

## Peer-Reviewed Literature Related to Smoke-Free Multiunit Housing

Courtesy of Andrea Licht ([andrea.licht@roswellpark.org](mailto:andrea.licht@roswellpark.org)) and Mark Travers ([mark.travers@roswellpark.org](mailto:mark.travers@roswellpark.org)), Roswell Park Cancer Institute

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## **Multiunit Housing Resident Surveys**

**Ballor DL, Henson H, Macguire K. Support for no-smoking policies among residents of public multiunit housing differs by smoking status. *Journal of Community Health*. 2013. June 18. Epub ahead of print. (Tacoma, Washington).**

We compared perceptions of smoking and non-smoking Tacoma, WA multiunit public housing residents regarding smoke-free policies and in-home smoking rules. Two-hundred-twenty-nine completed surveys (~16 % of units) of a modified version of the CDC's multiunit housing resident survey were analyzed. Smokers differed significantly ( $p < 0.05$ ) from non-smokers with respect to agreement with policies that would ban smoking in homes (41 % of smokers and 82 % of non-smokers strongly agreed or agreed), in common indoor areas (74 % of smokers and 82 % of non-smokers strongly agreed or agreed), and for outdoor areas (38 % of smokers and 68 % of non-smokers strongly agreed or agreed). For in-home smoking rules, smokers and non-smokers again differed significantly ( $p < 0.05$ ) with 53 % of smokers and 90 % of non-smokers not allowing smoking in their homes. Twenty-five percent of residents reported smelling secondhand smoke that infiltrated their residence from the outside on a daily basis. The most notable findings are that more than 50 % of smokers do not allow smoking in their homes and that more than 50 % of smokers are supportive of or neutral with respect to smoke-free policies for one's home. This suggests that implementation of smoke-free policies may not greatly impact vacancy rates even in populations with high rates of smoking (37 % in this study).

**Baezconde-Garbanati LA, Weich-Reushe K, Espinoza L, Portugal C, Barahona R, Garbanati J, Seedat F, Unger JB. Secondhand smoke exposure among Hispanics/Latinos living in multiunit housing: exploring barriers to new policies. *American Journal of Health Promotion*. 2011; 25(5 suppl):S82-90. (Southern California)**

**PURPOSE:** Despite a high prevalence of voluntary home smoking bans and laws protecting Californians from exposure to secondhand smoke (SHS) in the workplace, many Hispanic/Latino (H/L) residents of multiunit housing (MUH) are potentially exposed to SHS from neighboring apartments. An advocacy/policy intervention was implemented to reduce tobacco-related health disparities by encouraging H/L living in MUH to implement voluntary policies that reduce exposure to SHS. This article presents findings from qualitative and quantitative data collected during development of the intervention, as well as preliminary results of the intervention.

**DESIGN, SETTING, AND SUBJECTS:** MUH residents in Southern California participated in focus groups ( $n = 48$ ), door-to-door surveys ( $n = 142$ ), and a telephone survey ( $n = 409$ ).

**MEASURES:** Exposure to SHS, attitudes toward SHS, and attitudes toward policies restricting SHS in MUH were assessed.

**RESULTS:** H/L MUH residents reported high levels of exposure to SHS and little ability to protect themselves and their families from SHS. Respondents expressed positive attitudes toward adopting antismoking policies in MUH, but they also feared retaliation by smokers. The cultural values of familismo, respeto, simpatía, and personalismo influenced their motivation to protect their families from SHS as well as their reluctance to ask their neighbors to refrain from smoking. Nonsmokers were more likely to favor complete indoor and outdoor smoking bans in MUH, whereas smokers were more likely to favor separate smoking areas. The Regale Salud advocacy/policy intervention,

implemented to reduce SHS exposure, prompted the passage of seven voluntary policies in apartment complexes in Southern California to prevent smoking in MUH.

CONCLUSIONS: H/L in California support voluntary policies, local ordinances, and state laws that prevent exposure to SHS in MUH, especially those that are consistent with H/L cultural values and norms for interpersonal communication.

**Drach LL, Pizacani BA, Rohde KL, Schubert S. The acceptability of comprehensive smoke-free policies to low-income tenants in subsidized housing. *Preventing Chronic Disease*. 2010; 7(3):1-3. (Portland, Oregon)**

Our objective was to evaluate the acceptability of a comprehensive smoke-free policy among low-income tenants in a group of subsidized, multiunit buildings. We conducted a mixed-methods evaluation that included questionnaires mailed to 839 tenants and follow-up telephone interviews with 23 tenants who were current, former, and never smokers. Most never and former smokers supported the policy, citing improved health, fire safety, and building cleanliness; most current smokers disliked the policy and did not follow it. Messages focusing on shared community-level concerns, accompanied by smoking cessation resources, may support the transition to smoke-free policies in subsidized housing.

**Hennrikus D, Pentel PR, Sandell SD. Preferences and practices among renters regarding smoking restrictions in apartment buildings. *Tobacco Control*. 2003; 12(2):189-194. (Minneapolis, Minnesota)**

OBJECTIVE: This study assessed renters' preferences for official smoking policies in their buildings and their practices concerning restricting tobacco smoking in their apartments.

DESIGN: Renters (n = 301) living in large apartment complexes in a suburb of Minneapolis, Minnesota, completed a mail survey.

MAIN OUTCOME MEASURES: The survey asked about the official smoking policies in place in their apartment buildings, their preferences for policies, whether they had smelled tobacco smoke coming into their apartments from without, and, if so, what they had done about it.

RESULTS: The majority of non-smokers (79%) preferred that their building be smoke-free. When asked to identify the current smoking policy in their buildings, residents disagreed substantially. Most renters (60%) reported smoke-free policies in their own apartments and another significant proportion (23%) restricted smoking to certain areas or occasions or persons. 75% thought that enforcing a smoke-free policy for guests would not be difficult. 53% of those in non-smoking households had smelled tobacco smoke in their apartments; most of these reported being bothered by it. However, very few complained to the building owner or manager (15.5%) or to the smoker (6.9%).

CONCLUSIONS: The majority of non-smokers preferred that their buildings be smoke-free. A failure to report problems to apartment managers might be an impediment to instituting smoke-free policies in apartment buildings. The considerable disagreement among residents within apartment complexes about the current official smoking policy in their buildings suggests that policies are lacking or are not well communicated.

**Hewett MJ, Sandell SD, Anderson J, Niebuhr M. Secondhand smoke in apartment buildings: renter and owner or manager perspectives. *Nicotine & Tobacco Research*. 2007; 9(1):S39-S47. (Minnesota)**

This study explored the views of Minnesota renters and apartment owners or managers about environmental tobacco smoke (ETS) transfer between units in multifamily buildings and about smoke-free housing. A convenience sample of 49 decision makers who manage 27,116 rental units in Minnesota were aware of some ETS transfer in their buildings, but most felt it was rarely or never a significant factor in tenants' decisions to rent or to move. Most of those who had never designated a building smoke free had little or no interest in doing so, due to concerns that it would increase vacancy rates, constitute discrimination, or engender costs for enforcement. Owners who had already designated smoke-free buildings, however, had seen mostly neutral or positive effects on vacancies, turnover, and time required to manage the buildings, and planned to continue offering them. A total of 48% of households in a random sample of 405 reported that at times ETS enters their apartment from elsewhere; 10% said this occurs often or most of the time. Of those experiencing ETS transfer, 37% said it bothered them a lot or so much that they were thinking of moving. Only a small fraction of renters currently live in smoke-free buildings, but nearly half would be extremely or very interested in doing so. Interest is high across ethnicities, income levels, rent levels, and age groups and regardless of whether the household has children. 54% of respondents would be very likely to choose a smoke-free building, all other things being equal, and 34% would be willing to pay more to live in one.

**Hewett MJ, Ortland WH, Brock BE, Heim CJ. Secondhand smoke and smokefree policies in owner-occupied multi-unit housing. *American Journal of Preventive Medicine*. 2012; 43(5 Suppl 3):S187-S196. (Minnesota)**

**BACKGROUND:** Studies have documented movement of secondhand smoke (SHS) between units in multi-unit buildings, but none has focused on owner-occupied units in common-interest communities (CICs). In Minnesota, approximately 170,000 households (8%) live in such units. CIC households may experience long-term SHS exposure because owner-occupants typically live in the same unit for many years.

**PURPOSE:** This study estimated the prevalence of SHS incursion in CICs and assessed residents' attitudes toward SHS incursions and interest in smokefree policies.

**METHODS:** A stratified sample of Minnesota CIC owner-occupants was surveyed in 2009, with analysis in 2010-2011. Data were weighted to account for differing sampling, response, and coverage rates by stratum, then calibrated to population control totals for housing type, age, and smoking status.

**RESULTS:** The response rate was 35.6%, with 495 completions. Twenty-eight percent of households reported SHS incursion into their unit in the preceding 6 months; 59% of these said this bothers them a lot. Only 6% report that their CIC has a smokefree policy for residents' units. Forty-two percent would prefer such a policy whereas 26% would prefer smoking-permitted. Sixty-three percent definitely and 17% probably would choose a no-smoking building over a smoking-permitted building if they were buying a new unit, and 46% would be willing to pay more for such a unit.

**CONCLUSIONS:** Secondhand smoke incursion is common in CICs, and interest in smokefree CICs greatly exceeds the supply. Given the known health risks of SHS exposure, tobacco control efforts in multi-housing should address CICs as well as rental households.

**Hood NE, Ferketich AK, Klein EG, Wewers ME, Pirie P. Individual, social, and environmental factors associated with support for smoke-free housing policies among subsidized housing tenants. *Nicotine & Tobacco Research*. 2013; 15(6):1075-1083. (Columbus, Ohio)**

**INTRODUCTION:** Mandatory smoke-free policies in subsidized, multiunit housing (MUH) may decrease secondhand smoke exposure in households with the highest rates of exposure. Ideally, policies should be based on a strong understanding of factors affecting support for smoke-free policies in the target population to maximize effectiveness.

**METHODS:** A face-to-face survey was conducted from August to October 2011 using a stratified random sample of private subsidized housing units in Columbus, OH, without an existing smoke-free policy (n = 301, 64% response rate). Lease holders were asked to report individual, social, and environmental factors hypothesized to be related to support for smoke-free policies. Multiple logistic regression models were used to identify factors independently associated with policy support.

**RESULTS:** Most tenants supported smoke-free policies in common areas (82.7%), half supported policies inside units (54.5%), and one third supported a ban outside the building (36.3%). Support for smoke-free policies in units and outdoors was more common among nonsmokers than smokers (71.5% vs. 35.7%, p < .001 and 46.2% vs. 25.4%, p < .001, respectively). Several individual and social, but no environmental, factors were independently associated with policy support. Smokers who intended to quit within 6 months or less were more likely than other smokers to support in-unit policies (45.3% vs. 21.1%; p = .003).

**CONCLUSIONS:** More than half of subsidized MUH tenants supported smoke-free policies inside their units. Strategies to address individual- and social-level barriers to behavior change should be implemented in parallel with smoke-free policies. Policies should be evaluated with objective measures to determine their effectiveness.

**Hood NE, Ferketich AK, Klein EG, Wewers ME, Pirie P. Smoking behaviors and cessation interests among multiunit subsidized housing tenants, Columbus, Ohio, 2011. *Preventing Chronic Disease*. 2013; 10:E108. (Columbus, Ohio)**

**INTRODUCTION:** Cessation services have been recommended to complement smoke-free policies in subsidized multiunit housing, but little is known about smoking- and cessation-related characteristics among subsidized housing tenants. This study examined smoking behaviors and cessation-related interests in a population of subsidized housing tenants.

**METHODS:** A face-to-face survey was conducted in August to October 2011 with a probability sample of private subsidized housing lease holders in Columbus, Ohio (N = 301, 64% response rate).

**RESULTS:** Almost half (47.5%) of respondents were current smokers, including smokers of cigarettes or small cigars. Smokers were less likely than nonsmokers to have health insurance and more likely to be at risk for food insecurity. Among smokers, 20.3% did not smoke daily and 35.0% smoked 5 or fewer cigarettes per day. More than half (61.3%) purchased single cigarettes in the past month, with higher rates among nondaily smokers. Most smokers intended to quit within 6 months or less (60.1%) and were interested in using nicotine replacement therapy (NRT) (65.0%). Most respondents had Medicaid but only 30.4% knew Medicaid covered cessation medications.

**CONCLUSIONS:** This population of subsidized housing tenants had high rates of smoking, including light smoking. Interest in NRT was high and access can be improved by increasing awareness of Medicaid coverage among clients and health care providers. However, more research is needed about scalable, evidence-based cessation strategies for low-socioeconomic status and light

smokers. Strategies to address environmental factors such as availability of single cigarettes should also be considered in parallel with smoke-free policies.

**Hood NE, Wewers ME, Ferketich AK, Klein EG, Pirie P. Predictors of voluntary home-smoking restrictions and associations with an objective measure of in-home smoking among subsidized housing tenants. *American Journal of Health Promotion*. 2013. April 26. Epub ahead of print. (Columbus, Ohio)**

**PURPOSE.** Examine predictors of voluntary home-smoking restrictions (HSRs) and associations with an objective measure of in-home smoking.

**DESIGN.** Cross-sectional.

**SETTING.** Publicly subsidized multiunit housing units managed by private company in Columbus, Ohio, without a smoke-free housing policy.

**SUBJECTS.** Probability sample of primary leaseholders (N = 301, 64% response rate).

**MEASURES.** Self-reported knowledge, attitudes, and behaviors collected during face-to-face survey in fall 2011, including individual (e.g., knowledge of health effects), social (e.g., number of friends who smoke), and environmental (e.g., safety) factors hypothesized to be related to having HSRs. Surface nicotine concentration ( $\mu\text{g}/\text{m}^2$ ) based on samples collected from wood surface in respondents' living rooms (n = 279).

**ANALYSIS.** Multiple linear and logistic regression were used to identify factors associated with having HSRs and with indoor surface nicotine concentrations.

**RESULTS.** Fewer than one-third (29.2%) of tenants had complete HSRs, while more than half (55.8%) had partial restrictions. Several individual and social factors, but no environmental/community factors, were associated with having HSRs. Type of HSRs ( $p < .001$ ) and smoking status ( $p < .001$ ) were independently associated with mean surface nicotine concentrations.

**CONCLUSION.** Few subsidized housing tenants voluntarily limit in-home smoking. Partial restrictions could be considered as a harm reduction strategy but may be less effective among smokers. Strategies to change social norms are also needed to modify in-home smoking behavior among subsidized housing tenants.

**King BA, Babb SD, Tynan MA, Gerzoff RB. National and state estimates of secondhand smoke infiltration among U.S. multiunit housing residents. *Nicotine & Tobacco Research*. 2013; 15(7):1316-1321. (United States)**

**INTRODUCTION:** Multiunit housing (MUH) residents are susceptible to secondhand smoke (SHS), which can infiltrate smoke-free living units from nearby units and shared areas where smoking is permitted. This study assessed the prevalence and characteristics of MUH residency in the United States, and the extent of SHS infiltration in this environment at both the national and state levels.

**METHODS:** National and state estimates of MUH residency were obtained from the 2009 American Community Survey. Assessed MUH residency characteristics included sex, age, race/ethnicity, and poverty status. Estimates of smoke-free home rule prevalence were obtained from the 2006-2007 Tobacco Use Supplement to the Current Population Survey. The number of MUH residents who have experienced SHS infiltration was determined by multiplying the estimated number of MUH residents with smoke-free homes by the range of self-reported SHS infiltration (44%-46.2%) from peer-reviewed studies of MUH residents.



**RESULTS:** One-quarter of U.S. residents (25.8%, 79.2 million) live in MUH (state range: 10.1% in West Virginia to 51.7% in New York). Nationally, 47.6% of MUH residents are male, 53.3% are aged 25-64 years, 48.0% are non-Hispanic White, and 24.4% live below the poverty level. Among MUH residents with smoke-free home rules (62.7 million), an estimated 27.6-28.9 million have experienced SHS infiltration (state range: 26,000-27,000 in Wyoming to 4.6-4.9 million in California).

**CONCLUSIONS:** A considerable number of Americans reside in MUH and many of these individuals experience SHS infiltration in their homes. Prohibiting smoking in MUH would help protect MUH residents from involuntary SHS exposure.

**King BA, Cummings KM, Mahoney MC, Hyland AJ. Multiunit housing residents' experiences and attitudes toward smoke-free policies. *Nicotine & Tobacco Research*. 2010; 12(6):598-605. (New York)**

**INTRODUCTION:** Secondhand smoke (SHS) causes significant disease and death. A person's home represents a prominent source of SHS, and the potential for exposure is elevated among those who live in close proximity to smokers in multiunit housing (MUH). This study assessed the prevalence and predictors of SHS exposure and smoke-free policy support among MUH residents.

**METHODS:** Data were obtained from 5,936 MUH residents who participated in the New York State Adult Tobacco Survey between May 2007 and May 2009. Bivariate analyses were used to assess the prevalence of smoke-free home policies, SHS incursions, and support for smoke-free policies. Logistic regression was used to identify predictors of these measures while adjusting for gender, age, ethnicity, education, region, children in household, and housing type.

**RESULTS:** A total of 73.1% of respondents reported a personal smoke-free home policy in their home. Among these individuals, 46.2% indicated that SHS has ever entered their home in the past year, while 9.2% reported daily incursions. Overall, a majority of respondents (55.6%) support a policy that bans smoking in all areas of their building, including residential units; support was significantly higher among ethnic minorities and individuals who reside with children.

**DISCUSSION:** Nearly half of New York MUH residents with a smoke-free home policy have experienced a SHS incursion in their home. Since a majority of MUH residents support smoke-free policies and nearly three quarters already prohibit smoking in their home, opportunities exist for initiatives to promote smoke-free building policies.

**Koster B, Brink AL, Clemmensen IH. 'Neighbour smoke' – exposure to secondhand smoke in multiunit dwellings in Denmark in 2010: a cross-sectional study. *Tobacco Control*. 2013. 22(3):190-193. (Denmark)**

**BACKGROUND:** 'Neighbour smoke' is transfer of secondhand smoke between apartments including shared areas, such as hallways, community rooms and stairwells in multiunit dwellings and is an emerging issue for public health and health equity.

**OBJECTIVE:** To describe the prevalence of exposure to neighbour smoke in Denmark.

**METHODS:** A population-based sample of 5049 respondents (2183 in multiunit dwellings) living in Denmark aged  $\geq 15$  years completed a questionnaire in 2010 on tobacco-related behaviour and exposure to secondhand smoke. The authors examined the relations between exposure to neighbour smoke, own smoking, smoking inside the home, type of residence and demographic factors with descriptive statistics and logistic regression analysis.

**RESULTS:** In this sample, 22% of those living in multiunit dwellings reported exposure to neighbour smoke. Of respondents living in apartments, 41% preferred to live in a building in which smoking is banned. Smoke-free buildings were preferred by 58% of persons exposed to neighbour smoke compared with 37% of persons not exposed. Of the smokers (daily and occasional), 14% preferred to live in a smoke-free building; 31% never smoked indoors in their own home.

**CONCLUSIONS:** The only way to avoid absorbing tobacco smoke from neighbours is to live in a smoke-free multiunit dwelling. There is great demand for such dwellings, especially by young people, people with children and people exposed to neighbour smoke, as well as by people who smoke.

**Licht AS, King BA, Travers MJ, Rivard C, Hyland AJ. Attitudes, Experiences, and Acceptance of Smoke-Free Policies Among U.S. Multiunit Housing Residents. *American Journal of Public Health*. 2012. 102(10):1868-1871. (United States)**

We assessed factors related to smoke-free policies among a cross-sectional, nationally representative, random-digit-dial sample (landline and cell phone) of US multiunit housing residents (n = 418). Overall, 29% reported living in smoke-free buildings, while 79% reported voluntary smoke-free home rules. Among those with smoke-free home rules, 44% reported secondhand smoke incursions in their unit. Among all respondents, 56% supported smoke-free building policy implementation. These findings suggest that smoke-free building policies are needed to protect multiunit housing residents from secondhand smoke in their homes.

**Pizacani BA, Maher JE, Rohde K, Drach L, Stark MJ. Implementation of a Smoke-Free Policy in Subsidized Multiunit Housing: Effects on Smoking Cessation and Secondhand Smoke Exposure. *Nicotine & Tobacco Research*. 2012. 14(9):1027-1034. (Portland, Oregon)**

**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.

## **Multiunit Housing Operator Surveys**

**Cramer ME, Roberts S, Stevens E. Landlords attitudes and behaviors regarding smoke-free policies: implications for policy change. *Public Health Nursing*. 2011; 28(1):3-12. (Douglas County, Nebraska)**

**OBJECTIVE:** The study purpose was to describe multiunit landlord attitudes and behaviors toward smoke-free policies.

**DESIGN AND SAMPLE:** This was a descriptive, cross-sectional survey of multiunit landlords in Douglas County (N=392).

**MEASURES:** A 25-item survey was developed and pilot tested. It was administered by telephone (n=143) and mail (n=249) to multiunit landlords.

**RESULTS:** Combined response rate was 30.1% (81/143 telephone, 37/249 mail) representing 24,080 units on 974 properties with 34,399 tenants. Most respondents (73.7%) allowed smoking. Reasons for not implementing smoke-free policies were potential enforcement problems (57.0%), tenant objections (43.0%), loss of market share (39.5%). Respondents without smoke-free policies expected vacancy (53.6%) and turnover (50.0%) rates to increase, which was significantly different ( $p < .0001$ ) than respondents with smoke-free policies where only 10.7% reported increased vacancy and only 3.7% reported increased turnover.

**CONCLUSIONS:** Expected adverse impacts of smoke-free policies do not reflect real experiences of smoke-free policy implementation. Public health advocates can use these study findings to develop community-based education and social marketing messages directed at voluntary smoke-free policy changes. Respondents without smoke-free policies expressed interest at the end of the survey in learning how to implement smoke-free policies indicating a readiness for change.

**Hewett MJ, Sandell SD, Anderson J, Niebuhr M. Secondhand smoke in apartment buildings: renter and owner or manager perspectives. *Nicotine & Tobacco Research*. 2007; 9(1):S39-S47. (Minnesota)**

This study explored the views of Minnesota renters and apartment owners or managers about environmental tobacco smoke (ETS) transfer between units in multifamily buildings and about smoke-free housing. A convenience sample of 49 decision makers who manage 27,116 rental units in Minnesota were aware of some ETS transfer in their buildings, but most felt it was rarely or never a significant factor in tenants' decisions to rent or to move. Most of those who had never designated a building smoke free had little or no interest in doing so, due to concerns that it would increase vacancy rates, constitute discrimination, or engender costs for enforcement. Owners who had already designated smoke-free buildings, however, had seen mostly neutral or positive effects on vacancies, turnover, and time required to manage the buildings, and planned to continue offering them. A total of 48% of households in a random sample of 405 reported that at times ETS enters their apartment from elsewhere; 10% said this occurs often or most of the time. Of those experiencing ETS transfer, 37% said it bothered them a lot or so much that they were thinking of moving. Only a small fraction of renters currently live in smoke-free buildings, but nearly half would be extremely or very interested in doing so. Interest is high across ethnicities, income levels, rent levels, and age groups and regardless of whether the household has children. 54% of respondents would be very likely to choose a smoke-free building, all other things being equal, and 34% would be willing to pay more to live in one.

**Jackson SL, Bonnie RJ. A systematic examination of smoke-free policies in multiunit dwellings in Virginia as reported by property managers: implications for prevention. *American Journal of Health Promotion*. 2011; 26(1):37-44. (Alexandria, Roanoke, Richmond, and Norfolk Virginia)**

**PURPOSE:** In most states, smoking has been curtailed to some extent in public buildings, workplaces, and restaurants. The next frontier for smoke-free policies is the multiunit dwelling industry. However, the extent to which smoke-free housing currently is available is unknown. The purpose of this study was to measure the market for smoke-free housing in Virginia and to identify barriers to adopting smoke-free policies.

**DESIGN:** Telephone interviews were conducted with property managers of rental apartments, townhouses, senior housing, and public housing in four Virginia cities.

**SETTING:** Four cities in Virginia.

**SUBJECTS:** Two hundred sixty-three property managers in four cities in Virginia (approximately 75 property managers per city).

**MEASURES:** Property managers were administered a brief telephone survey.

**RESULTS:** Only 33.8% of property managers reported some type of smoke-free policy, with only 15% of those policies prohibiting smoking in residential units. Most property managers without a smoke-free policy were not considering adopting such a policy for a variety of reasons.

**CONCLUSION:** The availability of smoke-free multiunit dwellings is severely lacking. This study identified a number of science-based and legal misperceptions that may prevent the adoption of smoke-free policies. Correction of these misperceptions is warranted to increase the availability of smoke-free housing. Such policies will be useful in creating environments that support good health practices while simultaneously protecting tenants from exposure to secondhand smoke.

**King BA, Travers MJ, Cummings KM, Mahoney MC, Hyland AJ. Prevalence and predictors of smoke-free policy implementation and support among owners and managers of multiunit housing. *Nicotine & Tobacco Research*. 2010; 12(2):159-163. (Western New York)**

**INTRODUCTION:** Exposure to secondhand smoke causes disease and premature death. Although many municipalities have instituted policies prohibiting smoking in public areas, personal living areas remain largely unregulated. Individuals who reside in multiunit housing (MUH) facilities where smoking is permitted are particularly susceptible to involuntary exposure. This study assessed the prevalence and predictors of smoke-free policy implementation and support among owners and managers of MUH throughout Western New York State.

**METHODS:** A telephone survey was administered to a sample of owners and managers of MUH buildings in the Erie and Niagara counties, New York. A total of 127 respondents completed the survey between March and July 2008 (62% response rate). Logistic regression was used to assess predictors of policy implementation and support, while adjusting for participant smoking status, quantity of units owned/managed, government subsidy status, as well as building age, construction type, and size.

**RESULTS:** Only 13% of participants reported smoking restrictions within any of their buildings. Among those without a smoke-free policy, 75% would be interested in restricting smoking in at least one of their units, with interest being significantly higher among participants with government-subsidized units (odds ratio = 3.12, 95% CI = 1.14-8.52). Primary barriers to policy implementation included concern over increased vacancy (27%) and a decreased market base (21%).

**DISCUSSION:** Few Western New York MUH owners and managers have implemented smoke-free policies in their buildings, but most are receptive to doing so. Therefore, opportunities exist for

interventions to enhance policy acceptance, implementation, and enforcement among these individuals.

**King BA, Cummings KM, Mahoney MC, Hyland AJ. Intervention to promote smoke-free policies among multiunit housing operators. *Journal of Public Health Management and Practice*. 2011; 17(3):E1-8. (Western New York)**

**OBJECTIVE:** To assess the efficacy of an intervention to encourage the adoption of smoke-free policies among owners and managers of multiunit housing.

**DESIGN:** A pretest-posttest quasi-experimental design was employed.

**PARTICIPANTS:** The study population included 287 multiunit housing operators (MUHOs) from across New York State who were recruited to complete a baseline survey designed to assess policies about smoking in the housing units that they owned and/or managed. Subjects were surveyed between March and July 2008 (n = 128 intervention, n = 159 control) and recontacted 1 year later to complete a follow-up survey (n = 59 intervention, n = 95 control).

**INTERVENTION:** An informational packet on the benefits of implementing a smoke-free policy was mailed to MUHOs in the New York State counties of Erie and Niagara between March and July 2008. For comparison purposes, a sample of MUHOs located outside of Erie and Niagara counties who did not receive the information packet were identified to serve as control subjects.

**MAIN OUTCOME MEASURES:** Logistic regression was used to assess predictors of policy interest, concern, and implementation at follow-up. Predictors included: intervention group, baseline status, respondent smoking status, survey type, government-subsidy status, quantity of units operated, and average building size, construction type, and age.

**RESULTS:** Multiunit housing operators who received the information packet were more likely to report interest in adopting a smoke-free policy (OR = 6.49, 95% CI = 1.44-29.2), and less likely to report concerns about adopting such a policy (OR = 0.16, 95% CI = 0.04-0.66) compared to MUHOs who did not receive the information packet; however, the rate of adoption of smoke-free policies was comparable between the groups.

**CONCLUSION:** Sending MUHOs an information packet on the benefits of adopting a smoke-free policy was effective in addressing concerns and generating interest toward smoke-free policies but was not sufficient in itself to generate actual policy adoption.

**Pizacani B, Laughter B, Menagh K, Stark M, Drach L, Hermann-Frazen C. Moving multiunit housing providers toward adoption of smoke-free policies. *Preventing Chronic Disease*. 2011; 8(1):1-9. (Portland, Oregon)**

**BACKGROUND:** Tenants in multiunit housing are at elevated risk for exposure to secondhand smoke at home because of smoke migration from other units.

**COMMUNITY CONTEXT:** In 2004, tobacco control advocates in the Portland, Oregon, metropolitan area began to address this issue by launching a campaign to work with landlord and tenant advocates, private- and public-sector property managers, and other housing stakeholders to encourage smoke-free policies in multiunit housing.

**METHODS:** We outline the 6-year campaign that moved local housing providers toward adopting no-smoking policies. We used the stages of change model, which matches potential messages or interventions to a smoker's readiness to quit smoking.

**OUTCOME:** The campaign resulted in Oregon's largest private property management company and its largest public housing authority adopting no-smoking policies for their properties and a 29%

increase in the availability of smoke-free rental units in the Portland-Vancouver metro area from 2006 through 2009.

INTERPRETATION: We learned the importance of building partnerships with public and private stakeholders, collecting local data to shape educational messages, and emphasizing to landlords the business case, not the public health rationale, for smoke-free housing.

**Winickoff JP, Gottlieb M, Mello MM. Regulation of Smoking in Public Housing. *New England Journal of Medicine*. 2010; 362(24):2319-2325. (United States)**

Although the hazards of tobacco smoke exposure are well established, and clean indoor air laws are widespread, private homes have long been considered spaces beyond the legitimate reach of regulation. Reflecting this view, the federal government has not required the residential units it subsidizes through its public housing programs to be smoke-free. The U.S. Department of Housing and Urban Development (HUD) historically has maintained a neutral stance, saying that although local Public Housing Authorities (PHAs) may opt to ban smoking, they are not required to do so.

This policy choice has significant public health implications, given the difficulty of containing smoke in multi-unit housing. Over 7 million people are served by public housing in the U.S.,<sup>1</sup> with 4 in 10 units occupied by families with children.<sup>2</sup> Thus far, residents have had little recourse when experiencing tobacco smoke exposure in their buildings. However, policy and practice in this area are changing.

Over the last few years, many private landlords have made the housing units they own smoke-free for reasons of consumer demand, health, reduced fire hazard, lower insurance costs, and decreased cleaning costs. A small number of local governments have gone further, banning smoking in multi-family residential buildings. In public housing, nosmoking policies are rare. To date, only about 140 PHAs across the country (about 4% of the total) have reported that they voluntarily banned smoking in the public housing units they manage.<sup>3</sup>

On July 17, 2009, a shift in federal policy occurred when a key department within HUD issued a memorandum strongly encouraging PHAs to implement no-smoking policies in some or all of their public housing units.<sup>4</sup> This important development makes it timely to critically examine the state of the law and policy in this area. In this article, we explore current law concerning residential smoking regulations and consider whether additional legal and policy changes are needed for public housing units. We discuss the advantages and drawbacks of the current, localized regulatory regime, whether it is likely to lead to nationwide smoking bans in public housing, and whether such an outcome would be desirable from an ethical perspective.

## **Air Monitoring, Nicotine Monitoring, & Thirdhand Smoke Studies**

**Bohac DL, Hewett MJ, Hammond SK, Grimsrud DT. Secondhand smoke transfer and reduction by air sealing and ventilation in multiunit buildings: PFT and nicotine verification. *Indoor Air*. 2011; 21(1):36-44. (Minnesota)**

Surveys suggest that transfer of secondhand smoke (SHS) between units in multiunit residential buildings is common, but measured data are rare. This study was undertaken to quantify bulk air transfer between units and document transfer of SHS species before and after treatments that sealed boundaries between units and provided a minimum amount of continuous exhaust ventilation of

each unit. Six buildings in Minnesota were studied. Treatments were performed in clusters of up to eight units in each building, including zero to two units occupied by smokers. Bulk air transfer was quantified through passive perfluorocarbon tracer (PFT) gas tests. SHS transfer was evaluated using passive nicotine sampling. The median fraction of air entering a unit that came from other units tagged with PFTs ranged from 0.021 in a new condominium building to 0.353 in a 1930s duplex, with an overall median of 0.041. Treatments provided a median decrease of 29% in the fraction of transferred air and reduced PFT concentrations by about 40%, because of increased ventilation of both source and target apartments. Nicotine was transferred at only one-sixth the rate of PFTs. Involuntary exposure to SHS can be reduced but not eliminated by modifying existing, occupied multiunit buildings. **PRACTICAL IMPLICATIONS:** Recent studies of secondhand smoke exposure in multiunit housing indicate transmission of SHS constituents from smokers' units to those occupied by nonsmokers. A straightforward solution for this problem is to eliminate air leakage transfer between these units. This study describes a 2-year investigation of air sealing and ventilation improvements in six multiunit buildings located in a heating-dominated climate region of the US. The results quantify the reduction in interunit transfer of air between smokers' and nonsmokers' units. While it is possible to reduce the transfer when done with care, it is extremely difficult to eliminate these flows unless the buildings are vacated and extensively rebuilt. Eliminating air leakage between smokers' and nonsmokers' units is not a practical means of solving SHS transmission in an existing building.

**Dacunto PJ, Cheng KC, Acevedo-Bolton V, Klepeis NE, Repace JL, Ott WR, Hildemann LM. Identifying and quantifying secondhand smoke in multiunit homes with tobacco smoke odor complaints. *Atmospheric Environment*. 2013.71:399-407. (San Jose, San Francisco, Palo Alto, California)**

Accurate identification and quantification of the secondhand tobacco smoke (SHS) that drifts between multiunit homes (MUHs) is essential for assessing resident exposure and health risk. We collected 24 gaseous and particle measurements over 6–9 day monitoring periods in five nonsmoking MUHs with reported SHS intrusion problems. Nicotine tracer sampling showed evidence of SHS intrusion in all five homes during the monitoring period; logistic regression and chemical mass balance (CMB) analysis enabled identification and quantification of some of the precise periods of SHS entry. Logistic regression models identified SHS in eight periods when residents complained of SHS odor, and CMB provided estimates of SHS magnitude in six of these eight periods. Both approaches properly identified or apportioned all six cooking periods used as no-SHS controls. Finally, both approaches enabled identification and/or apportionment of suspected SHS in five additional periods when residents did not report smelling smoke. The time resolution of this methodology goes beyond sampling methods involving single tracers (such as nicotine), enabling the precise identification of the magnitude and duration of SHS intrusion, which is essential for accurate assessment of human exposure.

**Hood NE, Ferketich AK, Klein EG, Pirie P, Wewers ME. Associations between self-reported in-home smoking behaviors and surface nicotine concentrations in multiunit subsidized housing. *Tobacco Control*. 2012 Oct 23. Epub ahead of print. (Columbus, Ohio)**

**INTRODUCTION:** Smoke-free policies are being increasingly promoted and adopted in subsidised multiunit housing to address disparities in residential secondhand smoke exposure. In order to

inform the planning and evaluation of these policies, this study examined associations between self-reported in-home smoking and surface nicotine concentrations.

**METHODS:** A face-to-face, cross-sectional survey was conducted from August to October 2011 with leaseholders in a probability sample of private subsidised housing units in Columbus, Ohio, without an existing smoke-free housing policy (n=301, 64% response rate). After the survey, a wipe sample was collected from a wood surface in the living room to measure surface nicotine concentrations (n=279).

**RESULTS:** In-home smoking was reported by 56.6% of respondents. Geometric mean surface nicotine concentrations differed between non-smoking and smoking homes (11.4 vs 90.9  $\mu\text{g}/\text{m}^2$ ;  $p<0.001$ ), and between homes with complete, partial and no voluntary home smoking restrictions (8.9 vs 56.3 vs 145.6  $\mu\text{g}/\text{m}^2$ ;  $p<0.001$ ). Surface nicotine concentrations were moderately correlated ( $r=.52$ ) with the total number of cigarettes smoked indoors per week. Smoking behaviours of respondents, other household members and visitors, and length of stay were independently associated with surface nicotine concentrations in a multivariable model, explaining 52% of the variance.

**CONCLUSIONS:** Surface nicotine concentrations were significantly associated with a range of self-reported in-home smoking behaviours. This measure should be considered for evaluating changes in in-home smoking behaviours after implementation of smoke-free policies by subsidised housing providers. More research is needed about how surface nicotine concentrations differ over space, time and various indoor surfaces.

**King BA, Travers MJ, Cummings KM, Mahoney MC, Hyland AJ. Secondhand smoke transfer in multiunit housing. *Nicotine & Tobacco Research*. 2010; 12(11):1133-1141. (Western New York)**

**INTRODUCTION:** The home can represent a significant source of secondhand smoke (SHS), especially for individuals who live in close proximity to one another in multiunit housing (MUH). The objective of this study was to quantify real-time SHS transfer between smoke-permitted and smoke-free living units within the same MUH structure.

**METHODS:** Air monitors were used to assess  $\text{PM}_{2.5}$ , an environmental marker for SHS, in 14 smoke-free living units and 16 smoke-permitted units within 11 MUH buildings in the Buffalo, New York, area between July 2008 and August 2009. Air monitors were operated concurrently in both smoke-permitted and smoke-free units within each building. When feasible, additional monitors were stationed in shared hallways and on outdoor patios. Participants completed logs to document activities that could affect air quality.

**RESULTS:** Evidence of SHS transfer from smoke-permitted units was detected in 2 of the 14 smoke-free units and 6 of the 8 hallways. Real-time  $\text{PM}_{2.5}$  plots and participant logs suggest that SHS transfer is a function of many determinants, including ventilation and proximity between units. Following stratification by time of day, median  $\text{PM}_{2.5}$  levels were greatest between 4:00 PM and 11:59 PM but varied by location: 10.2  $\mu\text{g}/\text{m}^3$  in smoke-free units, 18.9  $\mu\text{g}/\text{m}^3$  in hallways, and 29.4  $\mu\text{g}/\text{m}^3$  in smoke-permitted units.

**CONCLUSIONS:** This study documents SHS incursions from smoke-permitted units into smoke-free units and adjacent hallways within the same building. Since many factors appear to impact the amount of SHS transfer between these areas, the implementation of a smoke-free building policy represents the most effective way to ensure that residents of MUH units are not exposed to SHS.



**Kraev TA, Adamkiewicz G, Hammond SK, Spengler JD. Indoor Concentrations of nicotine in low-income, multi-unit housing: associations with smoking behaviors and housing characteristics. *Tobacco Control*. 2009; 18(6):438-444. (Boston, Massachusetts)**

**OBJECTIVE:** An analysis of airborne nicotine measurements collected in 49 low-income, multi-unit residences across the Greater Boston Area.

**METHODS:** Nicotine concentrations were determined using passive monitors placed in homes over a one-week sampling period and air exchange rates (AER) were sampled using the perfluorocarbon tracer technique. Residents were surveyed through a questionnaire about smoking behaviour and a visual inspection was conducted to collect information on housing characteristics contributing to secondhand smoke (SHS) exposure. Using a mass balance model to account for the air exchange rate, volume of the home and sorption and re-emission of nicotine on indoor surfaces, the effective smoking rate (SR<sub>eff</sub>) was determined for each residence.

**RESULTS:** Nicotine levels ranged from the limit of detection to 26.92 microg/m<sup>3</sup>, with a mean of 2.20 microg/m<sup>3</sup> and median of 0.13 microg/m<sup>3</sup>. Nicotine measurements were significantly associated with the number of smokers in the household and the number of cigarettes smoked in the home. The results of this study suggest that questionnaire reports can provide a valid estimate of residential exposure to tobacco smoke. In addition, this study found evidence that tobacco smoke contamination in low-income housing developments is not limited to homes with smokers (either residing in the home or visiting). The frequent report of tobacco smoke odour coming from other apartments or hallways resulted in increased levels of nicotine concentrations and SR<sub>eff</sub> in non-smoking homes, suggestive of SHS infiltration from neighbouring units.

**CONCLUSION:** These findings have important implications for smoking regulations in multi-unit homes and highlight the need to reduce involuntary exposure to tobacco smoke among low-income housing residents.

**Levy, DE, Rigotti NA, Winickoff JP. Tobacco smoke exposure in a sample of Boston Public Housing Residents. *American Journal of Preventive Medicine*. 2013; 44(1):63-66. (Boston, Massachusetts)**

**BACKGROUND:** There is no safe level of tobacco smoke exposure. Nonsmoking residents of public housing are at particular risk of suffering the health consequences of tobacco smoke exposure.

**PURPOSE:** To compare levels of tobacco smoke exposure among nonsmoking residents of the Boston Housing Authority (BHA) to previously published data from the National Health and Nutrition Examination Survey and identify factors associated with such exposure in the BHA.

**METHODS:** Nonsmoking adults and children from two BHA housing developments were invited to participate in a tobacco smoke exposure screening in which they completed a short survey and provided a saliva sample for cotinine analysis. Data were collected in 2011 and analyzed in 2012.

**RESULTS:** Of 51 eligible study participants, 88% (95% CI=76%, 95%) had detectable cotinine levels (0.15 ng/mL lower limit of detection) compared to at most 56% of residents nationally (using a more sensitive 0.05 ng/mL lower limit of detection). Geometric mean cotinine levels among study participants were 0.52 ng/mL (95% CI=0.37 ng/mL, 0.74 ng/mL) compared to at most 0.10 ng/mL nationally. Residents living in homes with strict no-smoking rules had lower cotinine levels than those without such rules (0.40 ng/mL vs 1.07 ng/mL, p=0.006).

**CONCLUSIONS:** Tobacco smoke exposure is substantially higher in this sample of nonsmoking BHA residents than among nonsmoking Americans nationally. A comprehensive prohibition on

smoking in BHA housing units enacted in October 2012 will help protect this highly exposed group of residents and serve as a model for other housing authorities.

**Matt GE, Quintana PJE, Jakarian JM, Fortmann AL, Chatfield DA, Hoh E, Uribe AM, Hovell MF. When smokers move out and non-smokers move in: residential thirdhand smoke pollution and exposure. *Tobacco Control*. 2011; 20(1):1-3. (San Diego, California)**

**BACKGROUND:** This study examined whether thirdhand smoke (THS) persists in smokers' homes after they move out and non-smokers move in, and whether new non-smoking residents are exposed to THS in these homes.

**METHODS:** The homes of 100 smokers and 50 non-smokers were visited before the residents moved out. Dust, surfaces, air and participants' fingers were measured for nicotine and children's urine samples were analysed for cotinine. The new residents who moved into these homes were recruited if they were non-smokers. Dust, surfaces, air and new residents' fingers were examined for nicotine in 25 former smoker and 16 former non-smoker homes. A urine sample was collected from the youngest resident.

**RESULTS:** Smoker homes' dust, surface and air nicotine levels decreased after the change of occupancy ( $p < 0.001$ ); however dust and surfaces showed higher contamination levels in former smoker homes than former non-smoker homes ( $p < 0.05$ ). Non-smoking participants' finger nicotine was higher in former smoker homes compared to former non-smoker homes ( $p < 0.05$ ). Finger nicotine levels among non-smokers living in former smoker homes were significantly correlated with dust and surface nicotine and urine cotinine.

**CONCLUSIONS:** These findings indicate that THS accumulates in smokers' homes and persists when smokers move out even after homes remain vacant for 2 months and are cleaned and prepared for new residents. When non-smokers move into homes formerly occupied by smokers, they encounter indoor environments with THS polluted surfaces and dust. Results suggest that non-smokers living in former smoker homes are exposed to THS in dust and on surfaces.

**Thomas JL, Hecht SS, Luo X, Ming X, Ahluwalia JS, Carmella SG. Thirdhand tobacco smoke: A tobacco-specific lung carcinogen on surfaces in smokers' homes. *Nicotine & Tobacco Research*. 2013. July 26. Epub ahead of print. (Minnesota)**

**INTRODUCTION:** Thirdhand tobacco smoke consists of substances remaining on the surfaces or in the dust of areas where people have smoked. While previous studies have demonstrated the presence of nicotine and various other constituents of tobacco smoke on surfaces in smokers' homes, none has investigated the presence of tobacco-specific carcinogens.

**METHODS:** We used liquid chromatography-tandem mass spectrometry to analyze surface dust samples from both the homes of smokers and nonsmokers for the powerful tobacco-specific lung carcinogen 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK).

**RESULTS:** We positively identified NNK on surfaces in 33 of 37 smokers' homes ( $700 \pm 788$  pg/100cm<sup>2</sup> [range, not detected-3,500 pg/100cm<sup>2</sup>]), but only in 3 of 19 nonsmokers' homes ( $235 \pm 176$  pg/100cm<sup>2</sup> in the homes where NNK was detected [range, not detected-435 pg/100cm<sup>2</sup>]). The differences in occurrence and levels of NNK in the homes of smokers and nonsmokers were significant ( $p < .0001$ ).

**CONCLUSIONS:** The powerful tobacco-specific lung carcinogen NNK is present on surfaces in most homes occupied by smokers. Potential renters or buyers of apartments or homes should be

notified if previous residents were smokers in order to avoid unnecessary exposure of their families to a potent lung carcinogen.

**Wilson KM, Klein JD, Blumkin AK, Gottlieb M, Winickoff JP. Tobacco-smoke exposure in children who live in multiunit housing. *Pediatrics*. 2011; 127(1):85-92. (United States)**

**OBJECTIVE:** There is no safe level of secondhand tobacco-smoke exposure, and no previous studies have explored multiunit housing as a potential contributor to secondhand tobacco-smoke exposure in children. We hypothesized that children who live in apartments have higher cotinine levels than those who live in detached homes, when controlling for demographics.

**METHODS:** We analyzed data from the 2001-2006 National Health and Nutrition Examination Survey. The housing types we included in our study were detached houses (including mobile homes), attached houses, and apartments. Our study subjects were children between the ages of 6 and 18 years. Cotinine levels were used to assess secondhand tobacco-smoke exposure, and those living with someone who smoked inside the home were excluded.  $\chi^2$  tests, t tests, and Tobit regression models were used in Stata. Sample weights accounted for the complex survey design.

**RESULTS:** Of 5002 children in our study, 73% were exposed to secondhand tobacco smoke. Children living in apartments had an increase in cotinine of 45% over those living in detached houses. This increase was 212% ( $P < .01$ ) for white residents and 46% ( $P < .03$ ) for black residents, but there was no significant increase for those of other races/ethnicities. At every cutoff level of cotinine, children in apartments had higher rates of exposure. The exposure effect of housing type was most pronounced at lower levels of cotinine.

**CONCLUSIONS:** Most children without known secondhand tobacco-smoke exposure inside the home still showed evidence of tobacco-smoke exposure. Children in apartments had higher mean cotinine levels than children in detached houses. Potential causes for this result could be seepage through walls or shared ventilation systems. Smoking bans in multiunit housing may reduce children's exposure to tobacco smoke.

## **Economic/Legal/Implementation Studies**

**King BA, Peck RM, & Babb SD. Cost savings associated with prohibiting smoking in U.S. subsidized housing. *American Journal of Preventive Medicine*. 2013; 44(6):631-634. (United States)**

**BACKGROUND:** Tobacco smoking in multiunit housing can lead to second-hand smoke (SHS) exposure among nonsmokers, increased maintenance costs for units where smoking is permitted, and fire risks. During 2009-2010, approximately 7.1 million individuals lived in subsidized housing in the U.S., a large proportion of which were children, elderly, or disabled.

**PURPOSE:** This study calculated the annual economic costs to society that could be averted by prohibiting smoking in all U.S. subsidized housing.

**METHODS:** Estimated annual cost savings associated with SHS-related health care, renovation of units that permit smoking, and smoking-attributable fires in U.S. subsidized housing were calculated using residency estimates from the U.S. Department of Housing and Urban Development and previously reported national and state cost estimates for these indicators. When state estimates were used, a price deflator was applied to account for differential costs of living or pricing across

states. Estimates were calculated overall and by cost type for all U.S. subsidized housing, as well as for public housing only. Data were obtained and analyzed between January and March, 2011. RESULTS: Prohibiting smoking in all U.S. subsidized housing would yield cost-savings of approximately \$521 million per year, including \$341 million in SHS-related healthcare expenditures, \$108 million in renovation expenses, and \$72 million in smoking-attributable fire losses. Prohibiting smoking in U.S. public housing alone would yield cost-savings of approximately \$154 million per year.

CONCLUSIONS: Efforts to prohibit smoking in all U.S. subsidized housing would protect health and generate substantial cost-savings to society.

**Kline. Smoke knows no boundaries: legal strategies for environmental tobacco smoke incursions into the home within multi-unit residential dwellings. *Tobacco Control*. 2000; 9(2):201-205. (United States)**

OBJECTIVE: To describe legal theories that non-smoking residents of multiple occupancy buildings may employ when affected by environmental tobacco smoke (ETS) from neighbouring units.

DESIGN: Legal research was conducted in several US states. Research was performed among statutes and regulations. State health regulations were examined as well as common law claims of nuisance, warranties of habitability, and the right of quiet enjoyment.

RESULTS: Through the use of state regulations, such as a sanitary code, several states provide general language for protecting the health of residents in multi-unit buildings. State law also supports more traditional claims of nuisance, warranties of habitability, and the right of quiet enjoyment.

CONCLUSIONS: The use of state regulations has the potential to provide an effective, existing vehicle for resolution of ETS incursion problems. The general health protection language of the regulations, in conjunction with the latest evidence of the harmful effects of ETS, gives state agencies authority to regulate environmental tobacco smoke incursions among apartments in multi-unit dwellings. Where state regulations are not available, other common law legal remedies may be available.

**Modayil MV, Consolacion TB, Isler J, Soria S, Stevens C. Cost-effective smoke-free multiunit housing media campaigns: Connecting with local communities. *Health Promotion Practice*. 2011; 12(6 Suppl 2):S173-S185. (California)**

Presented are cost-effective paid media strategies to educate Californians to advocate for stronger smoke-free multiunit housing (SF-MUH) policies between 2006 and 2008. Included is a summary of general market and specific ethnic market costs that correspond to SF-MUH attitudes and home smoking bans. Statewide questionnaires indicated that half of the intended general market saw an antitobacco TV ad and half of the intended ethnic markets heard radio ads. Analyses indicated that it cost \$0.67 and \$0.78 per person to see Caution Tape and Apartment TV ads, respectively. Slightly higher per capita costs corresponded with positive attitudes toward SF-MUH: \$0.87 for Caution Tape and \$1.00 for Apartment. Lessons learned from this campaign included effectiveness of specific ads in ethnic markets, impact on SF-MUH work plan policy objectives, and the need for collaborations among state and local partners throughout the message development process.

**Ong MK, Diamant AL, Zhou Q, Park HY, Kaplan RM. Estimates of Smoking-Related Property Costs in California Multiunit Housing. *American Journal of Public Health.* 2012; 102(3):490-493. (California)**

We systematically evaluated smoking-related costs in multiunit housing. From 2008 to 2009, we surveyed California multiunit housing owners or managers on their past-year smoking-related costs and smoke-free policies. A total of 27.1% of respondents had incurred smoking-related costs (mean \$4935), and 33.5% reported complete smoke-free policies, which lowered the likelihood of incurring smoking-related costs. Implementing statewide complete smoke-free policies may save multiunit housing property owners \$ 18,094,254 annually.

**Satterlund TD, Treiber J, Kipke R, Cassady D. A qualitative evaluation of 40 voluntary, smoke-free multiunit, housing policy campaigns in California. *Tobacco Control.* 2013. June 19. Epub ahead of print. (California)**

**BACKGROUND:** Although it is legal for multiunit housing (MUH) property owners in all 50 states to prohibit smoking on their premises, including in individual units, MUH constitutes a relatively new setting to reduce exposure to secondhand smoke via voluntary smoke-free policy. This paper examines California state-funded smoke-free MUH policy campaigns between 2004 and 2010.

**METHODS:** A cross-case analysis of 40 state-funded smoke-free MUH policy campaigns was conducted via an examination of final evaluation reports submitted to the California Tobacco Control Program.

**RESULTS:** The most effective voluntary smoke-free MUH policy campaigns typically included: (1) learning the local [MUH] context, (2) finding and using a champion, (3) partnering with like-minded organisations, (4) building relationships with stakeholders, (5) collecting and using local data and (6) making a compelling case to decision makers.

**DISCUSSIONS:** The aforementioned steps tended to be intertwined, and successfully securing voluntary smoke-free MUH policy required a strategic but flexible plan of implementation prior to entrance into the field. Campaigns designed to enhance voluntary smoke-free MUH policy adoption should underscore the economic viability of such policies during each strategic step.

**Treiber J, Acosta-Deprez V, Kipke R, Satterlund T, Araquel C. Achieving smoke-free apartment outdoor area policies in Asian/Pacific islander neighborhoods of central Los Angeles. *Journal of Immigrant and Minority Health.* 2012; 14(5):895-897. (Los Angeles, California)**

Attempting to achieve non-smoking outdoor area policies in apartment complexes of Central Los Angeles Asian/Pacific Islander neighborhoods, People's CORE, a community based organization, partnered with a professional evaluator for a three year campaign. Focus group discussion results with residents showed readiness as well as hesitation towards non-smoking policies. Through community organizing, focus group discussions with tenants and one-on-one education outreach activities to apartment managers, the organization managed to have 20 apartment complexes adopt and implement policies for smoking restrictions in their common outdoor areas. Pre- and post-observations at 52 apartment complexes showed statistically significant reduction of tobacco litter in parking areas/garages, entrance ways, courtyards, and balcony/walkway/community rooms. The authors attribute the success of the project in part to the long-standing good reputation of People's CORE as a community mobilizer and organizer.