Original Investigation

Implementation of a Smoke-free Policy in Subsidized Multiunit Housing: Effects on Smoking Cessation and Secondhand Smoke Exposure

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Abstract

Introduction: We studied the impact of implementing a comprehensive smoke-free policy in multiunit housing in the Portland, Oregon metropolitan area. Among low-income tenants living in a subset of subsidized multiunit buildings, we evaluated cessation-related behaviors, policy knowledge and compliance, and secondhand smoke (SHS) exposure.

Methods: We mailed a self-administered questionnaire to a random sample of 839 current tenants of 17 subsidized buildings 4 months after policy implementation in January 2008 and sent another questionnaire to participants 1 year later. Results are based on 440 tenants who completed both surveys.

Results: We observed a self-reported annualized quit rate of 14.7% over the study period (95% *CI* = 7.9%–21.6%) compared with a historical quit rate in this population of 2.6% (95% *CI* = 0.6%–4.5%). Almost half of ongoing smokers reduced their cigarette consumption. More smokers correctly reported policy rules for indoor settings than for outdoor settings; self-reported indoor smoking decreased significantly from 59% to 17%. Among nonsmokers, frequent indoor SHS exposure (multiple times per week) decreased significantly from 41% prepolicy to 17% postpolicy.

Conclusions: The implementation of a smoke-free policy was associated with positive changes in cessation-related behaviors and reduced SHS exposure in this population of low-income adults.

Introduction

In spite of dramatic declines in tobacco use among American adults since the 1960s, people of lower socioeconomic status (SES) continue to have high smoking prevalence (Centers for Disease Control and Prevention [CDC], 2010a) and greater exposure to secondhand smoke (SHS; CDC, 2010b). It is well established that SHS is causally linked to various acute and chronic diseases and that there is no safe level of exposure (U.S. Department of Health and Human Services [USD-HHS], 2000). The promotion of smoke-free environments plays a key role in tobacco control strategies, as these environments change social norms regarding the acceptability of smoking, reduce harmful SHS exposure, and promote smoking cessation for all sectors of the population (USD-HHS, 2006). In Oregon, there has been substantial progress in promoting clean indoor air: The state now has a comprehensive workplace law (Oregon State Legislature, 2009a), a statewide tobacco-free school policy (Oregon Department of Education, 2009), and legislation requiring landlord disclosure of smoking policy for all multiunit rentals (Oregon State Legislature, 2009b). The prevalence of home smoking bans has risen dramatically as well even among low-income populations where smoking is more common. In 1999, 32% of Oregon smokers with annual household incomes of less than $20,000 had a full ban on smoking at home. By 2009, the percentage had increased to 56% (CDC, 2009).

In multiunit housing, nonsmoking tenants with home smoking bans can still be at risk for exposure to SHS if they are living in buildings without bans due to infiltration of SHS from other units or from outdoor areas such as patios (Bohac, Hewett, Hammond, & Grimsrud, 2011; King, Travers, Cummings, Mahoney, & Hyland, 2010). Indeed, several published studies have documented that nonsmokers living in multiunit housing smelled SHS in their apartments resulting from migration from other areas (Hennrikus, Pentel, & Sandell, 2003; Hewett, Sandell, Anderson, & Niebuhr, 2007; King, Cummings, Mahoney, Juster, & Hyland, 2010). Data from a 2006 local sample of Portland area renters indicate that almost a third of multiunit tenants experienced home SHS exposure during the previous week compared with only about 20% of single family home renters (Campbell deLong Resources, Inc., 2006).

Among low-income renters, the situation is likely to be worse. Lower income persons living in subsidized housing may have greater opportunity for SHS exposure because smoking prevalence is higher in the low-income population. Also, many are particularly vulnerable to the negative effects of SHS because

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they are more likely to be elderly or disabled or to have young children in the home. Recognizing the critical need for prevention among low-income populations, the U.S. Department of Housing & Urban Development (USD-HUD, 2009) published a notice in July 2009, strongly encouraging implementation of smoke-free policies in public housing to prevent SHS migration between units and subsequent exposure of nonsmokers.

Studies documenting the problem of SHS exposure in apartments due to migration from other units have also established that tenants, especially nonsmokers, are supportive of such policies. Hennrikus showed that almost 90% of those smelling smoke reported being bothered by it and about two thirds would be supportive of a smoke-free policy in their buildings. In a previous study, we showed that 74% of tenants living in subsidized housing supported a smoke-free policy, though the support was greater among nonsmokers (Drach, Pizacani, Rohde, & Schubert, 2010).

No study, to our knowledge, has extended its investigation into the relationship between smoke-free policies and reductions in SHS exposure among nonsmokers or on quit rates or other cessation-related behaviors, especially among a low-income population. There are ample data that support associations between home and workplace smoking bans and reductions in SHS exposure and cessation or reductions in consumption (Hopkins et al., 2001, 2010; Hyland et al., 2009; Pizacani et al., 2004), and it is reasonable to suggest that policies in multiunit housing could be similarly effective. But there are crucial differences between the different types of bans. Workplace bans are externally imposed but apply only during the workday. Furthermore, infractions are more easily enforced, as they are more likely to be public. Home bans are usually self-imposed, and thus, reactions to the restrictions may differ considerably for a smoker living under an externally imposed policy. Clearly, there exists a need to assess whether multiunit housing smoke-free policies have similar effects on SHS exposure and smoking-related behaviors.

In July 2007, after working with tobacco control advocates and government officials, Guardian Management Limited Liability Company, the largest property management company in metropolitan Portland, Oregon, announced that it would implement a comprehensive smoke-free policy at all of its multiunit buildings on January 1, 2008 (Pizacani et al., 2011). The policy banned smoking in apartments and in all indoor and outdoor communal areas within 25 feet of buildings. However, since almost all outdoor communal areas lay within 25 feet of building, smoking was effectively prohibited on most properties. With this announcement, the company also informed tenants about the Oregon Tobacco Quit Line (Oregon Public Health Division, 2011). Recognizing a unique opportunity to evaluate the health and social consequences of a mandatory smoke-free policy in a vulnerable population, we partnered with Guardian to study policy acceptability, compliance, enforcement, SHS exposure, and cessation rates and behaviors in 17 buildings comprised of low-income tenants receiving housing subsidies.

Methods

Between February 2008 and October 2009, we conducted a mixed methods evaluation that gathered data from current tenants, former tenants, building managers, and Guardian administration. The evaluation was approved by the Oregon Health Authority's Public Health Institutional Review Board. Data presented here were collected from mailed surveys of current tenants and in-person and online surveys of building managers.

Tenant Study Sample and Procedures

Guardian prepared a database that listed each adult leaseholder (n = 866) by unit in each of the 17 subsidized buildings as of April 2008. We randomly selected one adult tenant from each of these units (n = 839). All tenants had subsidies either through the USD-HUD Section 8 Program, where the eligibility requirement is 30% of median income or through the USD-HUD Low Income Housing Tax Credit Program (Section 42), where the eligibility requirement is 60% of median income.

In May 2008, we mailed the resulting sample of 839 adults a packet containing a $2 bill as a noncontingent incentive, a cover letter from Guardian, a paper-and-pencil questionnaire, and a postage-paid return envelope addressed to the evaluation team. Because many potential respondents were older and might have visual or other limitations, we used large fonts on the questionnaire, different colored pages for smokers and nonsmokers (to simplify skip patterns), and offered alternate survey administration by phone or in person. Each respondent who completed the questionnaire received an additional check for $25, as a thank you for his or her time. Nonrespondents were sent a second mailing in June 2008. A total of 687 tenants responded over the two mailings, generating a final response rate of 82%. We refer to this baseline questionnaire as "Time 1." The Time 1 questionnaire also gathered information retrospectively for the prepolicy period, which we defined as "Time 0."

One year later (May 2009), we mailed a "Time 2" questionnaire to tenants who responded to the Time 1 questionnaire and who consented to further participation (n = 564). The Time 2 procedures and incentive schedule were the same as those used for Time 1. The response rate for the Time 2 questionnaire was 78% (n = 440).

The Times 1 and 2 questionnaires both stressed in the cover letter and in printed text boxes on the survey itself that tenant answers would be viewed by evaluation staff only and that their answers could not affect their tenancy.

Analyses were restricted to tenants who responded to both Time 1 and Time 2 questionnaires (n = 440), except for the calculations related to loss to follow-up and historical quit rates.

Manager Study Sample

Eleven building managers were interviewed via an in-person semistructured interview within 6 weeks of policy implementation and then through brief online questionnaires seven times throughout the study period.

Measures

Policy-Related Items

In both surveys, we assessed tenant knowledge of the policy by asking "Tell us if you think these things are allowed or not allowed under the 'No Smoking' policy that started in January 2008: Smoking inside your apartment; smoking in indoor shared areas, like hallways and entryways; smoking outdoors on

porches, patios, or balconies; smoking in other outdoor areas of the property like the parking lot."

Compliance was measured by asking two questions. In the Time 1 survey, we asked, "Before the 'No Smoking' policy started in January, where did you smoke when you were at home?" At Times 1 and 2 we asked, "When you're at home now, where do you smoke?"

Quit-Related Items

Tenant smoking status was ascertained using a modification of the standard questions used by the Behavioral Risk Factor Surveillance System (CDC, 2011): "Do you, yourself, smoke every day, some days, or not at all?" All former smokers were asked about their quit date. We defined quit for this study as being a former smoker at Time 2 with a quit date some time after policy implementation (i.e., after January 2008).

We asked all continuing smokers whether the amount they smoked had changed since policy implementation (at Time 1) or in the last year (at Time 2). We asked quitters whether quitting was associated with policy implementation and if and when they had called the Oregon Tobacco Quit Line.

SHS-related Items

We assessed SHS exposure at Time 1 and Time 2. At Time 1, we asked tenant respondents to rate their exposure in the period before the policy started and since the policy started. At Time 2, we asked them to rate exposure in the past year. Specifically, we asked, "How often do you smell or breathe SHS in the following places around your apartment building? (Inside your apartment [smoke that comes in from outside or someone else's apartment]; in indoor shared areas, like hallways; outdoors on porches or patios; in other outdoor areas, like the parking lot)." Responses included, "Every day, a few times a week, a few times a month, hardly ever, never." For analysis, we combined "every day" with "a few times a week" and "a few times a month" with "hardly ever."

Tenant Demographics

At Time 1, we asked each respondent's age, gender, race, average monthly income during the last year, how many people lived in their apartment, and whether they used any equipment such as a cane, walker, wheelchair, or scooter to help them get around. We also assessed mobility limitation by asking, "Are you limited in any way because of any of the following health problems: Arthritis/rheumatism, lung or breathing problems, hearing problems, eye/vision problems, heart problem, stroke problem, diabetes, hypertension/high blood pressure, cancer, depression/anxiety/emotional problems."

Enforcement and Complaint Data from Managers

We collected enforcement data (e.g., tenant complaints, written and verbal warnings, and evictions) from building managers. We also asked managers whether or not they were personally in favor of the policy.

Analysis

Data were analyzed with SPSS 15.0 (http://www.spss.com) using a significance level of .05. Analyses comparing smoking status, SHS exposure, and compliance were conducted at three time points: the date of policy implementation (January 2008, referred to as Time 0), at the time of the first questionnaire (May 2008, Time 1), and at the time of the second questionnaire (May 2009, Time 2). Policy knowledge was assessed at Times 1 and 2. Differences over time were assessed using McNemar's test; between-group differences were assessed using Pearson's chi-square or *t* tests.

We calculated quit rates by dividing all those who quit in a particular period by those who were current smokers at the beginning of that period. For example, the 5-year annualized quit rate for former smokers who quit between 2002 and 2006 was calculated by dividing all those who were former smokers at Time 1 and had quit between 2002 and 2006 by all Time 1 participants who were smokers in 2002 and then dividing by 5 years. The latter group comprised current smokers at Time 1 and all those who quit from 2002 to 2009. Quit rates for 2007 and for the study period (2008–2009) were calculated in a similar fashion. We considered quit rates significantly different if their associated 95% *CI* did not overlap.

Results

Loss to Follow-up

Tenants who only completed the Time 1 questionnaire (i.e., were lost to follow-up) were not significantly different from those who completed both Times 1 and 2 questionnaires, except for age and number of chronic conditions reported (Table 1). Among participants who completed Time 1 and Time 2 surveys, age and presence of a chronic condition were not significantly related to quit status.

Respondent Characteristics

At Time 1, the study population was 69% female, 89% White, and the mean age was 61 years. The mean monthly income was about $850. More than three quarters listed at least one chronic health condition, and one third used a cane, walker, or wheelchair for mobility (Table 1).

Quit Rates

Of the 104 current smokers at the time of policy implementation (Time 0), a total of 23 smokers reported having quit by Time 2, for a quit rate of 22.1% (over 18 months). Eight of the 23 had reported quitting between policy implementation and Time 1 and 15 between Times 1 and 2. The annualized rate was 14.7% (95% *CI* =7.9%–21.6%). The quit rate restricted to smokers who had been quit for at least 6 months at Time 2 was 15.4% (95% *CI* = 9.1%–23.8%).

The quit rate for 2007, the year the policy was announced was 13.7% (95% *CI* = 9.4%–19.1%). We compared these rates with the average annual quit rate among study subjects for 5 years before the policy was announced in 2007. That rate was 2.6% (95% *CI* = 0.6%–4.5%), significantly lower than either of the two study quit rates. When historical quit rates were restricted to only those who responded to both questionnaires, the results were almost identical. All quit rates were based on self-report.

Table 1. Characteristics of Sample of Tenants From 17 Rent-Subsidized Buildings, Portland, Oregon[a]

	Final sample ($n = 440$)		Lost to follow-up ($n = 247$)	
	n (%)	95% *CI*	*n* (%)	95% *CI*
Gender				
Male	136 (31.3)	27–35.9	74 (31.5)	25.6–37.8
Female	298 (68.7)	64.1–73	161 (68.5)	62.2–74.4
Race				
White	378 (88.5)	85.1–91.4	198 (88.5)	79.7–89.3
Non-White (single race)	40 (9.4)	6.8–12.5	25 (10.7)	7.1–15.4
Multiracial	9 (2.1)	1–4	10 (4.3)	2.1–7.8
Number of chronic health conditions				
0	91 (20.7)	17–24.8	82 (33.2)*	27.4–39.4
1	89 (20.2)	16.6–24.3	59 (23.9)	18.7–29.7
2	75 (17)	13.6–20.9	41 (16.6)	12.2–21.8
3	74 (16.8)	13.4–20.6	27 (10.9)	7.3–15.6
4 or more	111 (25.2)	21.2–29.6	38 (15.4)	11.1–20.5
Use mobility equipment (e.g., cane or walker)				
Yes	133 (30.8)	25.5–35.4	57 (24.8)	19.3–30.9
Mean age (years)	60.8	59.3–62.4	55.2*	52.5–58.0
Mean monthly income ($)	849.66	800.06–899.26	878.00	799.34–958.66

Note. [a]Estimates are based on Time 1 survey data.
*$p < .01$.

We also asked the participants who quit whether the policy was part or all of the reason for quitting. About 41% said that it was part of the reason and 27% said that it was the main reason (total 68.2%, 95% *CI* = 45.1%–86.1%). Of the 23 participants who had quit, only two called the Quit Line after the policy was announced.

Reduction in Consumption

We asked all current smokers at Time 1 whether the amount they smoke changed since policy implementation. About 41% said that they were smoking the same amount as before the policy change, 4% said that they were smoking more, and 6% were not sure. Almost half (48.9%, 95% *CI* = 41.3%–56.5%) said that they were smoking less. Of those who were smoking less, 29% said that the policy was part of the reason and another 29% said that it was the main reason (total 58.5%, 95% *CI* = 42.1%–73.7%).

Knowledge of Policy

Among the 73 participants who were smokers at Times 1 and 2, we assessed knowledge of smoking policies related to various locations in the property (Table 2). At Time 1, most smokers knew that the policy prohibited smoking inside apartments (84.7%) and indoor shared areas (94.4%), but only about two thirds (68.1%) knew that the policy also prohibited smoking on outdoor porches and patios and parking lots (60.6%). One year later (Time 2), policy knowledge stayed about the same as Time 1, except for one measure: Knowledge that the policy prohibited smoking on outdoor porches and patios increased to 83.6% ($p = .034$).

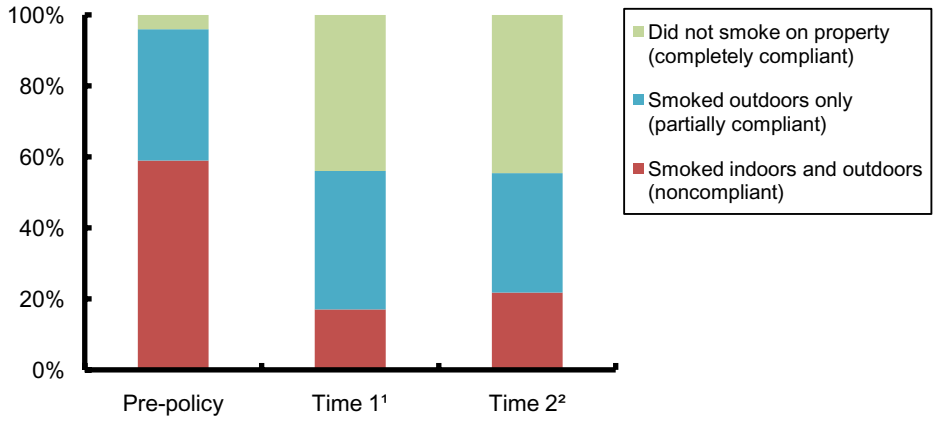
Compliance With Policy

We asked smokers where they smoked at different time points to assess policy compliance. We found that most noncompliance was occurring in outdoor areas of the property. Figure 1 shows that before the policy was implemented, 4% of smokers did not smoke on the property, 37% smoked outdoors only, and 59% smoked both inside their apartments and in outdoor areas of the property. At Time 1, a total of 44% did not smoke anywhere on the property, another 39% smoked outdoors only, and the percentage that smoked in both indoor and outdoor areas of the property dropped to 17% ($p < .001$ for comparison

Table 2. Knowledge of Policy Among Tenants Who Smoke ($n = 73$), by Location and Time

	Time 1[a]	Time 2[b]	
Aware that smoking is not allowed …	*n* (%)	*n* (%)	Change over time (*p*)
… inside apartment	61 (84.7)	66 (91.7)	.174
… in indoor shared areas, like hallways	67 (94.4)	71 (97.3)	.513
… outdoors on patios, porches, and balconies	49 (68.1)	61 (83.6)	.034
… outdoors in parking lots	43 (60.6)	50 (68.5)	.126

Note. [a]Time 1 survey was conducted 5 months postpolicy implementation.
[b]Time 2 survey was conducted 1 year later (17 months postpolicy implementation).



[1] Time one survey was conducted 5 months post policy implementation
[2] Time two survey was conducted one year later (17 months post policy implementation)
Note: $p<.001$ for all comparisons between pre-policy period and Time 1; no significant differences between Time 1 and Time 2

Figure 1. Compliance with policy among tenants who smoke ($n = 73$), by location and time.

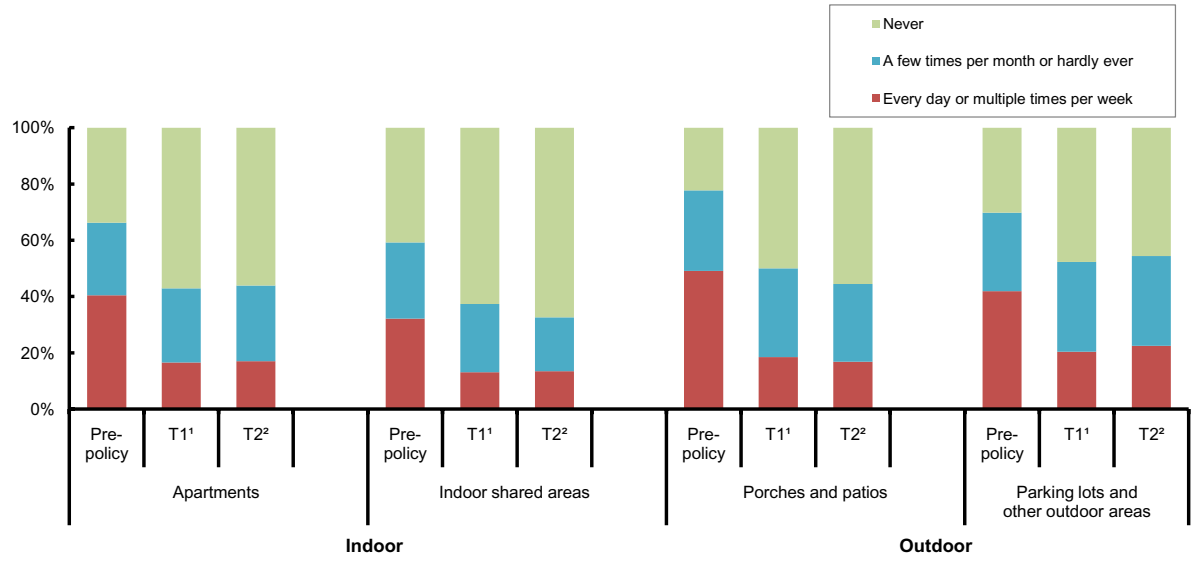
between prepolicy and Time 1). This represents a decrease in self-reported indoor smoking from 59% (95% *CI* = 46.8%–70.3%) to 17% (95% *CI* = 9.0%–27.7%). There were no significant changes between Times 1 and 2.

Noncompliance was significantly related to policy knowledge at Time 2. Of those who were partially compliant (smoked outdoors only), over two thirds did not know the policy prohibited outdoor smoking compared with 14% for smokers who were totally compliant ($p < .01$).

We also examined whether having a mobility limitation was associated with policy compliance. At Time 1, 21% of mobility-limited smokers ($n = 14$) were completely compliant, 43% smoked outdoors only (partially compliant), and 36% were noncompliant. Corresponding estimates for smokers without mobility limitations ($n = 57$) were 49%, 39%, and 12% ($p = .06$). At Time 2, 39% of the mobility-limited smokers were completely compliant, 15% were partially compliant, and 46% were noncompliant. Corresponding estimates for smokers without limitations were 46%, 39%, and 15% ($p = .04$).

SHS Exposure

We asked tenants who were nonsmokers at both surveys to report if and where they smelled SHS. In Figure 2, we show changes in SHS exposure by location. The percentage that



[1] Time one survey was conducted 5 months post policy implementation
[2] Time two survey was conducted one year later (17 months post policy implementation)
Note: $p<.001$ for all comparisons between pre-policy period and Time 1; no significant differences between Time 1 and Time 2

Figure 2. Secondhand smoke exposure among nonsmoking tenants ($n = 320$), by location and time.

reported smelling SHS frequently (every day or multiple times per week) inside their apartments decreased significantly from 41% before the policy to 17% at Time 1. For indoor shared areas, 32% smelled smoke frequently prior to the policy and only 13% at Time 1. In porches and patios, 49% reported smelling SHS frequently before the policy and 19% at Time 1. For outdoor areas like parking lots, 42% said that they smelled smoke frequently before the policy and 20% at Time 1 ($p < .001$ for comparison between prepolicy and Time 1). There were no significant differences between Times 1 and 2.

Enforcement and Tenant Complaints

Managers reported few tenant complaints over 18 months of data collection. On average, there was one complaint per month per building from nonsmokers regarding smokers' behaviors and about one per quarter per building from smokers who disliked the policy. Ten of 11 managers (91%) said that they found enforcement of the smoke-free policy difficult, particularly if tenants smoked in their apartments.

Despite these enforcement challenges, managers reported issuing an average total of eight verbal warnings per building related to smoke-free policy violations and six written warnings per building over an 18-month period. Managers also issued a total of 11 evictions related to the smoke-free policy. Eight of 11 managers (73%) said that they were personally in favor of the smoke-free policy, believing it would improve tenants' health and reduce costly smoke-related damage to the units.

Discussion

Our findings fill a critical gap in the literature related to the implementation and efficacy of smoke-free policies in subsidized multiunit housing. In this study, we observed that the implementation of a comprehensive smoke-free policy in a group of low-income multiunit housing complexes was associated with reductions in SHS exposure among nonsmokers and with cessation-related behaviors for smokers. Smokers' knowledge of and compliance with the prohibition of indoor smoking was substantially better than for outdoor smoking. Taken together, these findings support the establishment of smoke-free policies in subsidized multiunit housing as a new strategy to reduce the tobacco burden among low SES populations.

The smoke-free policy was associated with decreased cigarette consumption and smoking cessation. The quit rate we observed in this study after the policy was implemented was substantially higher (14.7%) than the average self-reported quit rate for this population from the preceding 5 years (2.6%). Interestingly, the quit rate first increased in 2007, the year the policy was announced, suggesting that tenants may have been quitting in preparation for the upcoming smoke-free policy. In addition, about half of the continuing smokers said that they smoked less since the policy was implemented, and the majority of those who quit or cut down said that the policy was part or all of the reason for quitting. We are not aware of any new tobacco taxes or other tobacco control measures that could have contributed to these changes.

Hence, a smoke-free policy for multiunit housing appears to be another type of ban than promotes smoking cessation. Previous studies have demonstrated that workplace and voluntary home smoking bans are associated with decreased cigarette consumption and smoking cessation. In an extensive review, Hopkins documented a median absolute increase in cessation of 6.4% points for smokers subject to a smoke-free policy in workplaces or public areas. In the home setting, two longitudinal studies have demonstrated reductions in consumption and increases in cessation for smokers who live in smoke-free homes (Hyland et al., 2009; Pizacani et al., 2004).

In this study, the increase in quit rates did not appear to be due to increases in calls to the Oregon Tobacco Quit Line. Tenants were informed about the availability of the Quit Line when they were notified about the new policy, and managers were given information on how to refer tenants to cessation resources, but only 2 of the 23 tenants who quit had called the Quit Line after the policy was implemented. Nevertheless, we recommend that information on quit resources be provided to tenants when implementing these policies to capitalize on the stimulated interest in quitting that often accompanies clean indoor air policies.

Few prior studies in workplace or home settings have explicitly studied policy acceptance or compliance among smokers. In a previous study (Drach et al., 2010), we showed that more than 85% of nonsmokers were happy with the policy compared with only 30% of smokers. Further, smokers who were unhappy with the policy were significantly more likely to not comply with it. In this study, we assessed compliance in greater detail and observed that almost 80% of smokers complied with the prohibition against indoor smoking. Smokers were not only less likely to cooperate with stipulations against outdoor smoking than indoor smoking but also less likely to be aware of those rules. Although all tenants were notified of the policy in writing 6 months before the policy was implemented, some of the buildings lacked signage announcing policy parameters. Increased efforts to advertise and promote the policy could help decrease noncompliance.

We expected that mobility might make smokers less able to comply with the policy because these smokers might have more difficulties leaving their apartments to smoke. Although numbers of smokers with mobility limitations were quite small in this study, we saw evidence that noncompliance was higher among them. However, most smokers with mobility limitations were able to at least partially comply with the policy.

We also saw substantial reductions in SHS exposure among nonsmoking tenants after the smoke-free policy was implemented—the proportion of nonsmokers who said that they smelled smoke inside their apartments "every day" or "multiple times per week" went from 41% before the policy to 17% after the policy (equivalent to a 58% decrease in exposure after the policy). This decrease in exposure corresponds well with workplace studies that documented a 60.5% median reduction in SHS across several studies associated with smoking bans (Hopkins et al., 2001). Further, the decrease corresponds roughly with reported compliance rates of smokers.

It is more difficult to compare the success of self-imposed home bans and landlord-imposed home bans with respect to reductions in SHS. Some studies have observed that presence of an indoor smoking ban was highly associated with reports of no

indoor smoking (Martinez-Donate, Johnson-Kozlow, Hovell, & Gonzalez-Perez, 2009; Pizacani et al., 2003). Others have shown that questionnaire reports of no household smoking compare well with air quality monitoring results showing low air nicotine measurements (Glasgow et al., 1998; Kraev, Adamkiewicz, Hammond, & Spengler, 2009). These studies are not directly comparable, however, because the exposure for our study was defined as whether a tenant smelled smoke seeping into their apartment from another source. No home ban study, to our knowledge, has accounted for smoke that might be entering into the home from household residents who have exited the home to smoke.

In general, we observed substantial reductions in the reported presence of SHS in the environment, especially indoors. However, for smoking to be eliminated entirely, there would likely need to be more resources devoted to education and possibly enforcement. As previously described (Drach et al., 2010), messages that emphasize the common good and include building cleanliness and fire safety as well as avoidance of SHS might be helpful in the effort to ensure clean indoor air for all tenants.

Limitations

This study had several limitations. First, data were based on self-report, and postpolicy responses regarding exposure to SHS, policy compliance, and cessation-related measures could have been affected by social desirability bias. We did find it encouraging, however, that reported reductions in SHS exposure corresponded well with compliance estimates. Unverified quit status is also subject to misclassification, however, in this study, overestimation of the quit rate would require substantially increased social desirability bias only 1 year later, which we think somewhat unlikely.

A second limitation relates to our comparison of those who quit during the study period to those who quit between 2002 and 2006 (the historical quit rate). The former group is comprised of those who were able to remain abstinent for many years, while the study quit group is comprised of those who have been quit for less time. This could have overestimated the difference between the two rates. We therefore calculated a quit rate restricted to those who had been quit at least 6 months when risk of relapse has been estimated at only about 10% (Hughes, Keely, & Naud, 2004). The resulting quit rate was consistent with the annualized study quit rate.

Third, we cannot generalize study results to a larger population of low-income tenants, as the sample represented only the buildings under study. However, these tenants were from a representative sample of all of tenants living in the rent-subsidized buildings of the large property management company we partnered with and generated important information about policy implementation for the company.

Fourth, many of the younger tenants were lost to follow-up. However, the remaining sample—older, often disabled, and unlikely to move even if unhappy with a policy—did generate important information about a population among which policy implementation may be difficult. Likewise, this study did not include tenants who left these subsidized buildings because of the policy. However, voluntary turnover at these buildings is low because a shortage of low-income housing combined with long or closed waiting lists makes subsidized housing difficult to obtain. Indeed, building managers reported that of 150 tenants who left during the period studied, only six left because of the policy. Finally, although we had a fairly high response rate, those who did not respond might have had more difficulties with the questionnaire. Our study population was older, and many may have had visual or other limitations that made participation difficult; we were unable to assess that.

Conclusions

Findings from this study support the efforts of housing providers and agencies across the nation that are promoting smoke-free environments in multiunit housing. Our study found that this kind of policy was effective in reducing SHS exposure within a population of older low-income tenants. We also observed sharply increased self-reported quit rates and reduced cigarette consumption.

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Declaration of Interests

No author had any competing interests.

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