

Protecting Workers from Secondhand Smoke in North Carolina

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Abstract

Background: Exposure to job-related secondhand smoke represents a significant, but entirely preventable occupational health risk to non-smoking workers. This article examines trends in smoke-free workplace policies in North Carolina. We also examine whether workers comply with such policies.

Methods: Data from the Census Bureau's Current Population Survey were analyzed from 1992 through 2002. Trends for North Carolina workers are compared with workers nationally, and trends are presented by age, race, gender, and type of worker.

Results: North Carolina ranks 35th in the proportion of its workforce reporting a smoke-free place of employment. The proportion of workers reporting such a policy doubled between 1992 and 2002. Females were more likely to report a smoke-free work environment (72.0%, CI +/-2.6) than males (61.2%, CI +/-4.6%). Blue-collar (55.6%, CI +/-5.5) and service workers (61.2%, CI +/-8.4), especially males, were less likely to report a smoke-free worksite than white-collar workers (73.4%, CI +/-2.6). Compliance with a smoke-free policy does not appear to be an issue, only 3.2% of workers statewide reported someone had violated their company's nonsmoking policy.

Conclusion: While some progress has been made in North Carolina to protect workers from secondhand smoke, significant disparities exist. Smoke-free policies can make a significant difference in reducing exposure to airborne toxins and their associated diseases, and these protective public health policies have not been shown to reduce business revenues. Much has been done to assure the health and safety of workers through public health policy. However, opportunities to protect North Carolina workers from the health effects of secondhand smoke are limited by a preemptive state law.

Key Words: Secondhand smoke, environmental tobacco smoke, occupational status, public health policy, CPS, NCI.

Introduction

A series of authoritative reports have conclusively demonstrated that exposure to secondhand smoke is a significant health threat to non-smokers, increasing the risk for lung cancer, coronary artery disease, asthma and other lung diseases, and Sudden Infant Death Syndrome.¹⁻⁵ New evidence indicates there are health risks for even a brief exposure to secondhand smoke for individuals with preexisting heart disease. In Helena, Montana, a comprehensive local ordinance that banned smoking in all indoor public places,

including worksites, was associated with a 40% decline in hospital admissions for acute myocardial infarction during the six months the ordinance was in effect, only to rebound after the ordinance was suspended following a legal challenge.⁶ The Helena study prompted the Centers for Disease Control and Prevention to review the literature and to issue a commentary on the public health risks of secondhand smoke, stating, "All patients at risk of coronary heart disease or with known coronary artery disease should be advised to avoid all indoor environments that permit smoking."⁷

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The United States workforce has undergone fundamental change in workplace smoking restrictions. Fifteen years ago the United States Congress banned smoking aboard all commercial airlines⁸ out of concern for the health of flight attendants who were routinely required to work in the smoking section of the aircraft. At least 11 states* have now enacted comprehensive legislation mandating that most places of employment, including restaurants and/or bars, be smoke-free. These states join hundreds of local communities that have passed totally smoke-free workplace ordinances.⁹

In this important area of occupational health protection, states with historical, economic, and political ties to tobacco, like North Carolina, have traditionally lagged behind other states and the nation.¹⁰ The purpose of this article is to examine trends in smoke-free workplace policies in North Carolina. The data presented are from the Census Bureau's Current Population Survey (CPS).** Trends in the state are compared with trends nationally and among select surrounding states. We also examine the degree to which workers in the state comply with rules that prohibit smoking at their place of employment.

Methods

The CPS is a continuous monthly survey that has been conducted by the Census Bureau for the Bureau of Labor Statistics since 1940, focusing on labor force indicators for the civilian non-institutionalized population of the United States ages 15 and older. In 1992, the National Cancer Institute (NCI) sponsored a 40-item Tobacco Use Supplement to the CPS, which included, among other items, questions about official workplace smoking policies and the nature and characteristics of those policies. The Supplement was conducted over four time periods, 1992-1993, 1995-1996, 1998-1999, 2001-2002. The monthly CPS sample consists of approximately 56,000 eligible housing units in 792 sampling areas. All strata are defined within state boundaries, and the sample is allocated among the states to produce state, Census region and division, and national labor force estimates, keeping the total sample size to a minimum. Response rates to the CPS labor force core questionnaire is about 95% and between 85-89% for the NCI Tobacco Use Supplement.

Worker Eligibility Criteria

Routine labor force questions from the CPS core were used to determine each respondent's employment status and to categorize each worker into a standard occupational group. Because the primary area of interest for this report was the extent of official workplace smoking policies for indoor working

environments in North Carolina, additional questions were used to identify eligible respondents. To be included in the analysis, individuals must have been 15 years of age or older and (1) employed either full- or part-time at the time of interview, (2) employed outside the home but not self-employed, (3) not working outdoors or in a motor vehicle, (4) not traveling to different buildings or sites, and (5) not working in someone else's home. Applying these criteria produces 10,773 eligible indoor workers for further analysis.

Definition of Smoke-Free

All eligible respondents were queried, "Does your place of work have an official policy that restricts smoking in any way?" (note: about 2% of subjects responded "don't know" and were excluded from the analyses). Those who responded "yes" were also asked: "Which of these best describes your place of work's smoking policy for indoor public or common areas, such as lobbies, restrooms, and lunch rooms?" and "Which of these best describes your place of work's smoking policy for work areas?" Response choices for each were: "Not allowed in any ..." "Allowed in some ..." or "Allowed in all ..."

Workers who reported that their employer had an official policy that restricted smoking and did not permit smoking in any public or common areas or in the work area, were considered to be working in a smoke-free environment. This definition is identical to that used in other national and state-based reports.⁹⁻¹³ For compliance, only workers with smoke-free policies were included in the analysis.

Statistical Analysis

Statistical analyses were performed using Statistical Analysis Systems software, version 8.02.¹⁴ Supplement weights, adjusted for overall Supplement non-response and Supplement self-response only, were produced using a special algorithm developed by the Bureau of Labor Statistics.¹⁵ Sudaan was used to compute standard errors and 95% confidence intervals (or margin of error) using the replicate weights that the Census Bureau constructed using Fay's methods.¹⁶

Results

The percentage of the North Carolina indoor workforce covered by a smoke-free workplace policy has increased over the ten-year period 1992 through 2002 (see Table 1). Less than a third of the state's workforce was smoke-free in 1992-1993, but by 2001-2002, slightly more than two thirds were reporting this level of protection. The trend toward smoke-free worksites

* States that have enacted comprehensive laws, the date of passage and setting affected: California (restaurants 1995, bars 1998), Maryland (workplaces and restaurants 1995), Delaware (workplaces, restaurants and bars 2002), New York (workplaces, restaurants and bars 2003), Massachusetts (workplaces, restaurants and bars 2004), Utah (restaurants 2005), Florida (restaurants 2003), Connecticut (restaurants 2003, bars 2004), Idaho (restaurants 2004), South Dakota (workplaces 2002) and Maine (restaurants and bars 2004).

** The federal government's primary data source for labor force statistics. These data cover the ten-year period 1992 through 2002.

Table 1.
Comparison of Workplace Policy Trends in North Carolina with Neighboring States and the Nation and State Rank in 2001-2002

Percent of indoor workers 15 years of age and older reporting a smoke-free workplace				
State and (rank in 2001-02)	1992-1993 % (CI) ¹	1995-1996 % (CI)	1998-1999 % (CI)	2001-2002 % (CI)
North Carolina (35)	30.8 (± 2.1)	54.4 (± 2.3)	61.0 (± 2.6)	67.3 (± 2.5)
Tennessee (39)	36.0 (± 2.1)	53.0 (± 2.8)	63.0 (± 4.2)	66.1 (± 3.6)
South Carolina (43)	37.7 (± 3.2)	58.3 (± 4.5)	63.8 (± 2.6)	65.4 (± 4.3)
Georgia (47)	46.7 (± 3.5)	56.7 (± 4.7)	66.1 (± 2.8)	63.3 (± 3.3)
Virginia (24)	43.7 (± 2.6)	62.2 (± 3.3)	70.6 (± 2.3)	71.2 (± 2.3)
All United States workers	46.3 (± 0.4)	63.4 (± 0.4)	69.0 (± 0.4)	70.9 (± 0.4)

CI = 95% confidence interval or margin of error

increased substantially during the initial three-year survey period, increasing 77% between 1992-1993 and 1995-1996, but just 24% over the next six years. As of 2001-2002, North Carolina ranks 35th among all the states in the proportion of its workforce reporting a smoke-free place of employment.

Smoke-free policies vary considerably by age and gender of the worker, with younger workers, particularly males ages 15-24, reporting lower rates of smoke-free policies (40.7% CI +/-12) than middle age male workers age 40-54 (62.0% CI +/-7.4) and older male workers age 55-64 (72.5% CI +/-10.7). Thus, less than 50% of male workers ages 15-24 are likely to be currently covered by a smoke-free policy, the lowest rate of any age group in the state, and this low rate of coverage has not changed in absolute terms since 1995-96. Overall, females are currently more likely to report a smoke-free work environment (72.0% CI +/-2.6) than males (61.2% CI +/-4.6). Rates are similar among blacks and whites throughout the 1992-2002 time period. The rates are slightly lower for Hispanic workers but these differences are not statistically significant.

While consistent progress has been observed in the effort to protect workers from job-related secondhand smoke in the

state who reported someone had violated their company's smoke-free policy in the two weeks prior to interview by smoking in their work area. Only a small percentage of the state's workforce reported a violation of a smoke-free policy over the six-year time period examined. Furthermore, compliance with such policies appears to be improving, with noncompliance decreasing from less than 5% in 1995-1996 to just 3.2% in 2001-2002, a level of compliance equal to that seen among workers nationally. Blue-collar and service workers report slightly higher rates of noncompliance than white-collar workers, a trend also observed nationally, although none of these differences are statistically significant. Despite the rapid increase in smoke-free workplace policies among workers in the state, in 2001-2002, 96.8% of all workers with such a policy indicated their place of employment was in compliance with that policy.

Discussion

The importance of secondhand smoke as a significant health risk to workers cannot be overstated. Finnish researchers calculated mortality among workers for several major diseases

state, some workers are less protected than others (see Table 2). Blue-collar and service workers are considerably less protected than white-collar workers. In 2001-2002, 52.4% (CI +/-5.8) of male blue-collar workers and 47.5% (CI +/-14.2) of male service workers were smoke-free, compared to 73.4% (CI +/-14.2) of all white-collar workers. This difference persisted across all four time periods. Females, regardless of occupational category, reported higher rates of smoke-free policies than males.

Table 3 provides estimates for smoke-free workers in the

Table 2.
Trends in Smoke-Free Policies in North Carolina by Type of Worker

Type of worker	1992-1993 % (CI) ¹	1995-1996 % (CI)	1998-1999 % (CI)	2001-2002 % (CI)
White-collar	38.3 (+/-2.1)	63.0 (+/-2.8)	68.5 (+/-2.8)	73.4 (+/-2.6)
Blue-collar	18.3 (+/-2.8)	41.6 (+/-5.0)	48.5 (+/-5.4)	55.6 (+/-5.5)
Service	29.5 (+/-4.8)	43.1 (+/-6.2)	48.6 (+/-7.6)	61.2 (+/-8.4)

CI = 95% confidence interval or margin of error.

Note: Throughout the manuscript we refer to three major occupational groups, white-collar, blue-collar and service workers. While no official definition exists for these workers, on the CPS public use data file, the Census Bureau "recodes" some 500 individual occupations into 14 major groups. Examples of white-collar occupations include people employed as managers, accountants, clerical workers, engineers, teachers, physicians, etc., blue-collar workers include carpenters, mechanics, assembly line workers, bus and truck drivers, tailors, etc; and examples of service workers are, food service workers, health technicians, personal and protective services (firefighters, guards, police), etc.

Table 3.
Compliance with Smoke-Free Workplace Policies among North Carolina Workers Compared to Workers Nationally by Type of Worker and Gender and % of Workers Reporting Someone Violated Workplace Policy in Past Two Weeks.

Type of worker/gender	1995-1996		1998-1999		2001-2002	
	% NC (CI) ¹	% US (CI)	% NC (CI)	% US (CI)	% NC (CI)	% US (CI)
All workers	4.5 (+/-1.3)	5.0 (+/-0.2)	2.6 (+/-1.1)	3.9 (+/-0.2)	3.2 (+/-1.2)	3.2 (+/-0.2)
Male	4.7 (+/-2.4)	6.1 (+/-0.4)	3.2 (+/-1.7)	4.8 (+/-0.3)	3.2 (+/-2.2)	3.9 (+/-0.3)
Female	4.3 (+/-1.3)	4.1 (+/-0.2)	2.3 (+/-1.2)	3.2 (+/-0.3)	3.3 (+/-1.4)	2.7 (+/-0.2)
White-collar	5.2 (+/-1.4)	4.2 (+/-0.2)	2.5 (+/-1.3)	3.1 (+/-0.2)	2.3 (+/-1.2)	2.5 (+/-0.2)
Service	5.8 (+/-5.2)	7.2 (+/-0.9)	3.2 (+/-3.5)	6.1 (+/-0.8)	7.0 (+/-3.3)	5.3 (+/-0.7)
Blue-collar	1.9 (+/-1.5)	7.3 (+/-0.8)	3.0 (+/-2.5)	6.1 (+/-0.7)	4.4 (+/-3.7)	5.4 (+/-0.6)

CI = 95% confidence interval or margin of error.

related to secondhand smoke and estimated that such exposures were responsible for 2.8% of all lung cancer deaths, 4.5% of deaths from asthma, and 3.4% of all coronary heart disease deaths.¹⁷ Other investigators have demonstrated that food service workers experience a lung cancer death rate that is 50 percent higher than the general population even after controlling for active smoking.¹⁸ More recently, the Centers for Disease Control and Prevention has estimated that secondhand smoke is a cause of 38,000 premature deaths annually in the United States, the majority from cancer and heart disease,¹⁹ although millions more are made ill and lose work from asthma, pneumonia, bronchitis and other respiratory problems.⁴

When smoking is permitted in indoor environments, the quality of the indoor air quickly becomes unhealthy, not only for workers, but patrons and visitors alike. When smoking is eliminated, improvements in air quality are almost immediate, even in heavily polluted bars and restaurants. Air quality researcher James Repace recently measured the levels of particle-bound polycyclic aromatic hydrocarbons (PPAH) and fine particle respirable suspended air pollutants (RSP) in eight hospitality venues in Delaware just prior to and several weeks after a statewide clean indoor air law was implemented.²⁰ PPAH levels in the eight venues prior to implementation of the statewide ban averaged five times the level found in outdoor air, while the average level of RSP was 15 times the level allowed in outdoor air under the United States National Ambient Air Quality Standards (NAAQS). Implementation of the law was associated with a 90-95% reduction in both RSP and PPAH levels. Similar results have been observed elsewhere.^{21,22} Repace calculated that to bring a typical bar with average smoking prevalence into compliance with the NAAQS for fine particle air pollutants would require more than 80 air changes per hour.²²

In North Carolina, opportunities to protect workers from the health effects of secondhand smoke through public health policy are limited by a preemptive law. In 1993, the state legislature passed a law that required state-controlled buildings to set aside 20% of their space for smoking and prohibited local regulatory boards from enacting stronger provisions unless the

legislation was enacted before the state law would take effect in October of that year.²³ A total of 105 local ordinances were in effect by the October date, 89 of which had been fast tracked to beat the deadline. A legal challenge to one ordinance, contending that boards of health are not elected officials and do not have the authority to rule on this particular issue, was eventually appealed to the North Carolina District Court. The subsequent ruling invalidated almost all of the 89 newly enacted ordinances,²⁴ forcing most communities to suspend legal enforcement of their ordinances.

Some progress has been made within the state to protect workers from the health effects of secondhand smoke through voluntary efforts, but such efforts have created significant differences in coverage between different categories of workers. The local Health Directors Association initiated an aggressive statewide education campaign encouraging local governments and others to adopt smoke-free policies in 1993,²⁵ and North Carolina Project ASSIST began educational campaigns to encourage businesses to adopt voluntary policies.²⁶ As a result, the proportion of the state's workforce reporting a smoke-free place of employment increased from three-in-ten workers in 1992-1993 to nearly seven-in-ten workers by 2001-2002, with most of the increase occurring during the time of the state-sponsored educational campaign.

However, significant disparities exist. While more than seven-in-ten white-collar workers in the state work in smoke-free settings, blue-collar and service workers lag significantly behind, and blue-collar workers are more likely than other workers to be exposed to other hazardous agents in the workplace. The smoke-free rate among service workers in North Carolina is similar to the rate reported by service workers nationally in 2001-2002, although male service workers in the state report significantly lower rates of smoke-free policies than other workers (less than 50% are smoke-free). Many of these workers are employed in the food service sector of the economy. A recent study of 38 major occupations showed food service workers were the least protected from job-related secondhand smoke. Just 28% of waiters/waitresses and 13% of bartenders report working under a smoke-free workplace policy.²⁷ According

to the Bureau of Labor Statistics, 275,000 North Carolinians were employed in restaurants and bars in August 2004 compared to 160,000 at the beginning of 1990, an increase of 70%, making it one of the more significant and fastest growing segments of the state's workforce.²⁸ More than 50% of these workers are women. Given the low level of smoke-free policy coverage among service workers in the state and nationally, it is likely that a large proportion of the quarter-million bar and restaurant workers in North Carolina are also at risk from job-related secondhand smoke.

There is evidence that suggests immediate improvements in the health status of bar and restaurant workers after implementation of a smoke-free law. Eisener et al.²⁹ in a study of 53 California bartenders, documented improvements in pulmonary function and respiratory symptoms one month after a statewide smoke-free law went into effect. Sargent et al. observed a 40% reduction in hospital admissions for acute myocardial infarctions in Helena, Montana following implementation of a smoke-free ordinance that included bars and restaurants.⁶ The elimination of secondhand smoke from all hospitality venues, such as bars and restaurants, could have a significant impact on the health of this large and growing segment of the state's workforce.

Smoke-free policies do not hurt business revenue, even in restaurants and other hospitality venues. Recently published economic analyses in California, New York, and elsewhere have clearly demonstrated that smoke-free laws are essentially revenue neutral, that is, they neither increase nor decrease revenue when implemented.³⁰⁻³⁵ In 2003, Scollo and colleagues³⁶ reviewed 97 studies on the economic impact of smoke-free policies, including studies funded by the tobacco industry. None of the 60 independently funded studies found any significant, long-term economic effects associated with smoking bans in restaurants and bars. Of the 27 studies that controlled for other economic factors and used objective measures to assess impact, none showed a negative effect. Zagat, the world's leading provider of survey-based consumer dining behavior, found that 72% of 110,000 American restaurant-goers surveyed for its 2005 poll indicated their eating-out habits would not change if smoke-free policies were put into effect in restaurants, while 26% said they would eat out more often, versus only 3% who said they would eat out less often.³⁷

The findings of this study are based on a series of cross sectional surveys conducted by the US Census Bureau for its Current Population Survey (CPS) and covering the period 1992 through 2002. Information on official worksite smoking policies is based on responses obtained from employees and not worksite managers or business owners. Data derived from workers are likely more accurate than a survey consisting of responses from workplace managers or owners for several reasons. First, almost all surveys of worksites published to date,¹¹ exclude

small businesses from their sampling frame, yet, according to the Census Bureau, small companies (<50 employees) employ 42% of all workers and make up more than 95% of all businesses in the US. Thus, worksite surveys provide an incomplete picture of worksite smoking policies. Second, worksite surveys typically rely on a response from a single individual, usually a company official, who responds for the entire company. In the COMMIT trial consisting of 11 communities of varying size in North America, Glasgow et al,³⁸ reported that individual workers reported rates of smoke-free policies that were lower than those reported by management-level representatives. Finally, the CPS has an excellent track record for obtaining accurate worksite and employment data. Since 1940 the CPS has been the federal government's main data source for monthly labor force statistics.

The primary purpose of this paper was to focus on differences in smoke-free policies by examining a number of demographic and employment variables as a means of highlighting which workers are currently not protected from the dangers of secondhand smoke in North Carolina. Multivariate analysis could provide some insight regarding which factors are independently associated with workplace smoking policy but such analysis is beyond the scope of this report. Variables such as age, gender, type of worker, work site and smoking status could serve as confounders of specific trends reported in this study. Previously published data demonstrate that smokers report significantly lower rates of smoke-free policies than nonsmokers.¹¹ Smokers tend to be younger and less educated than nonsmokers and blue-collar and service workers report significantly higher cigarette use rates than white-collar workers.

Conclusions

Second hand smoke is a well-established health hazard. While some progress has been made in North Carolina to protect workers from secondhand smoke, significant disparities exist. Smoke-free policies can make a significant difference in reducing exposure to airborne toxins and their associated diseases and these protective public health policies have not been shown to reduce business revenues. Much has been done to assure the health and safety of workers through public health policy. However, opportunities to protect North Carolina workers from the health effects of secondhand smoke are limited by a preemptive state law. **NCMedJ**

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