic impact of smokefree legislation and other smoking restrictions include: employment, sales, duties and tax revenues, profits, customer numbers, tourism numbers and expenditure, total number of businesses, and number of bankruptcies and start-ups within different sectors. We have therefore adopted the following as potential success indicators of the economic impact of the SEAA (2003). These are listed with the caveat that broader positive or neutral economic effects are possible indirect outcomes of the SEAA (2003), and are not core objectives against which the legislation should be evaluated.

- To demonstrate a neutral or positive effect on appropriately adjusted trends in relevant economic indicators (employment, sales, duties and tax revenues, profits, customer numbers, patronage, bankruptcies and total number of businesses) for all businesses and for specific sectors, to include:
  - bars and pubs

- cafes and restaurants
- hotels, B&Bs and motels
- To demonstrate a neutral or positive effect on appropriately adjusted trends in indicators of tourism such as tourist numbers or expenditure.
- To demonstrate a negative effect on appropriately adjusted trends in gambling expenditure and in related harms such as problem gambling.

We have included demonstrating a *reduction* in gambling expenditure and in ‘problem gambling’ as a success indicator. Viewing reductions in gambling expenditure as a positive outcome may be questioned, not least by the gambling sector. However, problem gambling is agreed to be an adverse effect of gambling, so categorising a reduction as a positive outcome is not problematic. Justification for these decisions is provided by the aim of the government’s 2003 Gambling Act being to control growth in gambling, and to prevent and minimise the harm due to gambling, including problem gambling. (Department of Internal Affairs, 2003).

## **10.2. Data Sources and methods**

In line with the recommendations of Siegel, we have wherever possible used objective data, prolonged time series, and adjusted for overall economic and secular trends, seasonality and other possible confounding influences. (Siegel, 1992)

### **10.2.1. Economic activity data from Statistics New Zealand**

Most of the data presented is routinely collected economic activity data which can be found on the Statistics New Zealand web-site, as both annual and quarterly time-series. Some of the quarterly time-series (retail sales) are published in seasonally adjusted form, and sometimes in ‘real prices’, adjusted for inflation. The ‘employment’ series used were from Statistics NZ’s Quarterly Employment Survey Accommodation, Cafes and Restaurants industry grouping (this excludes liquor retailing). Two employment series were used:

- Weekly Paid Hours. (Pay-week ending on, or immediately before, 20<sup>th</sup> of mid-month of quarter).
- Total Filled Jobs. (All full-time and part-time employees, plus working proprietors in businesses that have employees).

In addition, finer industry detail from 2002 onwards was supplied in a special tabulation purchased from Statistics New Zealand on: pubs, taverns, bars and clubs; liquor retailers; and cafes, restaurants and takeaways. Where seasonally adjusted data were not available, adjusted figures were calculated using a simple statistical model. Trends were calculated as centred moving averages, and averages of the seasonal ratios used as seasonal adjustment factors. The results of the analyses are presented graphically. We have also carried out regression analyses to assess the impact of the implementation of the SEAA (2003), adjusted for the above factors, by entering it into linear regression models as a dummy variable.

Additional economic data were available from Statistics NZ on overseas visitor numbers, and estimates of overseas visitor expenditure (these are estimated from the overseas visitors numbers and the annual International Visitor Survey). Gambling expenditure data is also available on the Statistic New Zealand website.

### **10.2.2. Other data sources**

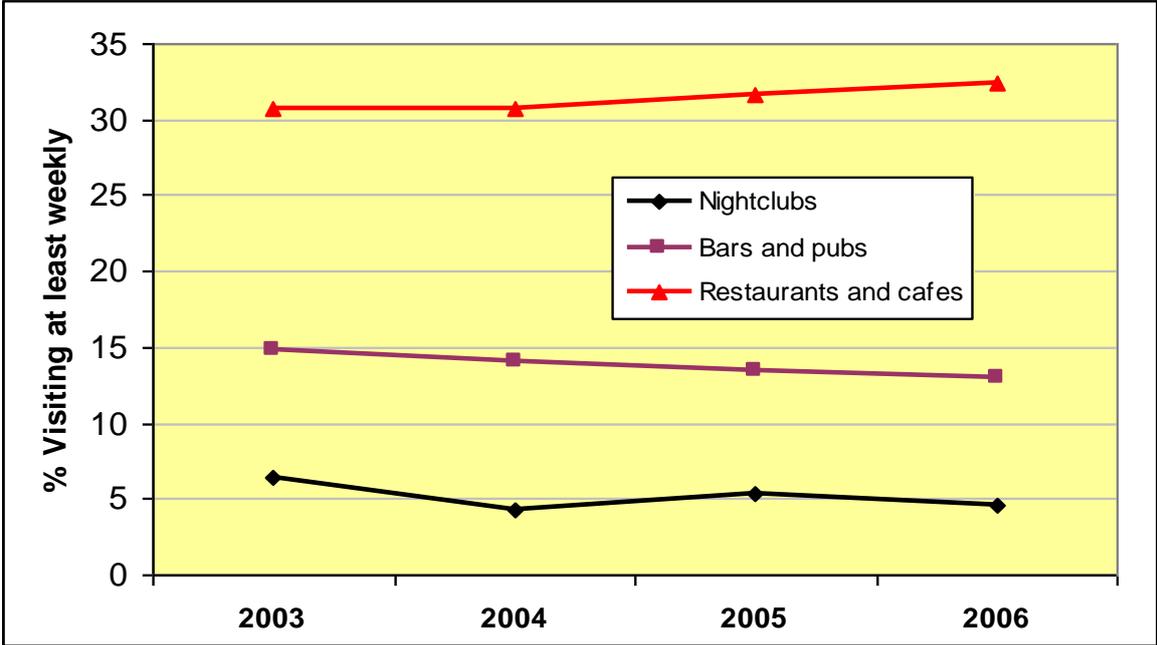
The HSC Monitor surveys in 2003-6 included questions on the patronage of hospitality venues. Problem gambling data is collated from the Helpline calls database and returns from the face-to-face counselling services of the Mental Health Directorate of the Ministry of Health's Problem Gambling Service Providers.

## **10.3. Results**

### **10.3.1. Patronage of bars, clubs, cafes and restaurants**

Detailed information on reported patronage of nightclubs, bars and pubs, and cafes and restaurants from the self-reported data in the HSC Monitor surveys are shown in tables A1.17-A1.19 in appendix I. Overall there was little change in the proportion reporting attending these venues regularly throughout 2003-6. There was a slight decline in the proportion saying they attended bars and pubs and nightclubs at least weekly over this period, and a small increase in at least weekly attendance of cafes and restaurants. However, there was no clear visual evidence of a change in these trends between 2003-4 and 2005-6 following implementation of the SEAA (2003) – see figure 10.3.1. Smokers patronage of hospitality venues was greater than non-smokers for pubs and bars and nightclubs, but not restaurants and cafes. Trends in changes in patronage were similar in smokers and non-smokers, except possibly smokers' patronage of nightclubs reduced between 2003 and 2006, but was largely unchanged for non-smokers..

**Figure 10.3.1 Patronage ( at least weekly) at hospitality venues, 2003-2006. Source: HSC Monitor Survey**



**10.3.2. Impact on overall retail sales in the hospitality sector**

Figure 10.3.2a shows total annual retail sales for 2002 to 2005 for the three main hospitality industry sectors – bars and clubs, cafes and restaurants, and accommodation (hotels, motels and B & Bs). It also shows sales for liquor retail stores, the other major seller of liquor, and the sector to which alcohol sales might be displaced if customers visited bars and clubs less as a result of the SEAA (2003) and socialised more at home.

The sales data are in constant September quarter 1995 prices <sup>k</sup>. Sales by bars and clubs have been declining steadily over this period, while those of other store-types have been increasing, particularly among restaurants and cafes. These trends continued in 2005. There is no obvious indication that bars and clubs sales fell at a more rapid rate in 2005 than the average rate of decline in previous years. Numerically sales fell 2.2 percent in 2005 compared with a fall of 3.0 percent in 2003 and 1.3 percent in 2004. Sales by liquor retailers increased 4.5 percent in 2005, a growth-rate slightly higher than in previous years. Total turnover of cafes and

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<sup>k</sup> The sales figures quoted throughout this section are in September 1995 prices. In current dollar terms, the numbers would be scaled up by between a quarter to a third.

restaurants increased by 7.2% in 2005. This compares with increases of 2.9 and 4.8% respectively in 2003 and 2004.

**Figure 10.3.2a Annual Total Retail Sales by four main liquor-selling store-types, 2002-2005**

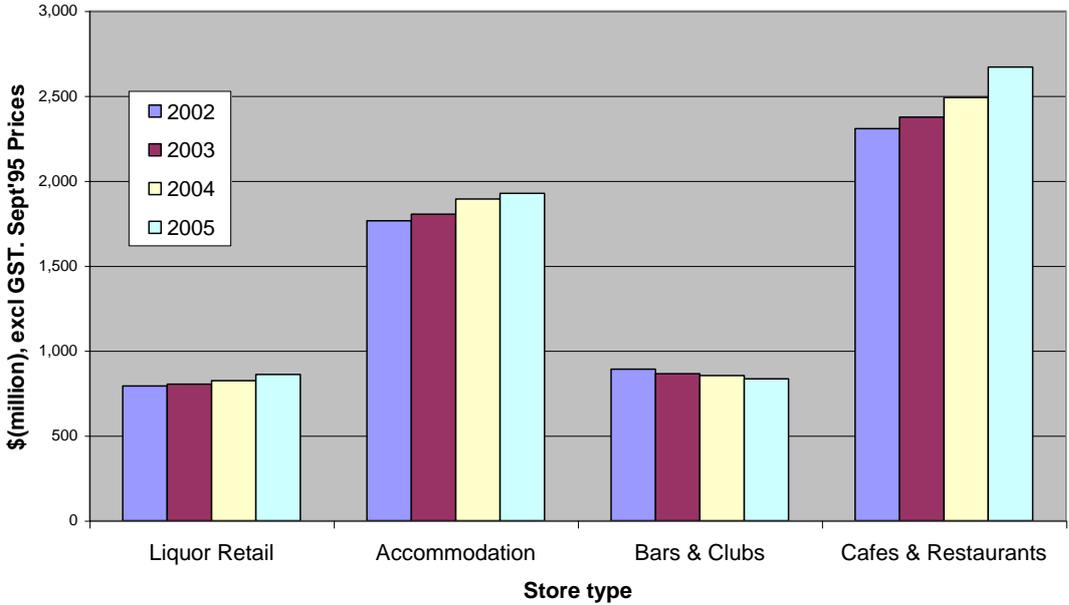
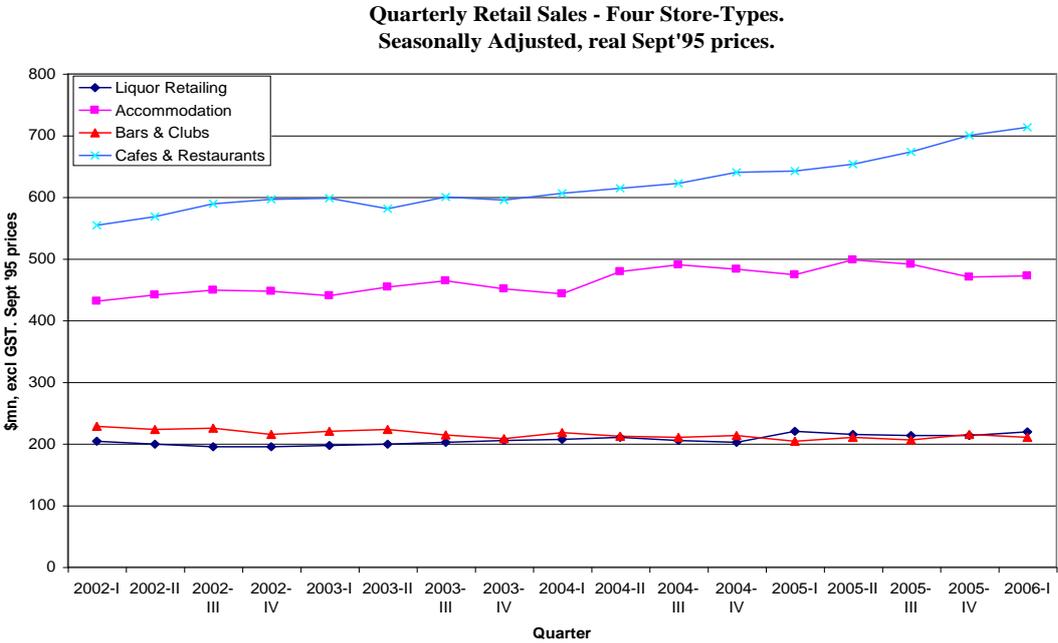


Figure 10.3.2b shows the equivalent quarterly series, seasonally adjusted (Official Statistics NZ seasonal adjustment) in real September 1995 prices. Liquor retailers and bars and clubs both have virtually flat sales over the four-year period. Visually there appears to be a small temporary shift coinciding with the first quarter of 2005. Its magnitude is equivalent to a fall of about six percent (or about \$14 million) in the sales of bars and clubs, and a rise of about six percent in the sales of sales of liquor retailers. Bars and clubs sales then appear to recover over the succeeding year. There is a large increase in seasonally adjusted sales in cafes and restaurants during this period, this accelerates during 2005 after implementation of the SEAA (2003).

**Figure 10.3.2b Seasonally Adjusted Quarterly Total Retail Sales, by Four main liquor-selling store-types, 2002-2006**

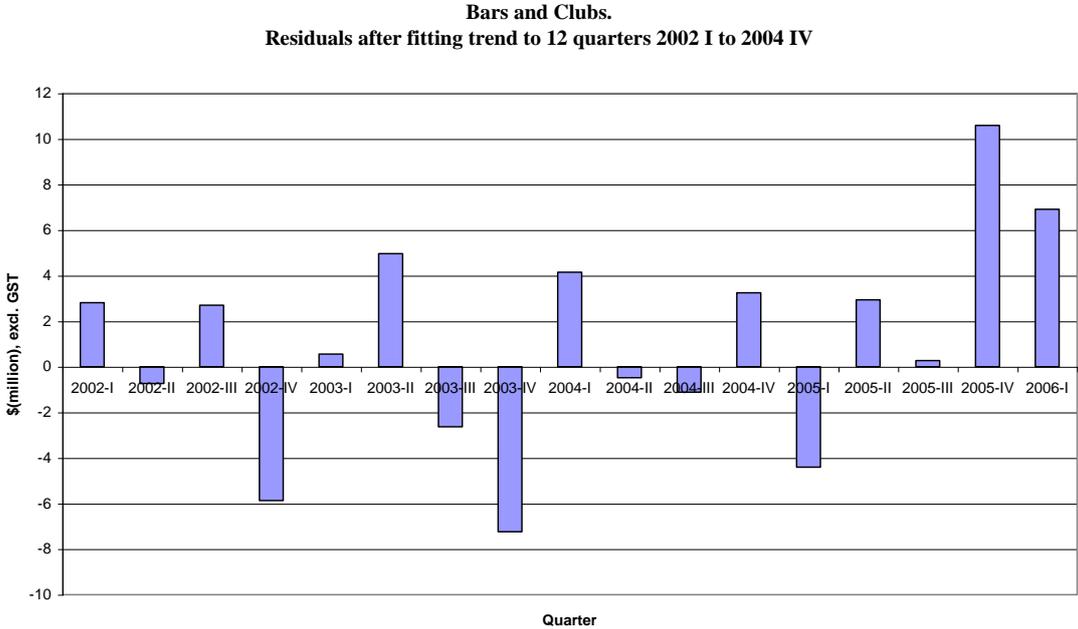


**10.3.3. Regression models of the impact of the Smoke-free Environments Amendment Act on Bar and Club Sales**

The simplest model, and that which is used here, is to assume that up to the end of 2004, sales of the various store-types were growing or declining at a constant rate for each store-type. This trend is then extrapolated into 2005 and compared with the actual data to assess the extent of the deviation from the anticipated sales if the trends had continued from before implementation of the SEAA (2003). Simple exponential trends have been fitted to the quarterly sales figures for bars and clubs and liquor retailing for the period from the March quarter of 2002 to the December quarter of 2004 (12 quarters in all). The trend was then extrapolated through to 2006 and the extrapolated trends compared with actual sales. The differences, or residuals, are shown in figures 10.3.3a and 10.3.3b.

**Figure 10.3.3a Quarterly Residuals from fitted trend. Bars and clubs, 2002-2005**

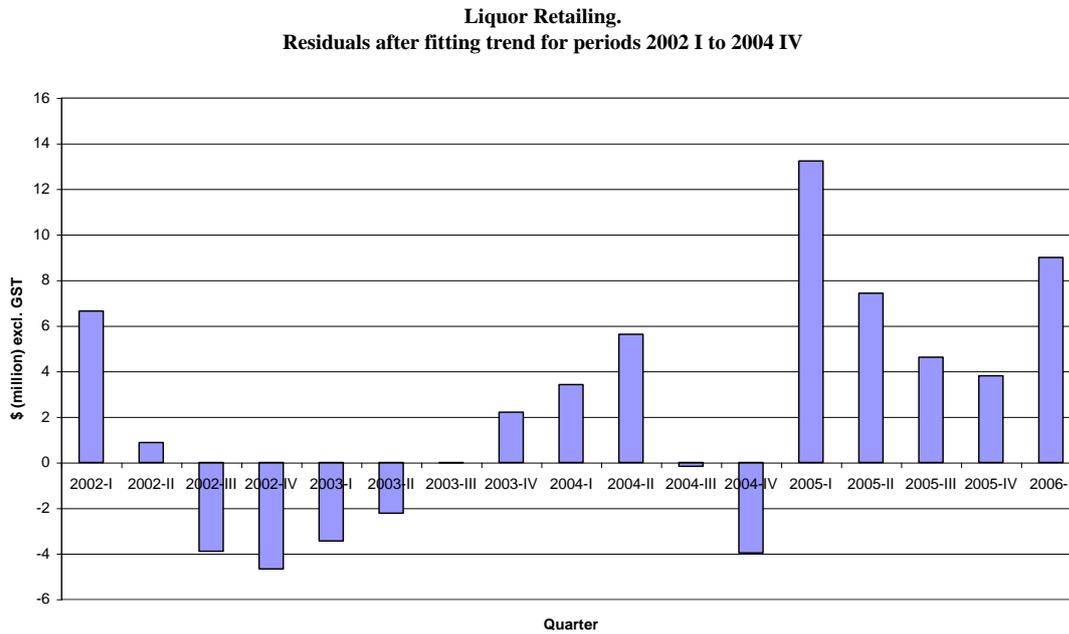
For bars and clubs, the pattern of residuals appears, visually at least, to be reasonably random



up to the end of 2004. There is a substantial negative residual (i.e. sales were less than expected from long term trends) in the first quarter of 2005, consistent with the data presented in 10.3.2b discussed above. This would be consistent with the SEAA (2003) depressing sales in that quarter. However the residual is not significantly greater than residuals seen in some earlier quarters. Also, all subsequent residuals from the June 2005 quarter to March 2006 were positive (i.e. there were more sales than expected from the long term trend), particularly in the last quarter of 2005 and first quarter of 2006. Sales had moved strongly above the longer term trend by late 2005 and early 2006.

For liquor retailing (figure 10.3.3b), the residuals are definitely not random in the 2002-2004 period, suggesting other factors have been influencing their sales. Sales appear significantly above trend in the first quarter of 2005, and remain above trend thereafter. Taken together, the data in figures 10.3.3a and 10.3.3b are consistent with some shift in sales in at least the first quarter of 2005 from bars and clubs to liquor retailers; but this is followed by an increase in sales above trend in both sectors of similar magnitude.

**Figure 10.3.3b Quarterly Residuals from fitted trend. Liquor Retailers, 2002-2005**



An alternative approach is to fit models for the whole period, but including as well as a ‘trend’ variable, a ‘dummy’ SEAA (2003) variable to assess the impact of SEAA (2003). The dummy variable is set at zero for most periods, taking a value of 1 in either the first quarter only of 2005, or a value of 1 from the 2005 March quarter onwards, if a more permanent impact is assumed. Results from this analysis using a linear rather than exponential trend are given in table 10.3.3a. The table shows that there are long-term trends downwards for bar and pub sales, and upwards in liquor retailing sales.

**Table 10.3.3a Results of models fitted to discern shifts in sales as a result of SEAA (2003) on total sales in bars and clubs, and liquor retailing sector (\$million, 1995 prices \*\*)**

	<b>Overall quarterly trend in sales - \$ million ( 95% CI)</b>	<b>Impact of SEAA (2003) on sales - \$ million ( 95% CI)</b>
<b>One-off model: assuming impact of SEAA only in first quarter of 2005</b>		
Bar and clubs	-1.0 (-1.5 to -0.5) p = 0.004	-7.4 (-17.0 to +2.2) p = 0.12
Liquor retailing	+1.2 (+0.8 to +1.7) p < 0.001	+9.8 (+0.8 to +18.8) p = 0.035
<b>Constant impact model - assuming impact of SEAA continues at same level from first quarter of 2005 onwards</b>		
Bar and clubs	-1.2 (-2.0 to -0.4) p = 0.006	+1.8 (-6.8 to +10.4) p = 0.65
Liquor retailing	+0.7 (+0.02 to +1.4) p = 0.04	+8.3 (+1.0 to +15.7) p = 0.03

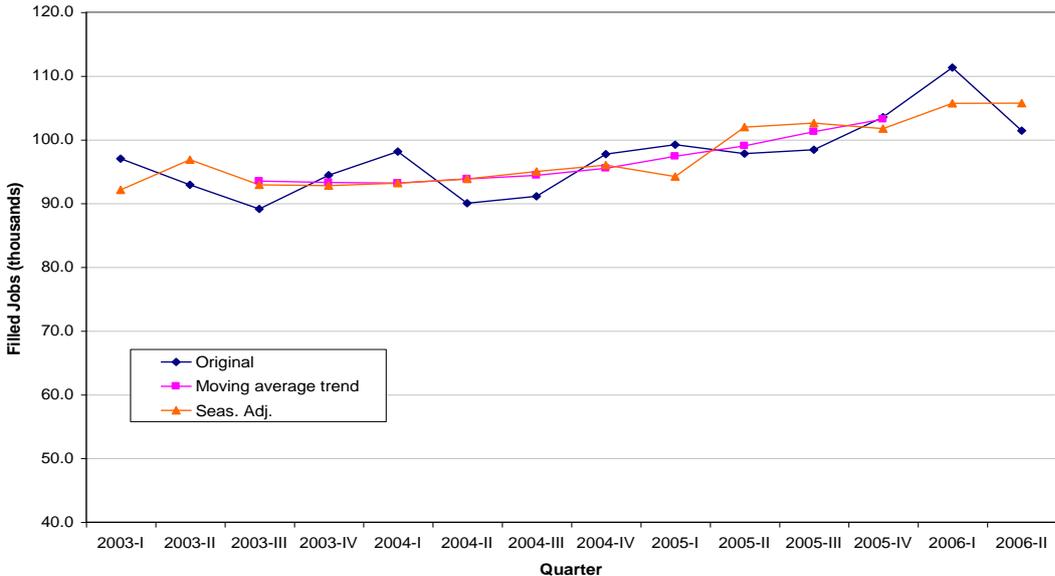
The most plausible conclusion to be drawn from these results is that SEAA (2003) had some impact in the March quarter of 2005 (one-off model), with an increase in sales through liquor retailing of around \$9.8 million and a reduction in sales in pubs and bars of around \$7.4 million (though this result was not statistically significant). The decrease in sales in bars and pubs was not sustained during 2005 (constant impact model). Overall sales in bars and clubs were not greatly affected following implementation of the SEAA (2003), with a small but not statistically significant increase in sales observed. Liquor retailers sales increased after implementation of the SEAA (2003), by about \$7.5 million in the March 2005 quarter, and up to \$12.5 million for all of 2005. These are on sales of a little above \$200 million quarterly, or \$800 million each per year.

#### **10.3.4. Impact on employment in the hospitality sector**

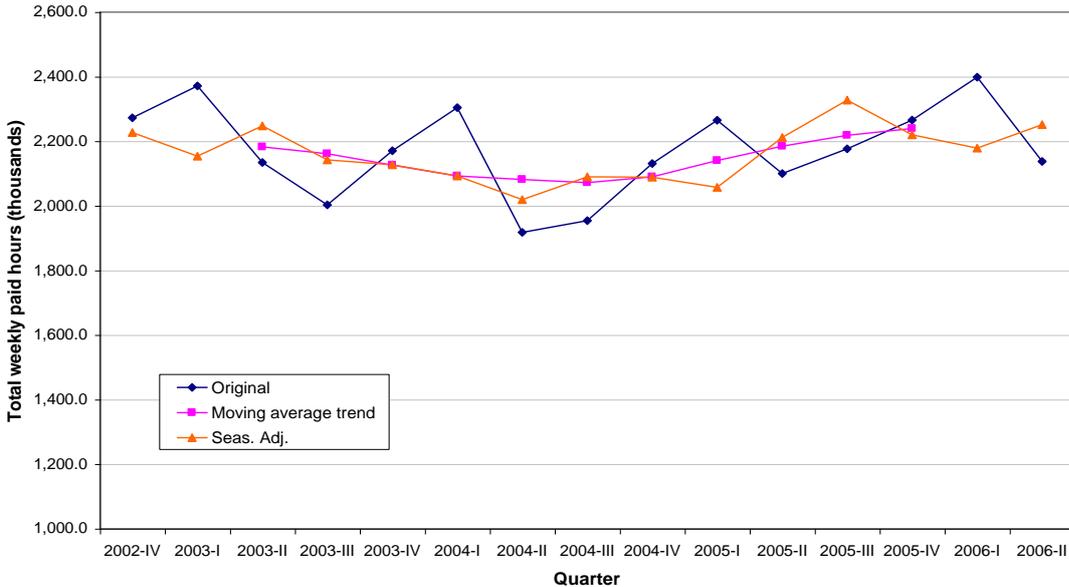
Figures 10.3.4a and 10.3.4b show seasonally adjusted trends in employment in the ‘Accommodation, Cafes and Restaurants’ sector. The moving average trend in total employment and hours worked appears to increase steadily from mid-2004, with no evident change in trend following implementation of the SEAA (2003). The seasonally adjusted series show dips in the first quarter of 2005, with a recovery in the second quarter. These might be

random fluctuations, or may represent effects of the SEAA (2003). Interpretation is hampered by the industry grouping being broad – including pubs, taverns, bars, and clubs; but also accommodation (hotels and motels), and restaurants, cafes and takeaways. Therefore, it is not possible to assess the effects within more narrowly defined sectors.

**Figure 10.3.4a Filled jobs per quarter in accommodation, cafes and restaurants sectors, 2003-2006. Source: Statistics New Zealand**

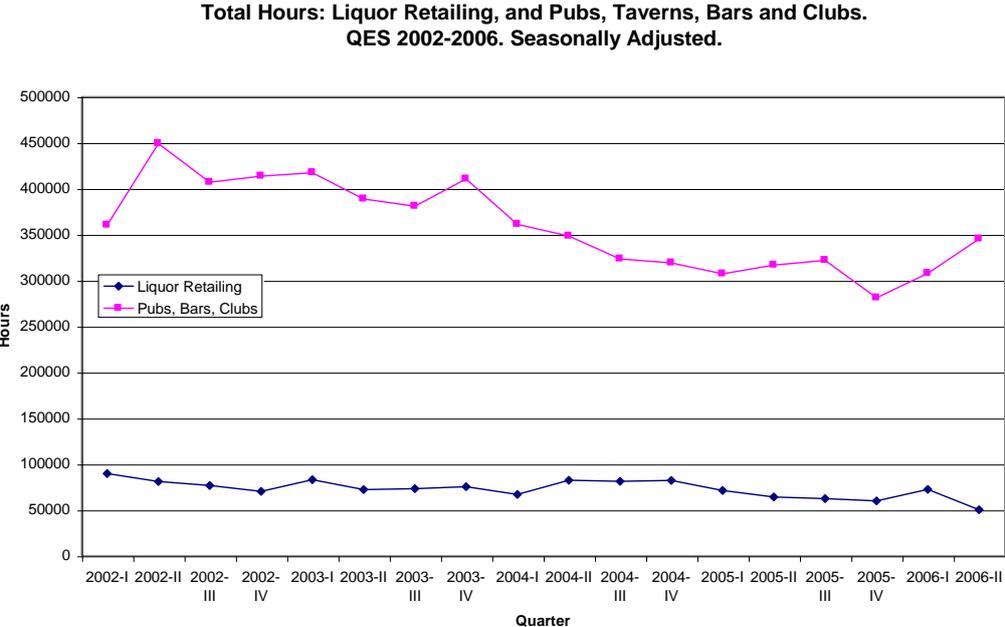


**Figure 10.3.4b Weekly paid hours per quarter. Accommodation, cafes and restaurants, 2003-2006. Source: Statistics New Zealand**

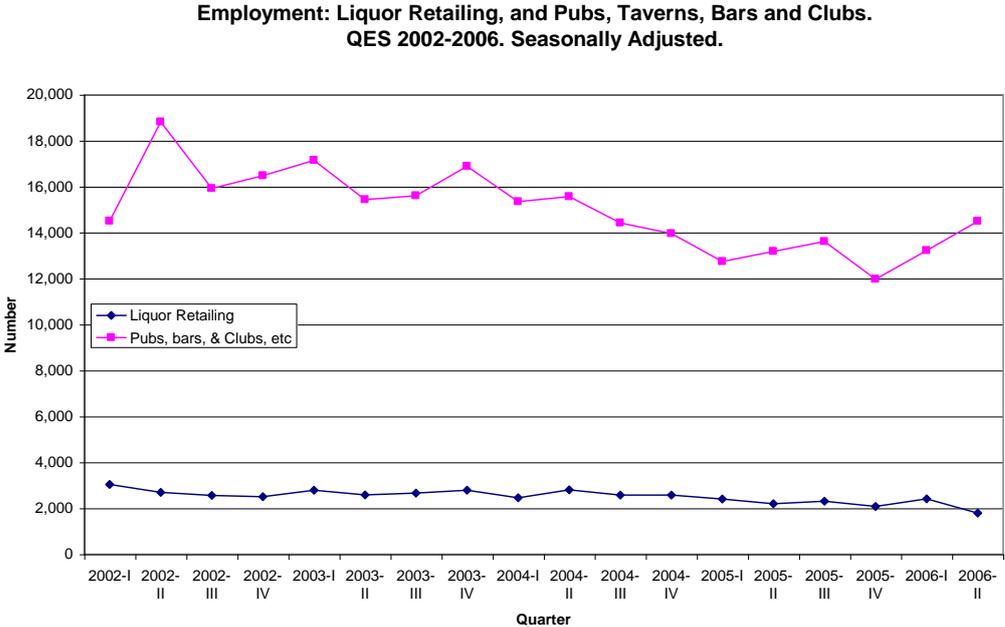


To investigate further, more detailed data were obtained from Statistics New Zealand with separate data for each of the above three sectors. The series after seasonal adjustment are shown in figures 10.3.4c and 10.3.4d for bars, tavern, pubs and clubs, and for liquor retailing.

**Figure 10.3.4c Filled jobs per quarter in bars, tavern, pubs and clubs, and for liquor retailing sectors, 2002-2006. Source: Statistics New Zealand**



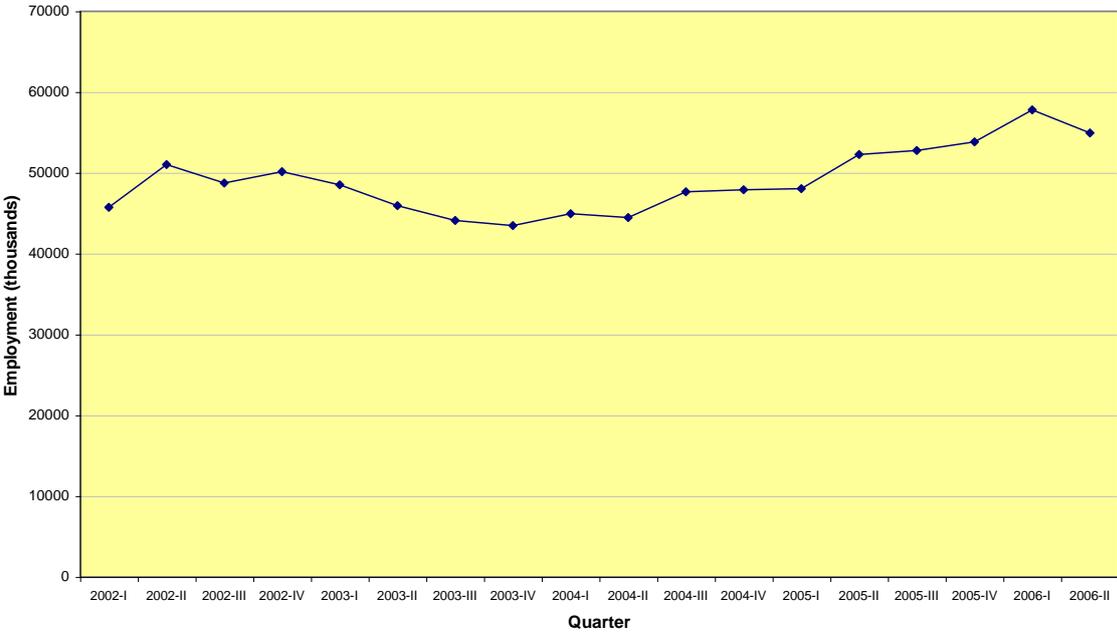
**Figure 10.3.4d Weekly paid hours per quarter in bars, tavern, pubs and clubs, and for liquor retailing sectors, 2002-2006. Source: Statistics New Zealand**



The figures for liquor retailing show that levels of employment and paid hours have been on a slight downward trend, with no change apparent in relation to the SEAA (2003) implementation. Employment and paid hours in the pubs, taverns, bars and clubs sector has been declining since the second quarter of 2002, with possibly a slight additional dip in the first quarter of 2005. This is equivalent to a fall of 6.1% in employment and 3.4% in hours worked compared with the average of the December 2004 and June 2005 quarters. The dips coincide with the decline in sales seen during this quarter (section 10.3.2). Since then, both indicators have been on an increasing trend, apart from a pronounced dip in the last quarter of 2005. There is therefore no evidence of a sustained negative effect of the SEAA (2003) on employment in these sectors.

Seasonally adjusted employment data for the restaurants, cafes and takeaways sector is displayed in figure 10.3.4e. The pattern is similar for employed hours (data not shown). There was a decline in employment in 2002 and 2003. During 2004 up until the first quarter of 2005, there was a small increase. This increase accelerated subsequently, until the second quarter of 2006, when there was a modest fall in numbers.

**Figure 10.3.4e Filled jobs per quarter in restaurant, cafes and takeaways sector, 2002-2006. Seasonally adjusted. Source: Statistics New Zealand**



### **10.3.5. Construction work within the hospitality sector**

Casual observation suggests that there has been construction of outdoor shelters attached to restaurants, cafes and bars and clubs, presumably in order to retain smokers' patronage whilst complying with the new legislation. However, the available building statistics ('Building Consents Issued' and 'Building Work Put in Place') do not provide specific information on this. The value of Consents Issued for Shops, Restaurants, Taverns increased particularly rapidly in 2005, as did 'Work put in Place' on Commercial Buildings, but relatively small-scale alterations and additions by taverns and clubs would be swamped in these series by the value of new buildings.

### **10.3.6. Bankruptcies**

No useable data were located on bankruptcy rates. It is likely that these data would show useful information only after a time lapse.

### **10.3.7. Gambling and problem gambling**

It is possible that making casinos and non-casino venues where gambling occurs smokefree may result in reduced expenditure on gambling among smokers, as enforced cigarette breaks outside may break the cycle of betting by allowing time for reflection. Concerns over the rapid growth of gambling, particularly problem gambling, led to the 2003 Gambling Act. This introduced measures to control the growth of gambling and minimise the harm caused by gambling. These included stricter controls over licensing of venues with non-casino gaming machines, and limits on the number of machines per venue. Most regulations were implemented between May and December 2004.

Gambling expenditure fell by 0.6 percent from \$2.039 billion in 2003/04 to \$2.027 billion in 2004/05. This was only the second fall in expenditure recorded in 25 years. The greatest falls occurred in expenditure in casinos and non-casino gaming machines. Non-casino gaming machine expenditure decreased by 0.8%, from \$1.035 billion to \$1.027 billion. This is the first time it has ever decreased. It follows increases of 33% in 2001, 30% in 2002, 21% in 2003, and 10% in 2004. Casino gambling expenditure (which includes casino gaming machines) decreased by 2.5%, from \$484 million to \$472 million. This is the first time this figure has ever decreased. It follows increases of 8% in 2001, 11% in 2002, 11% in 2003, and 6% in 2004. The Ministry of Health consultation document (2006) '*Preventing and Minimising Gambling Harm: 2007-2010*', (Ministry of Health, 2006a) remarks that:

*“This decrease has been attributed to the combined effects of the Gambling Act 2003 and an amendment to smokefree legislation that came into effect in December 2004.”*

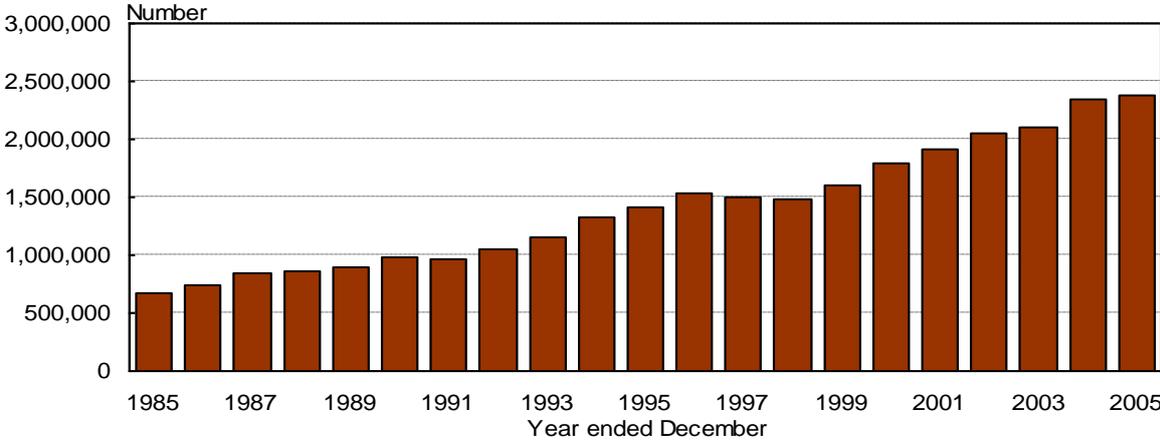
The Gambling Helpline had 2875 new clients in 2005, representing a 33.1% decrease from 4300 in 2004. Decreases occurred in all ethnic groups. The greatest decrease was in calls from gaming machine gamblers. The proportion of callers who were smokers decreased disproportionately suggesting a specific impact of the SEAA (2003) and Gambling Act in this group (Laugesen, 2006). Previously, there had been steady increases in new caller numbers to 2002, followed by small decreases in 2003 (1.2%) and 2004 (5.2%). Number of follow-up contacts also decreased by 9.4% in 2005, after increases in each of the previous three years. There was also a decrease (15.8%) in number of clients accessing face-to-face counselling services for gamblers in 2005, the first fall since 1997. The number of new clients decreased by 20.9%. (Ministry of Health, 2006b)

#### **10.3.8. Overseas visitor numbers and expenditure**

One of the arguments made in submissions to the Health Committee considering the Smoke-free Amendment Act was that comprehensive smokefree legislation would result in a fall in overseas visitors to New Zealand. (Price et al., 2006)

The number of visitors to New Zealand in 2005 actually rose by 35,278 (1.5%) to their highest recorded level since 1985 (figure 10.3.8). Estimated overseas visitors expenditure increased from \$6,298 million in 2004 to \$6,504 million in 2005, an increase of 3.3%. The increase in visitor numbers 2005 was smaller than the average annual growth between 1995 and 2004 of around 6%. However, the increase in 2005 was in comparison to 2004, a year in which there had been record numbers of visitors with the biggest annual percentage increase for 10 years. Also, overseas visitors numbers are affected by many factors, notably exchange rates of international currencies with the New Zealand Dollar. The New Zealand dollar was at historically high levels against the Australian dollar, British pound and US dollar in 2005 –the top three source countries for international visitors to New Zealand.

**Figure 10.3.8 Overseas visitor numbers to New Zealand 1985-2005, Source: Statistics New Zealand**



**10.4. Discussion**

**10.4.1. Critique of the evidence**

The patronage data from the HSC Monitor surveys provide limited evidence of economic impacts, as these data were self-reported and trends were available over only four years. The remaining data were largely derived from routine economic statistics compiled by Statistics New Zealand. Such data will have some limitations in scope, level of detail and validity due to the data being collected for general surveillance and reporting requirements rather than specifically for the evaluation studies described in this section. However, it has the advantage of being objective and is collected using consistent methods, blind to the evaluation questions investigated in this report. Therefore, bias in the data collection process is unlikely.

Of the other datasets, the numbers calling the gambling helpline or attending counseling services may be affected by factors other than the underlying number of problem gamblers – for example, the propensity to contact support services, and degree of marketing of the services. The retail sales and employment series, and tourist expenditure figures are based on sample surveys, and so are susceptible to sampling error.

The analyses were mostly limited to visual inspection of graphs of uncontrolled time series of seasonally adjusted data. These were often over quite short time periods before and after the SEAA (2003), making assessment of changes in trends problematic. This problem is compounded by lack of detail on possible confounding factors such as changes to: prices, advertising and marketing, other relevant regulations and legislation, and incomes and

taxation. Finally, there were some gaps in the data. For example, there was no information available on economic impacts among rural pubs and bars.

#### **10.4.2. Conclusions**

Bars and pubs are often cited as the sector most likely to suffer from introduction of smokefree legislation. There has been a declining trend in sales in the bars and clubs sector since 2002. There was probably an additional small reduction in retail sales in bars and clubs in the first quarter of 2005, with some evidence of displacement to liquor retailers. The shift in sales amounted to around four percent of bars and clubs total sales in the March 2005 quarter. However, the effect was not sustained. Subsequent figures were in line with pre-existing trends. This picture was supported by the employment and hours worked data, with a decline from 2002 to 2004, with possibly a small additional dip in the first quarter of 2005. Again, this dip was not sustained, and the trend of declining employment in this sector now appears to have flattened out.

Data from the remainder of the hospitality sector were consistent with a neutral or weakly positive effect of the SEAA (2003). Patronage, sales and employment and hours worked in cafes and restaurants have increased steadily since 2002. The rate of increase was similar or slightly greater after implementation of the SEAA (2003).

There is suggestive evidence that introduction of the SEAA (2003) coincided with a downturn in expenditure related to gambling and a decline in problem gambling. However, this may have been wholly or partly attributable to stricter regulation of gambling introduced in 2004-5 through the Gambling Act. The number of overseas visitors and their expenditure increased in 2005, though the increase in numbers was less than the long-term trend.

In conclusion, as has been found in other jurisdictions, there was no evidence for the economic disaster (particularly for pubs and bars) predicted by opponents of the legislation in the New Zealand hospitality sector. Rather the effects seem to have been broadly neutral or weakly positive, other than a modest and temporary decrease in bar and pub sales and employment, in the quarter immediately after implementation of the SEAA (2003).

# 11. Discussion

## 11.1. Summary of main findings

### 11.1.1. Process evaluation

There was convincing evidence of strong and increasing public support for the smokefree aspects of the SEAA (2003), and the underlying principles of protecting the rights of non-smokers from SHS exposure in workplaces and public places. By 2006, this support was overwhelming, and there was strong majority support including among most smokers. There was opposition to making hospitality industry workplaces smokefree prior to implementation. This came from some bar managers and owners, and other employers; and particularly from hospitality associations like HANZ. This opposition decreased subsequently. By 2005, there was evidence of increasing acceptance, if not full support, of the SEAA (2003).

The evidence suggests that the enforcement process and infrastructure has worked reasonably well. This is despite the inherent limitations of a passive system, the limited resources available for enforcement and implementation centrally and locally, and the missed opportunity to demonstrate rigorous enforcement through early prosecutions. Enforcement may have been helped by the broad support for the SEAA (2003) among the public and key stakeholders, so in practice the smokefree provisions have probably been largely self-policed (as is the experience in most jurisdictions internationally). Certainly, most of the available evidence suggests that compliance generally is high within the hospitality industry, including bars and pubs where most enforcement problems were expected. Data from the HSC Monitor surveys suggests that there is a persisting problem of non-compliance in a small proportion of non-office, non-hospitality workplaces, though the figures are based on self-reported exposures from a small sample of subjects. There is no more credible evidence due to a lack of systematic monitoring or research.

### 11.1.2. Core outcomes evaluation

There is evidence from self-reported data that SHS exposure in the workplace, the primary objective of the SEAA (2003), decreased among groups still exposed after the SEA (1990). These reductions occurred equitably among Māori and non-Māori (see section 11.1.4). There was also evidence that air quality substantially improved in the hospitality sector. However, there may be still a significant proportion (around 8%) of the workforce, particularly men in

industrial settings, who may be exposed to indoor SHS in the workplace. However, this was based on self-reported data from a relatively small number of subjects.

We found no evidence for an impact on hospitalisation rates for SHS-associated diseases in the general population in the year following SEAA implementation. However, this does not mean there have been no health benefits, since there were many reasons why finding such an effect was unlikely. There was no data on plausible immediate health impacts among groups such as hospitality workers who were still heavily exposed to SHS in the workplace prior to the SEAA (2003).

### **11.1.3. Non-core outcomes evaluation**

There had been speculation that comprehensive smokefree legislation would increase SHS exposure in the home, as smokers were no longer able to smoke in pubs and bars. We found no evidence to support this view. Indeed, there was evidence from the HSC Monitor Surveys that SHS exposure in homes reduced following implantation of the SEAA (2003), though this was less clearly demonstrated in the Year 10 Smoking survey data. Ideally, confirmatory objective evidence is required, using biomarkers to investigate these trends.

There was no convincing evidence of an impact of the SEAA (2003) on smoking prevalence and consumption. This may be due to a lack of robust data, and the short timeframe for evaluation post implementation. There was clear evidence of reductions in socially-cued smoking and also of increased calls to the Quitline in period after implementation, suggesting that the SEAA (2003) had other positive impacts on smoking-related behaviours which may result in reductions in smoking prevalence.

The evidence of economic impacts had some limitations since it came largely from routinely collected time-series data, rather than in-depth studies conducted specifically to evaluate the impact of the SEAA (2003). The data that were available suggested a broadly neutral effect, with no evidence of a significant impact on the hospitality industry including bars, where opponents had predicted the most severely negative effects, and some evidence of a positive impact on the restaurant and café sector. A fall in gambling expenditure and problem gambling may have been due to the SEAA (2003) and/or the regulations introduced by the 2003 Gambling Act.

#### **11.1.4. Impact on Māori**

##### ***Introduction***

The SEAA (2003) does not include explicit objectives to reduce SHS exposure or smoking prevalence among Māori. However, objectives to reduce disparities can reasonably be inferred, given the greater exposure to SHS and smoking prevalence among Māori prior to implementation of the SEAA (2003), and the commitments within key government health strategies to improving Māori health in general, and specifically to reduce the impact of tobacco smoking in Māori communities (see section 4.1). These include the National Māori Tobacco Control Strategy, National Tobacco Control plan, and the New Zealand Health Strategy (Ministry of Health, 2000, 2003a, 2005a). In addition, within the Māori Health strategy 'He Korowai Oranga', there is a commitment to partnership and participation in relation to the development and decision-making for health related services and delivery. (Ministry of Health, 2002)

Performance against each of these dimensions is summarised in the following sections using the same process and outcomes structure as used in the rest of the report. An assessment of the degree of Māori participation and partnership in the development and implementation of the SEAA (2003), and in the preparation of this review to the process section has been added.

##### ***Process evaluation***

###### **1. Māori involvement in the preparation of this evaluation**

The editorial team included three Māori researchers, Heather Gifford (HG), Marewa Glover (MG), and Andrew Waa (AW). All have a special interest in tobacco and its effects on Māori communities. All contributed extensive comments on drafts of the report. MG contributed to the discussions in drawing up the initial evaluation proposal, and AW was involved throughout in detailed discussions about methods and content, and additional analysis of HSC data during preparation of the report. HG carried out the interviews with Māori stakeholders which are described in sections 6.2.7 and 6.3.7.

###### **2. Māori partnership and participation in developing and implementing the 2003 Smoke-free Amendment Act**

It is beyond the brief of this evaluation to perform a detailed analysis of the degree of Māori partnership and participation in developing and implementing the SEAA (2003). However, the Māori stakeholder interviews indicated strong support for the smokefree policy among Māori politicians and tobacco control communities.

Detailed assessment of the degree of adherence to the principles and provisions of the Treaty of Waitangi was also not a key component in this evaluation. However, in the Māori stakeholder interviews, participants were asked if there were any particular issues that arose for Māori communities as a result of the implementation of the smoke free workplaces and public places provisions of the SEAA (2003). This did not appear to be the case. Interviewees were generally supportive of the SEAA (2003) and the manner of its introduction.

### **3. Knowledge, attitudes and beliefs about second-hand smoke, smoke free workplaces and public places, and support for the Smoke-free Environments Amendment Act (2003)**

Evidence presented in sections 5.3.1-5.3.3 suggests that beliefs in the dangers of SHS, support for the rights of non-smokers, and support for the SEAA (2003) ban on smoking in restaurants and pubs and bars were similar in Māori and non-Māori prior to implementation. The evidence suggests that there were similar trends in increasing support for the rights of non-smokers and the SEAA (2003) provisions subsequently. Indeed, the HSC Monitor survey data suggested that support among Māori for bans on smoking in pubs and restaurants was about 5% less in 2004, but by 2006 was almost the same as for non-Māori (table A1.5).

### **4. Compliance and enforcement of the Smoke-free Environments Amendment Act (2003)**

The Māori stakeholders interviewed raised few issues about the process of implementation of the SEAA (2003) for Māori. One interviewee described a lack of information available for Māori communities, though others disagreed. The lack of te reo (Māori language) resources was noted. There were mixed views about the issue of smokefree maraes, with some participants saying it is a self-determination (tino rangatiratanga) issue for Māori communities, that needs to be decided by individual whanau, hapu and iwi; while others expressed disappointment that marae were not included in the SEAA.

## *Core outcome evaluation*

### **1. Secondhand smoke exposure in the workplace**

There was evidence from the NRB and HSC Monitor surveys carried out prior to the SEAA (2003) implementation, of increased SHS exposure in the workplace among Māori (see section 7.3.2). The HSC Monitor surveys from 2003-2006 showed that self-reported workplace SHS exposure decreased markedly after implementation of the SEAA (2003), and that the differentials in SHS exposure between Māori and non-Māori had virtually disappeared by 2006 (see figure 7.3.2).

### **2. Health Outcomes**

There were no data available on changes in health outcomes specific to Māori.

## *Non-core outcome evaluation*

### **1. Non-workplace secondhand smoke exposure**

The data on self-reported SHS exposure in the home from the HSC Monitor and Year 10 Smoking surveys are described in section 7.3.5. The HSC surveys suggested that trends of reductions in reported SHS exposure, and increases in homes reported as smokefree were more marked in Māori households. As a result, residual differences in SHS exposure were largely due to increased smoking prevalence rather than an increased tendency to allow smoking in the home (as had been the case prior to the SEAA (2003)). However, these trends were less clear in the Year 10 Smoking survey, which may be less susceptible to bias. Hence this is an area requiring further research (see below).

### **2. Smoking prevalence and smoking-related behaviours**

There were very little data available in the published analyses about changes in smoking-related behaviours and prevalence among Māori. This data could potentially be obtained from the AC Nielsen smoking prevalence data, and Year 10 Smoking survey data on reported parental smoking. The HSC Monitor data suggested there were similar rates of socially-cued smoking among Māori in hospitality settings in 2003-4 prior to the SEAA (2003), and that the reductions in socially-cued smoking in 2005-6 occurred equally among Māori and non-Māori (tables A1.14-A1.16). The Quitline data did not demonstrate any great change in the proportion of Māori callers to the Quitline following implementation of the SEAA (2003).

### **3. Economic impacts**

There were little data available on economic impacts of the SEAA (2003) specific to Māori businesses and Māori communities. Patronage of hospitality venues was similar between Māori and non-Māori before and after the SEAA (2003) – table A17-A19.

### ***Conclusions***

The overall picture from the evaluation of the SEAA (2003) from a Māori perspective was very positive. There was strong support for the smokefree provisions of the SEAA (2003) and the underlying principles of the rights of non-smokers to protection from SHS among Māori. Implementation did not appear to have raised any specific problems within the Māori community, though this was based on evidence from a small number of stakeholder interviews.

There was evidence of a large reduction in workplace SHS exposure among Māori, with differentials in self-reported SHS exposure between Māori and non-Māori almost eliminated. There was some evidence of a positive effect on exposure to SHS in the home, although non-smokers in Māori households remained more likely to be exposed. To our knowledge, this is the first time that the specific effects of smokefree legislation on indigenous communities have been described.

Uncertainties and gaps in the evidence include objectively verified levels of SHS exposure in non-workplace settings such as homes and cars, whether Māori are over-represented among those still exposed to SHS in residential institutions, and the effect of changes in SHS exposure on health impacts among Māori.

## **11.2. Summary critique of data sources and evaluation studies**

The available data came from a mix of specially commissioned studies, ongoing studies, and routine statistics.

Routine data, which was the main source of evidence for economic effects, often has limitations since it is used for a specific purpose for which it was not designed. This is certainly true of the economic data, where it would have been useful to have detailed data series such as turnover, profits, and employment for specific sub-sectors; as well as comprehensive information on possible confounding factors such as changes in population income, price of products and services in the sector, and changes to other relevant regulations. Similarly, for the health impacts data, the evidence came from routinely available hospitalisation data. As a result, there was no information on the rates of exposure to SHS and

smoking, and changes in other risk factor levels among those admitted with potentially smoking- or SHS-related diseases.

The ongoing and specially commissioned studies were generally of high quality. The biggest potential problems were:

- low-response rates which may have resulted in selection bias
- use of self-reported SHS exposure without corroborating information from biomarkers data
- lack of coverage of some key areas – for example: rural pubs and non-hospitality workplaces in studies of compliance and air quality; and evidence of health impacts among heavily exposed workers such as bar workers

Finally, nearly all the evaluation studies described in this report, use a simple before-after approach, without any comparison control group(s). Smoking, health impacts, and smoking-related behaviours which influence exposure to SHS in different settings are changing over time, as are economic indicators. Examples from this report are changes in: SHS exposure in the home, overall tobacco consumption, hospital admissions for AMI and unstable angina, and in employment and sales in different sectors of the economy. These trends may also be influenced by a wide range of potential confounding determinants. Without a long run of observations before and after the SEAA (2003), and detailed information on changes in possible confounding determinants, it is not possible to deduce precisely the effect of the legislation.

Generally the information about confounders is very limited, and most of the data series are restricted to a few time points before the legislation, and data from only 12-18 months after. Therefore, except where there are dramatic changes after introduction of the SEAA (2003), as for example with the reduction in the increase in cotinine levels after bar visits in the ESR study, conclusions about impact of the SEAA (2003) are not certain.

# Glossary

<b>Term</b>	<b>Definitions</b>
Hospitality industry	Hospitality industry is used in this report to refer to pubs, bars, members' clubs, nightclubs, cafes, restaurants, hotels, motels and other businesses whose main purpose is to serve food and drink and provide serviced temporary accommodation.
Secondhand smoke (SHS) exposure	Secondhand smoke exposure is secondary exposure of individuals to tobacco smoke as a result of others smoking tobacco.
Smokefree legislation	Smokefree legislation in this report refers to legislation or policies which make all or almost all workplaces, including hospitality industry settings, totally smokefree; with no smoking at all allowed in any indoor area.
Socially cued smokers	Smokers who smoke more in specific social settings – such as when out with friends in pubs and bars
Socially cued smoking	Smoking which occurs in specific social settings – such as in pubs and bars or restaurants

# Abbreviations

Abbreviation	Description
AMI	Acute Myocardial Infarction ('heart attack')
ASH	Action on Smoking and Health
CBD	Central Business District
CDC	Centers for Disease Control
COPD	Chronic Obstructive Pulmonary Disease (includes conditions commonly known as chronic bronchitis and emphysema)
CPI	Consumers Price Index
DHB	District Health Board
ESR	Institute of Environmental Science Research
FTE	Full time equivalent
HANZ	Hospitality Association of New Zealand
HSC	Health Sponsorship Council
NGO	Non-Governmental Organisation
NRB	National Research Bureau
NRT	Nicotine replacement therapy
PM <sub>2.5</sub>	2.5 µm or less diameter particulate matter (also known as respirable or fine particles)
SEA (1990)	Smoke-free Environments Act (1990)
SEAA (2003)	Smoke-free Environments Amendment Act (2003)
SES	Socio-economic status
SHS	Second hand smoke (also known as: passive smoke; environmental tobacco Smoke; tobacco smoke pollution)
WHO	World Health Organization

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