

The Health Consequences of Involuntary Exposure to Tobacco Smoke

A Report of the Surgeon General



Department of Health and Human Services

Chapter 10

Control of Secondhand Smoke Exposure

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Table 10.10 Percentage of indoor workers aged 18 years or older who reported smoke-free workplace policies, by geographic region and gender, United States, 1992–2002

Geographic region and gender	1992–1993 (%)	1995–1996 (%)	1998–1999 (%)	2001–2002 (%)
Overall	46.65	63.85	69.34	71.15
Men	40.46	58.05	63.95	66.41
Women	51.70	69.02	74.08	75.21
Northeast	45.13	65.87	72.85	76.22
Men	38.45	60.75	68.46	72.19
Women	50.95	70.48	76.72	79.62
Midwest	41.69	58.99	65.70	67.94
Men	34.82	51.20	58.31	61.48
Women	47.37	65.99	72.23	73.54
South	44.64	61.43	66.96	67.64
Men	38.53	55.47	61.13	62.14
Women	49.13	66.41	71.82	72.11
West	58.28	72.00	74.35	75.86
Men	52.75	67.69	70.72	73.24
Women	63.16	76.20	77.81	78.28

Sources: U.S. Department of Commerce, Census Bureau, National Cancer Institute Sponsored Tobacco Use Supplement to the Current Population Survey, public use data tapes, 1992–1993, 1995–1996, 1998–1999, 2001–2002.

smokers reported significantly higher rates of smoke-free policy coverage compared with current smokers (Table 10.12). In both 1992 and 2000, a larger percentage of nonsmokers than smokers reported employer policies that restricted smoking in work areas, but this question was only asked of individuals who had reported the existence of an employer smoking policy (USDHHS, CDC, NCHS, NHIS, public use data tapes, 1992, 2000).

Variations by Educational Attainment

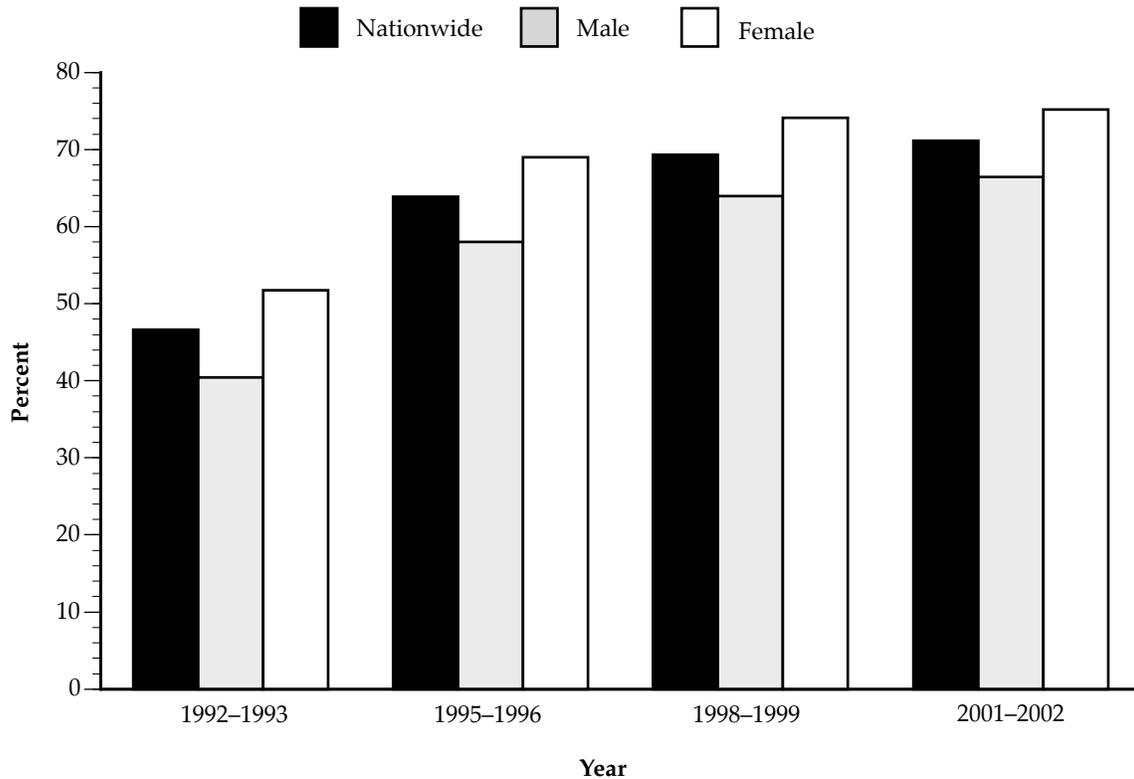
Using the CPS data across all years (Shopland et al. 2002), smoke-free worksite coverage was strongly associated with the worker's level of education (Figure 10.7). In 2002, about 57 percent of indoor workers with less than a high school education reported a smoke-free worksite, compared with 71 percent with some college education, and 81 percent with 16 or more years of education. The same trends were observed in the NHIS data (USDHHS, CDC, NCHS, NHIS, public use data tape, 2000), although the reported levels of smoke-free worksite policy coverage were higher for each educational category in the 2000 NHIS data (except those with less than a high school diploma) compared with the 1999 CPS data.

Workplace Settings with High Exposure Potential

A number of workplaces related to the entertainment and hospitality industries, including restaurants, bars, and casinos, continue to present the potential for high levels of worker exposure to secondhand smoke. This potential for higher exposure reflects the frequent exemption of these settings from state and local clean indoor air laws and the generally higher levels of smoking, primarily by patrons, in such locations.

Restaurant and bar workers are far less likely than other workers to be protected by smoke-free workplace policies, more likely than other workers to have these policies violated where they do exist, and more likely to be exposed to high levels of secondhand smoke on the job. Data from the CPS Tobacco Use Supplement document that workers in the food preparation and services occupation were less likely than employees in any other occupational category to report a workplace policy in place that designated both work areas and public or common areas as smoke-free (Shopland et al. 2004). As of 1999, only 42.9 percent of food preparation and service workers surveyed reported such a policy compared with 69.3 percent of U.S. indoor workers overall. For the more specific food service job categories of waiters/

Figure 10.4 Percentage of indoor workers aged 18 years or older who reported smoke-free workplace policies, by gender, United States, 1992–2002



Sources: U.S. Department of Commerce, Census Bureau, National Cancer Institute Sponsored Tobacco Use Supplement to the Current Population Survey, public use data tapes, 1992–1993, 1995–1996, 1998–1999, 2001–2002.

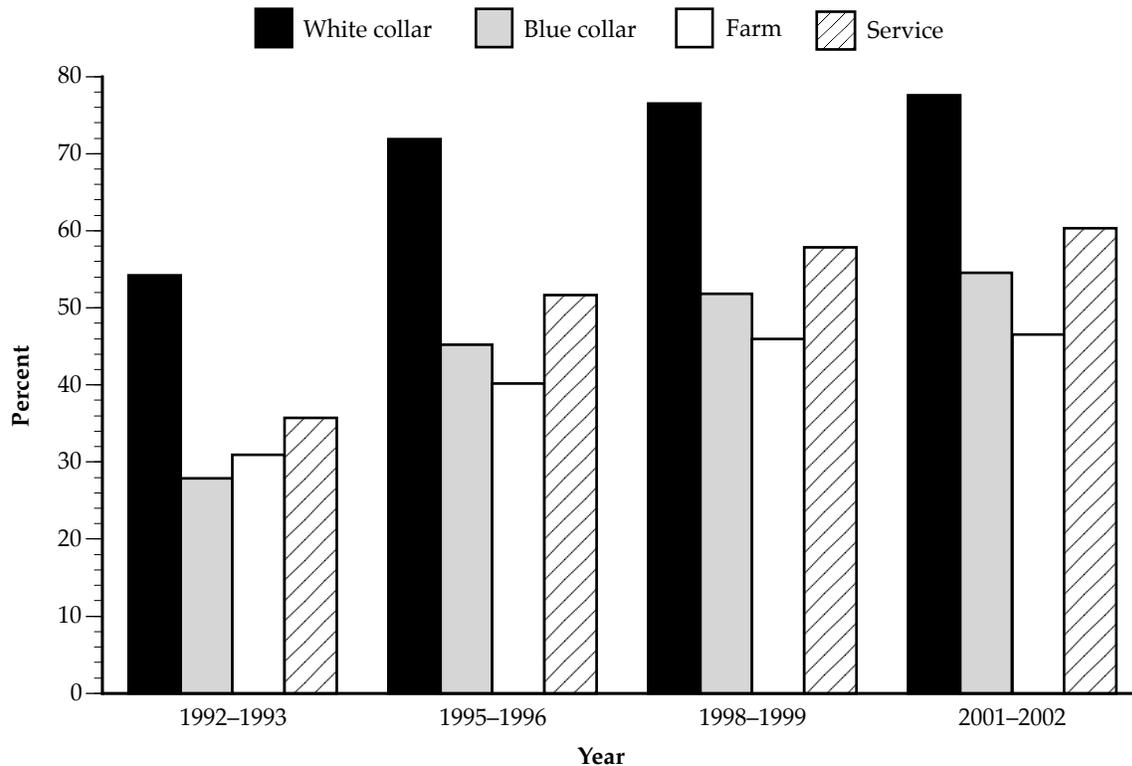
waitresses and bartenders, the proportions of employees reporting such a policy were even lower: 27.7 percent and 12.9 percent, respectively. Moreover, while only 3.8 percent of all U.S. workers who worked under a smoke-free workplace policy reported that someone had smoked in their work area during the two weeks preceding the interview, the corresponding figure for food service workers was 6.4 percent (compared with 3.7 percent for nonfood service workers), and the figures for waiters/waitresses and bartenders were 12.9 percent and 32.2 percent, respectively (although in the latter two cases the confidence intervals [CIs] are quite wide).

Wortley and colleagues (2002) analyzed the objective indicator of cotinine levels among nonsmoking adult workers surveyed in the 1988–1994 Third National Health and Nutrition Examination Survey (NHANES III) who reported no home exposure to

cigarette smoke; their findings are consistent with these results. The study found that waiters/waitresses had the highest geometric mean serum cotinine level and the highest proportion of workers with a cotinine level above the accepted cutoff point used to indicate secondhand smoke exposure compared with any of the occupational categories examined. The study also reported higher cotinine levels among blue collar and service occupations and lower cotinine levels among white collar occupations. Occupations with higher worker cotinine levels tended to be those in which other studies have reported that smaller proportions of workers were protected by smoke-free workplace policies (Wortley et al. 2002).

In a review of studies with reported mean concentrations of several relevant airborne substances, such as CO, nicotine, and respirable suspended particulates, Siegel (1993) found that the levels of

Figure 10.5 Percentage of indoor workers aged 18 years or older who reported smoke-free workplace policies, by occupational status, United States, 1992–2002



Sources: U.S. Department of Commerce, Census Bureau, National Cancer Institute Sponsored Tobacco Use Supplement to the Current Population Survey, public use data tapes, 1992–1993, 1995–1996, 1998–1999, 2001–2002.

secondhand smoke in restaurants were 1.6 to 2.0 times higher than in offices and 1.5 times higher than in homes with at least one smoker. Levels in bars were 3.9 to 6.1 times higher than in typical office settings and 4.4 to 4.5 times higher than in homes with at least one smoker. Siegel (1993) also reviewed epidemiologic studies that provided lung cancer risk estimates for food service workers. He concluded that compared with the general population, these workers have an estimated 50 percent greater risk of developing lung cancer, in part attributable to secondhand smoke exposure on the job.

Workers in casinos that allow smoking comprise another group at high risk for exposure to secondhand smoke (Davis 1998). A 1995 study of casino workers documented the presence of nicotine in the air inhaled by the workers and an increase

in serum cotinine levels across the work shift (Trout et al. 1998). The mean cotinine level in these workers was higher than for participants in NHANES III (1988–1991) who reported secondhand smoke exposure at work. A recent study found that patrons who had spent four hours in a casino where smoking was allowed experienced statistically significant increases in 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol, a tobacco-specific lung carcinogen (Anderson et al. 2003). The study concluded that exposure of a nonsmoker to secondhand smoke in a casino results in the uptake of this carcinogen. This finding has implications for casino employees who are likely to spend significantly more time than patrons in these environments. The authors noted that “on the basis of our results and other studies, one would expect that carcinogen levels in nonsmoking casino

Table 10.11 Percentage of indoor workers aged 18 years or older who reported smoke-free workplace policies, by age and gender, United States, 1992–2002

Characteristic (years)	1992–1993 (%)	1995–1996 (%)	1998–1999 (%)	2001–2002 (%)
Age				
18–24	39.65	55.54	60.34	63.19
25–44	47.40	64.17	69.16	70.93
45–64	48.82	67.35	73.82	74.91
≥65	46.51	63.49	69.77	72.85
Men				
18–24	33.29	50.12	54.92	58.52
25–44	40.83	58.29	63.74	66.05
45–64	43.35	61.61	68.66	70.31
≥65	41.94	58.02	62.86	68.26
Women				
18–24	44.64	60.43	64.86	66.89
25–44	52.89	69.57	74.17	75.34
45–64	53.15	72.18	78.09	78.65
≥65	49.77	67.97	75.63	76.46

Sources: U.S. Department of Commerce, Census Bureau, National Cancer Institute Sponsored Tobacco Use Supplement to the Current Population Survey, public use data tapes, 1992–1993, 1995–1996, 1998–1999, 2001–2002.

employees would increase as a result of ETS [environmental tobacco smoke] exposure at their worksite” (Anderson et al. 2003, p. 1545).

Siegel and Skeer (2003) identified additional specialized workplace settings that appear to have high potential for worker secondhand smoke exposure. The authors reviewed existing data on secondhand smoke exposure in bars, bowling alleys, billiard halls, betting establishments, and bingo parlors, measured by ambient nicotine air concentrations. Nicotine concentrations in these venues were 2.4 to 18.5 times higher than concentrations in offices or residences and 1.5 to 11.7 times higher than concentrations in restaurants. The authors concluded that these exposure levels may subject workers in those venues to (working) lifetime excess lung cancer mortality risks that substantially exceed the typical de manifestis risk level that triggers regulatory action (Siegel and Skeer 2003).

Data from the CPS Tobacco Use Supplement suggest that certain population groups are more likely to work in food preparation and service jobs and in other occupations where they are less likely than other workers to be covered by smoke-free workplace policies. These groups include teens and young adults (Gerlach et al. 1997), persons of low SES (Shopland et al. 2004), and Hispanics (Shopland et al. 2004).

Compliance with Workplace Smoking Policies

In the past, most studies focused on assessing whether workplace smoking policies were in place and describing the provisions of those policies. Less emphasis had been placed on assessing compliance with the policies. To ascertain worksite compliance with smoking policies, the 1996 and 1999 CPS asked all employees who reported working under an official policy that prohibited smoking in work areas and in public or common areas whether anyone had smoked in their work area at any time during the two-week period before their interview (USDOC 2004). In both 1996 and 1999, Shopland and colleagues (2001) noted very low rates of infractions overall (Table 10.13) and few differences by geographic region. In 1999, 3.8 percent of all U.S. workers covered by a smoke-free workplace policy reported that someone had smoked in their work area during the two weeks preceding the interview (Shopland et al. 2004). As noted earlier, this figure was substantially higher for food preparation and service workers (6.4 percent) compared with nonfood service workers (3.7 percent). The figures for waiters/waitresses and bartenders were 12.9 percent and 32.2 percent, respectively.