
**Survey of Minnesota Renters regarding
Secondhand Smoke Movement in Apartment Buildings
and Interest in Smoke-Free Buildings**

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Center for Energy and Environment



Association for Nonsmokers - Minnesota

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Secondhand Smoke Movement in Apartment Buildings
and Interest in Smoke-Free Buildings**

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EXECUTIVE SUMMARY

Objectives

This study was completed as part of a research project focused on environmental tobacco smoke (ETS) in apartment buildings. Minnesota renters, who comprise 25.4% of Minnesota households,¹ have no guarantee of a smoke-free place to live. As a result, they are sometimes exposed to environmental tobacco smoke (ETS) entering their apartments from other apartments, from common areas of the building such as hallways or party rooms, or from balconies, patios or grounds outside the building, a phenomenon that we refer to here as “ETS transfer” or “secondhand smoke transfer.” The goal of the project as a whole is to build a sound base of knowledge that will facilitate two types of actions to reduce renters’ exposure to environmental tobacco smoke (ETS) in their homes: designation of smoke-free apartment buildings, and treatment of smoking-permitted buildings to minimize ETS transfer.

This report summarizes the results of the second of six project tasks: a survey of Minnesota renters. This task has three objectives:

1. to quantify the perceived extent and severity of problems with ETS transfer among Minnesotans who live in rental housing, both overall and within population groups of key concern to MPAAT,
2. to provide owners with solid information regarding the marketability of smoke-free rental housing and the importance of ETS-free units to renters, both overall and by market segment, and
3. to examine how problems with ETS transfer vary by building type and by location within buildings, thereby helping to guide the building testing to be conducted later in the project.

Methodology

Six hundred rental households living in multifamily buildings in Minnesota were surveyed in late winter and early spring of 2001. Those surveyed included a random sample of 405 rental households and over-samples of minorities of particular concern to MPAAT, young adults, households with children and households living in 2-to-4 unit dwellings. These samples provide a margin of error due to sampling of $\pm 5\%$ for Minnesota rental households as a whole and $\pm 10\%$ or less for the over-sampled subgroups, as well as for low income households.² We used a combination of mail and telephone approaches to achieve an overall response rate of 71%. Telephone interviews were completed in Spanish where necessary. The addresses corresponding to completed surveys were matched with addresses in various property databases to obtain

¹ Based on 2000 Census data from the Minnesota State Demographer’s internet site at <http://front.mnplan.state.mn.us/demography/Cen2000profiles/cen00profhouse.html>

² Households below 50% of Minnesota median income for the household size. This corresponds to the cutoff criterion for the federal Energy Assistance Program in Minnesota. Households below this income level are sufficiently numerous in the rental population to provide a $\pm 10\%$ confidence interval without over-sampling. This income level is higher than the federal Health and Human Services poverty definition.

accurate information on the age and number of units in the building occupied by the respondent. The survey data were analyzed using SPSS statistical software.

Incidence of Smoking among Rental Households in Minnesota

Seventy-one percent of rental households in multifamily buildings in Minnesota have no smokers, while 29% have one or more smokers. Households with children and non-senior households are significantly more likely to have a smoker (40% and 34% respectively) than other households. The data suggest that poor rental households may also be more likely to have one or more smokers, but the sample size of poor households is too small for this difference to reach even marginal significance. There are no statistically significant differences in the prevalence of smokers by quintiles of income, by rent category, by ethnicity (i.e., membership in an MPAAT minority of concern or not), or by residence in the Minneapolis-St. Paul Metropolitan area vs. Outstate areas. Few of the population segments analyzed have smokers in more than a third of households, and none has smokers in more than 40% of households.

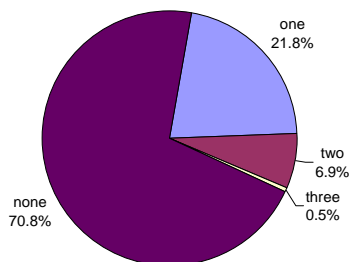


Figure E1. Of the people who live in your apartment, how many smoke?

Twenty-three percent of rental households said they allow smoking in their apartments, 18% “sometimes” allow it, and 59% do not allow it. Among households with at least one smoker, 65% allow smoking in their homes, 19% sometimes allow it, and 16% do not allow it. Among households with no smokers, 6% allow smoking in their homes, 17% sometimes allow it, and 77% do not allow it.

Secondhand Smoke Transfer in Multifamily Buildings

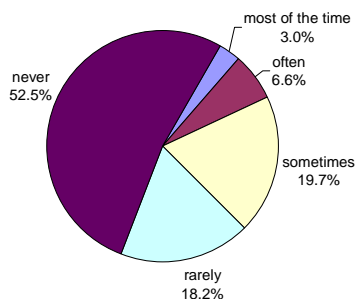


Figure E2. In the past 12 months, how often has... [tobacco smoke odor] gotten into your current apartment from somewhere else in or around the building?

Forty-eight percent of rental households in multifamily buildings in Minnesota report that, at times, tobacco smoke odors get into their current apartment from somewhere else in or around the building. Three percent say that this occurs “most of the time” and 7% say that it occurs “often.” Considering the 482,000 rental households in the state, and assuming that roughly 80% of them are in multifamily buildings (as was

the case in the 1990 Census), this means that about 37,000 rental households experience secondhand smoke transfer “often” or “most of the time.” Another 20% or 76,000 “sometimes” experience secondhand smoke transfer, and an additional 18% experience secondhand smoke transfer “rarely.”

Households with children, very poor households, non-senior households and households in older buildings report significantly or marginally more frequent secondhand smoke transfer into their current apartment. There are no significant differences in the frequency of problems with secondhand smoke transfer by rent category, minority status, or presence of smokers in the households. In addition, there is no significant difference in the reported frequency of ETS transfer by building height (low-rise, mid-rise or high-rise), building size, or the floor that the tenant is located on.

Respondents who said that tobacco smoke odor at times gets into their current apartment from somewhere else were asked how much this odor bothers them. Five percent of those who are experiencing ETS transfer (2% of all renters) said it bothers them so much that they are thinking of moving. Thirty-two percent of those who are experiencing it (15% of all renters) said it bothers them “a lot,” and 42% of those who are experiencing it (20% of all renters) said it

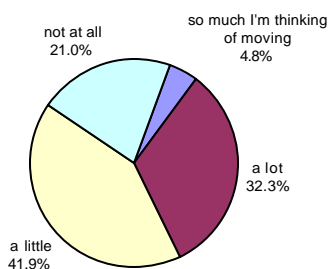


Figure E3. When [tobacco smoke odor] gets into your apartment from somewhere else, how much [does it] bother you?

bothers them “a little.” Twenty-one percent say it does not bother them at all. These findings imply that statewide about 7,700 rental households are currently experiencing ETS transfer severe enough that they are thinking of moving, while another 58,000 households are experiencing ETS transfer to a degree that bothers them “a lot.” Households that experience more frequent ETS transfer are more bothered by it. Households with no smokers and households with children under five years of age are significantly more

bothered by ETS transfer than other households, with 6% and 13%, respectively, saying that the ETS transfer they are experiencing bothers them so much that they are thinking of moving.

Among those who experience ETS transfer in their current apartments, 43% said that the most common way the tobacco smoke gets into their apartment is from the hallway, 23% said the most common route is through their windows, 9% said the most common route is through air leaks from other apartments and 6% said the most common route is through bathroom or kitchen fans. Secondhand smoke transfer is reported to occur roughly equally in all four seasons. There is only a weak relationship between the most common route of ETS transfer and building size, rent category (a possible rough proxy for building condition) and building age.

Sixty-four percent of renters have had a problem with ETS transfer in a current or previous apartment at some time. The actions renters have taken in response to the problem are to close

their windows (41%), block the gap under the door to the hallway (22%), talk to the landlord (17%), turn off or block their bathroom or kitchen fan (12%), talk to the people who smoke (8%), move (7%) and seal leaks in walls, floors or ceilings (5%).

Current Extent of Smoke-Free Designation

Fourteen percent of renters in the random sample said that they live in buildings where the landlord prohibits smoking in all apartments. This proportion seemed implausibly high based on our familiarity with the rental market in Minnesota, so we sought to verify this information by contacting the building owners. This resulted in a corrected estimate that only about 2.4% of Minnesota renters currently live in buildings where smoking is prohibited in all apartments.

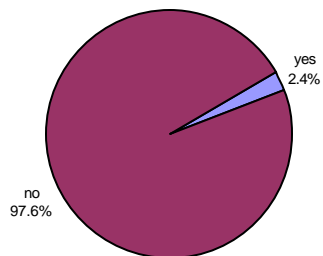


Figure E4. Does the landlord prohibit smoking in [all apartments in] your building?

Market for Smoke-Free Rental Units

Minnesota renters express a high level of interest in smoke-free buildings. Twenty-six percent of respondents in the random sample said they would be “extremely interested” in living in a building where smoking is not allowed anywhere, and 20% said they would be “very interested.” These two together comprise 47% of the rental market, clearly a viable market segment.

Not surprisingly, the level of interest is much higher among households with no smokers than among households with smokers: 63% of households with no smokers are extremely or very interested, vs. 8% of households with one or more smokers. MPAAT minorities of concern are also more interested in living in a smoke-free building than are people of other ethnicities: 42% of MPAAT minorities are extremely interested, vs. 23% of people of other ethnicities.³ We found no other statistically significant differences in the level of interest in smoke-free buildings: interest was consistent across income levels, rent levels and age groups

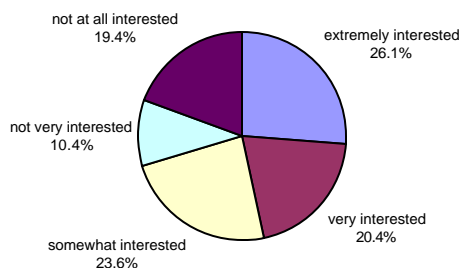


Figure E5. How interested would you be in living in a building where smoking is not allowed anywhere?

³ “Other ethnicities” includes primarily non-Hispanic Caucasians, with a very small number of people of other ethnicities.

and regardless of whether the household had children or not or was located in the Metro or Outstate area.

Looking at the issue from another perspective, 20% of renters said that it is very important to them to live in a building that allows smoking, 12% said it is somewhat important, 16% said it is not very important, and 52% said it is not at all important.

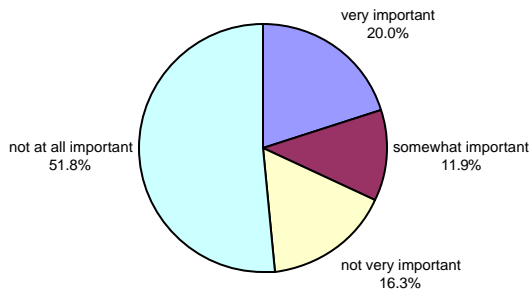


Figure E6. How important is it to you to live in a building that allows smoking?

Households with smokers are much more likely to say that living in a building that allows smoking is very important to them than are non-smokers (43% vs. 11%). Households with incomes below 50% of the state median for their family size and renters over 24 are more likely to say that living in a building where smoking is allowed is important to them than are other renters.

Fifty-four percent of households in the random sample said that if two apartment buildings were the same in every way including rent, except that one did not allow smoking, they would be “very likely” to choose the smoke-free building. Nineteen percent said they would be “somewhat likely,” 9% said they would be “not very likely,” and 18% said they would be “not at all likely” to choose the smoke-free building. Households without smokers, seniors and MPAAT minorities of concern are more likely to say they would choose the smoke-free building. There are marginally significant differences across quintiles of income, a result that seems to be primarily due to a difference between the highest quintile and the other four quintiles, rather than a gradual change across quintiles.

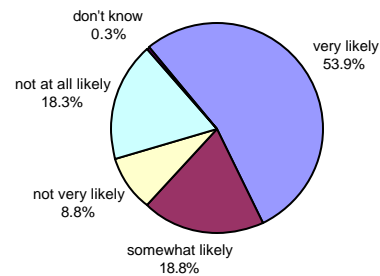


Figure E7. If two apartment buildings were the same in every way including rent, except that one did not allow smoking, how likely would you be to choose the "no-smoking" building over the building where smoking was permitted?

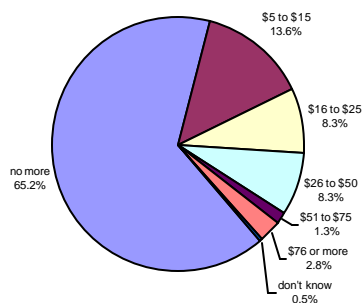


Figure E8. If two apartment buildings were the same, except that one did not allow smoking anywhere, how much more would you be willing to pay per month to live in the "no-smoking" building?

Thirty-four percent of renters said they would be willing to pay more to live in a smoke-free building. Fourteen percent would be willing to pay \$5 to \$15 more per month, an additional 8% would be willing to pay \$16 to \$25 more per month, and an additional 8% would be willing to pay \$26 to \$50 more per

month. A few would be willing to pay \$51 to \$75 more per month (1%) or even \$76 or more per month (3%). Non-smokers, households with higher incomes, MPAAT minorities of concern and non-senior households are significantly more likely than others to be willing to pay more to live in a smoke-free building.

About a third of tenants would be willing to live in a moderately less convenient location in order to live in an apartment with little or no tobacco smoke odor: 30% would be willing to drive ten minutes farther to work; 36% would be willing to travel 10 minutes farther to parks or lakes; and 31% would be willing to walk three blocks further to a bus line.

Not too many tenants are willing to trade space for a smoke-free environment: only 13% would be willing to live in an apartment with one less bedroom, and only 11% said they would be willing to live in an apartment with smaller rooms.

In terms of amenities, only 12% said they would be willing to live in an apartment with older carpets, paint and cabinets. Fourteen percent of those who currently have underground parking would be willing to live in a building that did not have it in order to live in an apartment with little or no tobacco smoke odor. Eighteen percent of those who currently have a dishwasher would be willing to live in an apartment without a dishwasher to live in a building with little or no tobacco smoke odor. Thirty percent of renters would be willing to live in a building that was 20 years older. Twelve percent would be willing to live in a building with less security, but only 6% would be willing to live in a somewhat less safe neighborhood in order to live in an apartment with little or no tobacco smoke odor. Seven percent would be willing to live in a somewhat noisier neighborhood.

Discussion

Secondhand smoke transfer appears to be a very common occurrence in multifamily buildings in Minnesota, with almost half of renters experiencing it in their current apartments and almost two-thirds having experienced it in some apartment they have lived in. Ten percent of renters say ETS comes into their apartments from elsewhere often or most of the time. The design and construction of existing multifamily buildings in Minnesota is not isolating renters from contaminants generated outside their own apartments.

There appears to be strong market potential for smoke-free buildings. Only three in ten rental households include someone who smokes, and no market segment we looked at has smokers in more than four out of ten households. Almost half of Minnesota renters are extremely or very interested in living in a smoke-free building. Market potential appears to be high across all demographic segments investigated, ranging from a high of 64% extremely or very interested among minorities to a low of 40% extremely or very interested among those in the lowest quartile of rent paid.

Offering smoke-free buildings appears quite likely to be profitable to private owners. Over half of rental households said they would be very likely to choose a smoke-free building over a smoking-permitted building that was the same in all other ways, suggesting that owners could differentiate their properties simply by designating them smoke-free. Ninety-five percent of the

smoke-free owners interviewed earlier said that smoke-free designation had had neutral or positive effects on turnover, vacancy and amount of rent charged, and over half said that smoke-free designation had reduced turnover costs (for painting, decorating, leasing). Only one of twenty smoke-free owners had had to enforce his lease against a tenant who smoked. These experiences suggest that operating costs for smoke-free buildings would be the same or lower than those for smoking-permitted buildings. Over a third of renters said they would be willing to pay more to live in a smoking-permitted building, suggesting that smoke-free designation might increase income as well as decrease operating costs.

The results suggest that many clients of public and publicly-assisted housing are also very interested in smoke-free housing. Six in ten households below the federal HHS poverty line (about 25% of Minnesota median income) and almost two-thirds of households below 50% of Minnesota median income have no smokers. Very low income households are more likely to experience ETS transfer in their current apartments and very low and low income households are as likely to be bothered by this as higher income renters. These households have a level of interest in smoke-free buildings that is almost identical to that of higher income households – 45% of very poor households and 44% of poor households are extremely or very interested. For obvious reasons, though, these households are less likely to say they would pay more to live in a smoke-free building.

About one in forty rental households live in a building where the landlord prohibits smoking in the apartments. This appears to indicate that Minnesota owners have successfully implemented smoke-free policies in a few buildings. The qualitative survey of owners also identified successful experiences with smoke-free designation in Minnesota.

BACKGROUND

The Center for Energy and Environment (CEE) and the Association for Nonsmokers – Minnesota (ANSR) are conducting a research project focused on environmental tobacco smoke (ETS) in apartment buildings. “Clean Indoor Air in Apartments – Researching Effective Strategies” is funded by the Minnesota Partnership for Action Against Tobacco (MPAAT), a non-profit public foundation funded by proceeds from the Minnesota tobacco settlement.

Minnesota renters, who comprise 25.4% of Minnesota households⁴ and who disproportionately include minorities, low income households, and young adults, have no guarantee of a smoke-free place to live and sometimes experience unwanted exposure to environmental tobacco smoke (ETS) entering their apartments from other apartments, from common areas of the building, or from outside the building. The goal of this project is to build a sound base of knowledge that will facilitate two types of actions to reduce renters’ exposure to environmental tobacco smoke (ETS) in their homes:

- designation of smoke-free apartment buildings, and
- treatment of smoking-permitted buildings to minimize transfer of ETS among units.

The project includes six interrelated applied research activities:

1. ***Qualitative interviews of multifamily building owners and managers.*** These interviews will provide an understanding of the barriers and information needs owners face in addressing this problem.
2. ***A survey of a stratified random sample of Minnesota renters.*** This survey will quantify the extent and severity of perceived problems with ETS transfer among renters, both overall and within population groups of key concern (low income households, young adults, and minorities⁵ and households with children). It will provide solid information on the marketability of smoke-free rental housing and the importance of ETS-free units to renters, both overall and by market segment. It will also provide data on the distribution of problems with ETS transfer by building type and location within buildings as input to later building testing.
3. ***Legal research.*** Technical legal research will summarize the status of the law with regard to designation of smoke-free buildings and taking or not taking actions to minimize ETS transfer in smoking-permitted buildings. It will examine federal and state legislation, regulations, case law, and secondary sources in the areas of landlord-tenant law, civil rights law, negligence/tort law, and nuisance and environmental rights law. The research will allow us to develop a model smoke-free lease clause, and to identify changes to statutes, ordinances and regulations that would facilitate smoke-free rental housing and reductions in ETS transfer in smoking-permitted housing.
4. ***Buildings research.*** This research will quantify contaminant dispersal and air movement among units in a sample of multifamily buildings in Minnesota, using passive

⁴ Based on 2000 Census data from the Minnesota State Demographer’s internet site at <http://front.mnplan.state.mn.us/demography/Cen2000profiles/cen00profhouse.html>

⁵ Particular minorities of concern to MPAAT are Black, African-American, or African; Hispanic or Chicano; American Indian or Native-American; and Southeast Asian (Cambodian, Hmong, Vietnamese, Laotian, or Thai).

perfluorocarbon tracer gas techniques, multiple fan depressurization and air flow modeling, supplemented by measurements of fine particulate mass and nicotine. The work will focus on those building types found in task 2 to have the greatest problems. After testing to diagnose the causes of unwanted air transfer, we will treat the building structure and the ventilation system(s) to reduce it and measure the reductions achieved. Successful treatments will be identified and associated costs quantified.

5. **Financial analysis.** Financial analysis will quantify the potential benefits of smoke-free properties to owners in terms of reduced turnover rates, reduced fire insurance rates and reduced costs of cleaning and maintenance when units turn over.
6. **Synthesis.** We will evaluate all of the research outcomes from Tasks 1 to 5 to identify the most promising avenues for application of the findings. The most appropriate paths of communication will be identified and the key project results will be packaged in formats suitable for the target audiences, in preparation for subsequent implementation.

This report summarizes the results of the second research activity: a survey of a stratified random sample of Minnesota renters. This task has several objectives. One is to quantify and document the extent and severity of perceived problems with ETS transfer among Minnesotans who live in rental housing, both overall and within population groups of key concern to MPAAT. A second is to provide owners with solid information regarding the marketability of smoke-free rental housing and the importance of ETS-free units to renters, both overall and by market segment. A third objective is to examine how problems with ETS transfer vary by building type and location within buildings, thereby helping to guide the engineering research to be conducted in Task 4.

The primary research questions addressed in this task are:

Minimizing ETS transfer

- What are tenants' perceptions of the frequency and severity of problems with objectionable air movement between units in the apartment they currently occupy?
- What are tenants' perceptions of the source(s) of the objectionable air entering their apartments?
- What are tenants' perceptions of the frequency and severity of problems with movement of ETS specifically between units in the apartment they currently occupy?
- What are tenants' perceptions of the source(s) of ETS, specifically, entering their apartments?
- During what season(s) of the year do tenants notice the greatest problems with ETS transfer?
- What have tenants done about any problem with ETS transfer (contacted management, talked to the smoking household, done something to reduce air movement themselves, other)?
- What effect has the action had?
- Have tenants experienced problems with ETS transfer in other apartments they have lived in?
- Would tenants move from an apartment due to ETS transfer problems? Why or why not? Have they ever done so?
- What fraction of tenants have a smoker in the household? For these tenants, how important is it for them to live in a building that allows smoking?
- What fraction of tenants allow smoking in their homes? For these tenants, how important is it for them to live in a building that allows smoking?

- How do answers to these questions vary by ethnicity, income, rental rate, age of respondent, number of children in the household, presence of a smoker in the household?
- How do answers to these questions vary by building type and age and by tenants' location within the building?

Smoke-free buildings

- What is tenants' level of interest in smoke-free buildings? Would they be willing to pay higher rent to live in such a building? How much higher?
- What fraction of tenants currently live in designated smoke-free buildings (or designated smoke-free units)?
- How much importance do tenants attach to a designated smoke-free building, compared with the importance they attach to other factors they consider when deciding to rent an apartment (price, location, amenities, security, etc.)
- How much importance do tenants attach to a unit with little or no observable ETS transfer, compared with the importance they attach to other factors they consider when deciding to rent an apartment (price, location, amenities, security, etc.)
- How do answers to these questions vary by ethnicity, income, age of respondent, number of children in the household, presence of a smoker in the household, or rental rate?

METHODOLOGY

Since the goal of this task is to provide statistically reliable data on problems with ETS transfer and interest in smoke-free housing among Minnesota renters, a quantitative approach was used. A stratified random sample was selected to assure adequate representation of the overall population and of sub-populations of key concern. Data collection focused on achieving a high response rate to minimize non-response bias.

Questionnaire design, analysis planning and report preparation were executed primarily by CEE and ANSR, but with significant input from the contracted survey research firm, Anderson, Niebuhr & Associates (ANA). Sample design and selection, data collection, cleaning, coding and much of the analysis were executed by Anderson, Niebuhr & Associates, with input as needed from CEE. Staff of the Minnesota Multi Housing Association (MHA) and Hanbery, Neumeyer & Carney reviewed the survey instrument, and these organizations together with the Minnesota chapter of the National Association of Housing and Redevelopment Officials (Mn NAHRO) reviewed the draft report.

Population, and Subpopulations of Key Concern

The population of interest for this task is comprised of those Minnesota renters who live in buildings with two or more dwelling units. The actual sampling frame consists of rental households. According to the 2000 Census⁶ Minnesota had 482,262 renter-occupied housing units in 2000. Based on data from the 1990 Census, the latest information available on this point, roughly 80% of renter-occupied housing units in Minnesota are in buildings with two or more dwelling units.

Selected subpopulations are of key concern to MPAAT. In its "Priorities to be used to develop a strategic plan for MPAAT's research account for the Year 2000," MPAAT identified the following "targeted populations:" women, African-Americans, American Indians, Asian-Americans, Latinos, youth 18 to 24 years of age, blue collar workers, senior citizens, and gays and lesbians. The Minnesota Department of Health has a particular focus on youth under 18 years of age. This study over-sampled minorities, young adults (18 to 24) and households with children to achieve sample sizes large enough to provide 95% confidence intervals of $\pm 10\%$ for these subgroups. We were unaware of MPAAT's focus on blue collar workers and gays and lesbians at the time of the study design and so did not oversample these groups or ask questions about occupation or sexual orientation on the questionnaire. Senior citizens were expected to be well enough represented in the rental population to provide adequate confidence intervals without over-sampling. One additional subpopulation that was over-sampled consisted of households in buildings of 2-to-4 units. We wanted to achieve a reasonable confidence interval for this group to facilitate analysis of the differences among buildings of various sizes in the extent and severity of problems with ETS transfer.

⁶ *Profiles of General Demographic Characteristics 2000. 2000 Census of Population and Housing: Minnesota.* U.S. Department of Commerce, 2000.

Samples

Several commercially available lists were investigated as potential sources for the renter samples. The InfoUSA (formerly American Business Information) list was chosen because it was by far the largest, containing 496,065 entries, quite close to the 2000 Census count of renter-occupied housing units. The InfoUSA list had telephone numbers available for 319,804 households. The households in the sample without telephone numbers were sent to another commercial firm, Telematch, to obtain additional phone numbers.

The InfoUSA list included some limited demographic information that was used to draw the required oversamples, including information on the age of the householder (used to draw the oversample of respondents 24 years of age or younger), presence of children (used to draw the oversample of households with children), ethnicity (based on surname -- used to draw the oversample of minority respondents) and number of units at the address (based on postal delivery sequence file -- used to draw the oversample of households in 2-to-4 unit buildings). This information is imperfect, so respondents' membership in these subpopulations was confirmed from actual survey responses.

The initial sampling plan (Table 1) was to draw a stratified random sample of 860 Minnesota renters to allow for 600 completions with a 70% response rate. The 70% response rate was felt to be as high as could be achieved at reasonable cost from this population and to provide for acceptable non-response error. The 600 completions were to include 400 respondents for Minnesota as a whole, to provide a 95% confidence that the sampling error for population proportions would be less than or equal to 5%. Based on available demographic data, this simple random sample was expected to be sufficient to give a 95% confidence interval of $\pm 10\%$ for low income households (with income below 50% of the Minnesota median income for their household size). Other subgroups were to be over-sampled to assure a $\pm 10\%$ confidence interval, including minority households (roughly 9% of rental households based on 1990 Census data), heads of household 24 years of age or younger (roughly 17% of rental households based on 1990 Census data), households with children (roughly 8% of rental households based on 1990 Census data) and 2-to-4 unit dwellings (roughly 18% of rental households based on 1990 Census data).

Table 1. Initial sampling plan.

	Anticipated from 400 random completions	Additional surveys needed	Total completions
Overall population of rental households	400	--	400
MPAAT minorities	36	64	100
Young adults (≤ 24 yrs)	68	32	100
Households with children	32	68	100
Respondents living in 2-4 unit dwellings	72	28	100

The actual sample drawn included 1594 entries. The larger-than-anticipated sample was required due to the need to replace the substantial number of entries that proved to be out-of-sample because they were non-renters, because the telephone numbers were no longer valid or for some other reason. The sample disposition and the final response rates achieved for the random sample and for the various subgroups of interest are shown in Tables 3 through 4.

The total final sample of respondents includes 600 households. Of these, 405 households make up the random sample. The number of respondents in the various analysis subgroups is shown in Table 2. Cross-tabulations and other analyses related to any of the subgroups in Table 2 were conducted using the completed surveys from the random sample and from the over-sample specific to that group. For example, any cross-tabulations related to MPAAT minorities of concern were conducted including the random sample (62 MPAAT minorities of concern and 335 other ethnicities, excluding the 8 cases with MPAAT minority status unknown) plus the 66 MPAAT minorities obtained from the over-sample that was drawn specifically to increase the sample size of MPAAT minorities. The additional 22 MPAAT minority cases obtained from over-sampling young adults, households with children and respondents in 2-to-4 unit dwellings were excluded. This approach assures that both the “MPAAT minority” sample and the “other ethnicities” sample used to compare these two groups were drawn at random from their respective populations, and do not include an inflated number of young adults, households with children or respondents in 2-to-4 unit dwellings.

Table 2. Final numbers of respondents in analysis subgroups.

	Completes from 405 random completions	Completes from oversample specific to group	Total from random sample plus oversample specific to group	Completes from oversample of other groups (not used)	Total completions
Overall population of rental households	405	--	405	--	--
MPAAT minorities	62	66	128	22	150
Young adults (≤ 24 yrs)	75	31	106	29	135
Households with children	71	42	113	57	170
Respondents living in 2-4 unit dwellings	61	7	68	36	104

Design of the Survey Instrument

CEE and ANSR developed a first draft of the renter questionnaire, which was critiqued by staff of ANA, MHA and Hanbery, Neumeyer & Carney and went through several iterations. Minnesota NAHRO was not able to give us input on the questionnaire within the timeframe available. To assure that the overall questionnaire design and individual items provided valid and reliable results, ANA pretested the questionnaire with 20 respondents, fourteen by mail and six by telephone. Copies of the final questionnaire in English and in Spanish are included in Appendix A.

Data Collection

In order to achieve response rates of 70% or more and minimize non-response bias, we used a combination of mail and telephone approaches. The first mailing included a personalized cover letter (see Appendix A), the questionnaire and a crisp \$2 bill, and was sent by first-class mail along with a pre-addressed, postage-paid return envelope. The cover letter indicated that all renters completing a survey would be entered in a drawing to win \$1000. The second mailing was a reminder postcard. The third mailing featured a flyer highlighting the \$1000 drawing, another copy of the questionnaire, and another pre-addressed, postage-paid return envelope.

Those who did not respond to the mailings were contacted by telephone if possible. The telephone interviews were conducted in Spanish when Spanish-speaking individuals were encountered who were unable to follow the line of questioning in English. Some other language barriers were encountered with insufficient frequency to justify the cost of conducting the interviews in those languages, including Hmong (4), Somali (2), Ethiopian (1), Arabic (1), Russian (1), Chinese (1), and unidentified languages (22). Data were collected between February 20 and April 14, 2001, essentially all during the heating season, since the average daily temperature did not get above 60°F in the first half of April 2001 even in southern Minnesota.

Table 3. Sample disposition and response rate for overall sample.

Type	Description	Number
C	Completed by Mail	324
C	Completed by Phone (English)	256
C	Completed by Phone (Spanish)	20
OOS	Unavailable study period	1
OOS	Attempted 9 or more times	90
OOS	Non-Spanish Language Barrier	32
OOS	Mentally/Physically/Emotionally unable to participate	28
OOS	Deceased	1
OOS	Bad phone number	357
OOS	Non-renter	240
NR	Refusal	225
NR	Answering Machine	13
NR	No Answer	0
NR	Busy	0
NR	Callback	7
		1594

Total completes	600
Total sample touched	1594
Out of sample	749
Adjusted sample	845
Non-respondents	245
Response rate (completes/adjusted sample)	71%

The response rate achieved for the overall sample was 71% (see Table 3). The response rate achieved for subcode 2 (the over-sample drawn to increase the number of MPAAT minorities of concern) was 75%; that for subcode 3 (the over-sample drawn to increase the number of young adults) was 77% and that for subcode 4 (the over-sample drawn to increase the number of households with children) was 82% (Table 4). The response rate achieved for subcode 5 (the over-sample drawn to increase the number of renters living in 2-to-4 unit buildings) was only 45%.

Some bias can be introduced due to the non-respondents, or even due to some of the cases defined as “out-of-sample,” if, for example, those who refused to respond or those who were attempted nine or more times are different in some systematic and important way from those who responded. One particular area of concern here is the 32 individuals for whom a non-Spanish language barrier was encountered. These 32 are a small group relative to the total sample touched but somewhat more substantial relative to the sample of MPAAT minorities of concern touched. On the whole, though, the response rates are exceptionally high for a population of renters.

Table 4. Sample Disposition for Over-Sampled Groups.

Type	Description	subcode 2	subcode 3	subcode 4	subcode 5
C	Completed by Mail	33	23	38	7
C	Completed by Phone (English)	49	17	13	2
C	Completed by Phone (Spanish)	10	3	0	0
OOS	Unavailable study period	0	0	0	0
OOS	Attempted 9 or more times	13	5	6	0
OOS	Non-Spanish Language Barrier	20	3	1	0
OOS	Mentally/Physically/Emotionally unable to participate	0	0	0	2
OOS	Deceased	0	0	0	0
OOS	Bad phone number	73	30	15	12
OOS	Non-renter	12	7	35	27
NR	Refusal	25	9	11	10
NR	Answering Machine	5	1	0	0
NR	No Answer	0	0	0	0
NR	Busy	0	0	0	0
NR	Callback	0	3	0	1
		240	101	119	61
Total completes		92	43	51	9
Total sample touched		240	101	119	61
Out of sample		118	45	57	41
Adjusted sample		122	56	62	20
Non-respondents		30	13	11	11
Response rate (completes/adjusted sample)		75%	77%	82%	45%
Total actually in population targeted by oversample		66	31	42	7

Analysis of the frequency of problems with ETS transfer as a function of building age and size requires accurate data on those two variables. We felt that renters often would not be able to provide very accurate estimates of the age of the buildings in which they live. In addition, renters in larger buildings may not have a very accurate idea of the number of units in the building. To obtain accurate information on these two variables, the addresses of all 600 respondents were sent to the Hawthorne Group for matching with building information. The Hawthorne Group used their “MultiFacts” database, other in-house databases, on-line city and county databases, direct contact with city and county staff who looked up information in their databases, and, in a few cases, direct contact with building staff, to obtain data on the number of units in each building and the year it was built. The primary difficulty in doing this is that tax assessors’ records, the main source of all these data, are based on the legal address, which is often different from the mailing address. In spite of these difficulties, Hawthorne Group was able to provide the number of units in the building and the age of the building for 87% of the respondents.

Data Cleaning and Coding

Each questionnaire was reviewed for completeness and consistency and coded by experienced coders before being transferred to an SPSS data file for analysis. All transfer of data was verified. CEE provided input to ANA regarding data cleaning and back-coding of various “other” responses into pre-defined response categories.

To facilitate analysis, quite a few recoded variables were created from the questions in the survey instrument and/or the data from the property database. These recoded variables are defined below.

Indoor smoke free (Q4rcd1): Building where respondent lives is smoke-free in all indoor areas. “Yes” if “Yes” or “NA” to Q4a, c, d, e, AND f; “No” if “No” to Q4a, c, d, e OR f, regardless of whether the others are “Yes,” “Don’t Know” or missing; “Don’t know” if any of Q4a, c, d, e or f is “Don’t know,” as long as there are no “No” values for these variables; Missing if Q4a is missing and there are no “No” or “Don’t know” values for any of these variables; Missing if Q4a is “Yes” and any of the others is missing, as long as there are no “No” or “Don’t know” values for these variables.

Indoor and outdoor smoke-free (Q4rcd2): Building where respondent lives is smoke-free in all indoor and outdoor areas. “Yes” if “Yes” or “NA” to Q4 a, c, d, e, f, AND g; “No” if “No” to Q4a, c, d, e, f OR g, even if any of the others is “Yes,” “Don’t know” or missing; “Don’t know” if any of Q4a, c, d, e, f or g is “Don’t know,” as long as there are no “No” values for these variables; missing of Q4a is missing and there are no “No” or “Don’t know” values for any of these variables; Missing if Q4a is “Yes” and any of the others is missing, as long as there are no “No” or “Don’t know” values for these variables.

Willing to pay more (Q14rcd1): Respondent would be willing to pay more to live in a no-smoking building: “No” if answered “no more” to Q14, “Don’t know” if answered “don’t know,” “Yes” if any amount greater than zero.

Rent category I (Q26rcd1): Quartiles of rent for the size of apartment respondent has. The sample was divided into four groups based on responses to Q24 (number of bedrooms), and for each of those groups, quartiles of monthly rent (Q26) were determined. The recoded variable was then created to indicate whether each respondent is in the 1st, 2nd, 3rd or 4th quartile on rent for an apartment with the number of bedrooms s/he has.

Rent category II (Q26rcd2): Luxury, standard or affordable rent based on market information. Staff from the Minneapolis office of Apartment Search, Inc. provided the information in Table 5 on their classification of rents for various sizes of apartments into luxury, standard or affordable categories. Unfortunately, this information was not available at the time the survey instrument was developed. The recoding of Q26 used to roughly match the Apartment Search categories is shown in Table 6.

Table 5. Rent categories as defined by Minnesota Apartment Search staff.

	studio	1 BR	2 BR	3 BR	bldg class
luxury	\$701 or more	\$800 or more	\$950 or more	\$1301 or more	A
standard	\$551 to \$700	\$650 to \$799	\$750 to \$949	\$1001 to \$1300	B
affordable	\$550 or less	\$649 or less	\$749 or less	\$1000 or less	C

Table 6. Correspondence of renter responses to Apartment Search rent categories as defined by CEE.

	studio	1 BR	2 BR	3 BR
luxury	\$700 or more	\$800 or more	\$900 or more	\$1251 or more
standard	\$500 to \$699	\$600 to \$799	\$700 to \$899	\$1000 to \$1250
affordable	\$499 or less	\$599 or less	\$699 or less	\$999 or less

Smoker in household (Q29rcd1): : At least one person in the household smokes. “No” if 0 to Q29, “Yes” if 1 or more.

Any Children in household (Q30_31r1): At least one child in the household. “Yes” if Q30 or Q31 is 1 or more, otherwise “No”.

Number of children in household (Q30_31r2): Sum of Q30 and Q31

Young children in household (Q30rcd1): “Yes” if Q30 is 1 or more, otherwise “No.”

Age group (Q33rcd1): Recode of categories in Q33 into less than 25, 25 to 64, 65 or older

MPAAT minorities of concern (Q34rcd1): Yes” if yes to Q34 a (Black, African-American or African), b (Hispanic or Chicano), c (American Indian/Native American) d (Cambodian, Hmong, Vietnamese, Laotian or Thai) or e (Other Asian), even if respondent also checked f (White) or g (Other) (only 13 of 600 did so). “No” if yes to Q34 f (White) or g (Other), or both, and

respondent did not also check a, b, c, d or e. Among the 600 respondents, only three checked “Other,” and these three wrote in “Turkish,” “Arab” and “Multicultural.” Although these three were included in the non-MPAAT minorities group, they are so small in number relative to those who checked “White” that the non-MPAAT minority group is essentially representative of white non-Hispanic renters.

Federal poverty status (HHS) (Q35rcd1): Respondent’s household income is or is not below the federal Health and Human Services (HHS) definition of poverty for their household size (for the year 2000). Our survey’s income categories were constructed with this and one other specific poverty definition in mind, but could not be too numerous or exact without appearing to pry unduly into respondents’ affairs. Our assignment of income categories to approximate federal poverty status is shown in Table 7. For households of 1 to 6 persons, which includes all of the respondents in this survey, the federal HHS poverty definition for each household size works out to 24 to 26% of the Minnesota median income for that household size.

Table 7. Responses used to approximate federal (HHS) poverty status of respondent households.

Q35 Household Income	Q28 Number in Household					
	1	2	3	4	5	6
Less than \$8,000	yes	yes	yes	yes	yes	yes
\$8,001 to \$11,000	no	yes	yes	yes	yes	yes
\$11,001 to \$14,000	no	no	yes	yes	yes	yes
\$14,001 to \$17,000	no	no	no	yes	yes	yes
\$17,001 to \$20,000	no	no	no	no	yes	yes
\$20,001 to \$23,000	no	no	no	no	no	yes
\$23,001 to \$26,000	no	no	no	no	no	no
\$26,001 to \$29,000	no	no	no	no	no	no
\$29,001 to \$34,000	no	no	no	no	no	no
\$34,001 to \$39,000	no	no	no	no	no	no
\$39,001 to \$44,000	no	no	no	no	no	no
\$44,001 to \$60,000	no	no	no	no	no	no
\$60,001 to \$80,000	no	no	no	no	no	no
\$80,001 to \$100,000	no	no	no	no	no	no
More than \$100,000	no	no	no	no	no	no

Income at or below 50% of state median (Mn EAP Poverty Status) (Q35rcd2): Respondent’s household income is or is not below 50% of the median household income for their household size in Minnesota. This is the criterion used to determine eligibility for the federal Energy Assistance Program (commonly known as “Fuel Assistance”) in Minnesota. Our assignment of income categories to approximate Minnesota EAP poverty status is shown in Table 8.

Neither federal HHS poverty status nor income at or below 50% of the state median can be used directly to determine whether respondents would be eligible for HUD Low Rent Public Housing

or Section 8 housing, for two reasons. The first is that the cutoff criteria for eligibility are determined by local agencies, and the second is that they are based on percentages of local rather than statewide median income. Federal regulations require that 75% of all new Section 8 admissions be targeted to families with incomes below 30% of median family income, but this income is specific to the metropolitan area or county where the resident is located. Housing authorities can set their own admission targets for low rent public housing, but again, this is relative to median family income in that area of the state. On a statewide basis, as of May 2001, 54% of residents of public housing in Minnesota had incomes below 30% of the median for their area and an additional 26% had incomes between 31 and 50%, so that a total of 80% had incomes below 50% of the median for their local area. As of the same date, 63% of households using Section 8 certificates or vouchers had incomes below 30% of the median for their area and an additional 24% had incomes between 31 and 50%, so that a total of 87% had incomes below 50% of the median for their area.⁷ Income at or below 50% of the state median (Q35rcd2) is a fairly good proxy for the types of renters living in subsidized housing in Minnesota.

Table 8. Responses used to approximate income at or below 50% of state median (Mn EAP Poverty Status).

Q35 Household Income	Q28 Number in Household					
	1	2	3	4	5	6
Less than \$8,000	yes	yes	yes	yes	yes	yes
\$8,001 to \$11,000	yes	yes	yes	yes	yes	yes
\$11,001 to \$14,000	yes	yes	yes	yes	yes	yes
\$14,001 to \$17,000	yes	yes	yes	yes	yes	yes
\$17,001 to \$20,000	no	yes	yes	yes	yes	yes
\$20,001 to \$23,000	no	yes	yes	yes	yes	yes
\$23,001 to \$26,000	no	no	yes	yes	yes	yes
\$26,001 to \$29,000	no	no	yes	yes	yes	yes
\$29,001 to \$34,000	no	no	no	yes	yes	yes
\$34,001 to \$39,000	no	no	no	no	yes	yes
\$39,001 to \$44,000	no	no	no	no	no	yes
\$44,001 to \$60,000	no	no	no	no	no	no
\$60,001 to \$80,000	no	no	no	no	no	no
\$80,001 to \$100,000	no	no	no	no	no	no
More than \$100,000	no	no	no	no	no	no

Number of units from property data recoded into survey categories (no_unrcd): Exact number of units from property databases recoded into categories from Q19 of survey.

Number of units from property data lumped into larger categories (nounrcd2): Exact number of units from property databases recoded into categories of 2 to 4 units, 5 to 9 units, 10 to 50 units and more than 50 units.

⁷ Data from HUD Multifamily Tenant Characteristics System at www.hud.gov:80/mtcs/public/

Building height (bldghite): Recode of categories from Q22 into “low-rise” (1, 2 or 3 floors), “mid-rise” (4 to 6 floors) and “high-rise” (7 or more floors).

Age of building based on property data (age_prop): Age computed from year built given in property databases and then recoded into the categories from Q20 of the survey (less than 5 years old, 5 to 20 years old, 21 to 50 years old and more than 50 years old).

Location (Location): “Metro” if the property is located in one of the Minnesota counties that comprise the Minneapolis-St. Paul Standard Metropolitan Statistical Area (Anoka, Carver, Chisago, Dakota, Hennepin, Isanti, Ramsey, Scott, Sherburne, Washington and Wright) and “Outstate” if located in any other county of Minnesota.

Data Analysis

The Statistical Package for the Social Sciences (SPSS/Windows) and WinCross were used to calculate descriptive statistics and run cross-tabulations and other analyses and to prepare tab and banner reports.

The tab and banner report (Appendix B) presents the data for the following comparison groups:

- MPAAT minorities of concern (Yes or No -- based on Q34rcd1 – recoded from Q34)
- Federal (Health and Human Services) poverty status (Yes or No – based on Q35rcd1 – constructed from Q28 and Q35)
- Income at or below 50% of State of Minnesota median income (Yes or No – based on Q35rcd2 – constructed from Q28 and Q35)
- Income quintiles (based on Q35rcd3 – recoded from Q35)
- Age group (less than 25, 25 to 64, 65 or older – based on Q33rcd1 – recoded from Q33)
- Any children in household (Yes or No – based on Q30-31r1 – constructed from Q30 and Q31)
- Young children in household (Yes or No – based on Q30rcd1 – recoded from Q30)
- Smoker in household (Yes or No – based on Q29rcd1 – recoded from Q29)
- Rent category I (quartiles – based on Q26rcd1 – recoded from Q26 and Q24)
- Rent category II (affordable, standard, luxury – based on Q26rcd2 – recoded from Q26 and Q24).
- Building height (low-rise, mid-rise and high-rise – based on bldghite – recoded from Q22).
- Age of building (less than 5 years old, 5 to 20 years old, 21 to 50 years old, more than 50 years old – based on age_prop – recoded from property data).
- Number of units from property data (2 to 4 units, 5 to 9 units, 10 to 50 units and more than 50 units, based on - nounrcd2 – recoded from property data.)
- Location (Metro or Outstate – based on address).

Representativeness of the Sample

The random sample of 405 respondents was designed to provide a 95% confidence that the sampling error for population proportions would be less than or equal to 5%. However, with a response rate of 71%, there could also be some non-response bias. Ideally, basic demographic data from the respondents would be compared to available data from the entire population to check the representativeness of the final sample of 405. The 2000 Census is the best source of data for all Minnesota rental households against which to check the distribution of age, income, ethnicity and other variables in the sample, and was used as a basis of comparison where possible. Only some of the 2000 Census data has been released, and for those variables where the data has not been released, the 1990 Census was used as a rough check on the representativeness of the sample. It is important to realize that the renter-occupied housing units from the 2000 Census are not the precise population against which we would ideally wish to compare to our sample, because they include rented single family homes and mobile homes, while this study is focused on and drew a sample from only the population of renters who live in buildings with two or more units. Single family homes and mobile homes accounted for 18% of the rental units in Minnesota in the 1990 Census (data for the 2000 Census are not yet available), and rental households that occupy buildings of these types may well be different from the overall rental population in household size or in other characteristics.

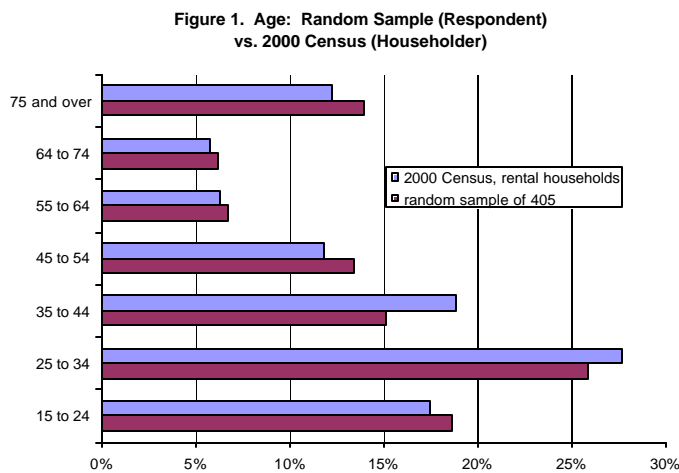


Figure 1 compares the distribution of the age of respondents in the random sample (based on responses to Question 33) to the distribution of age of householder for rental households in the 2000 Census. The distribution of ages in the random sample is not significantly different, statistically speaking, from the expected distribution based on the population data. This means that the differences could be expected due to sampling error, and do not appear to reflect non-response bias.⁸

Figure 2 compares the ethnicity of the respondents in the random sample (Q34) with the ethnicity of the rental householder in the 2000 Census. Our questionnaire did not ask Hispanics to separately identify their race. At the time of the 1990 Census (the latest data available on this), about half of Hispanic rental householders identified themselves as white and about half as various other ethnicities (mostly black, native American or Asian/Pacific Islander). Placing all the Hispanics in our sample in either the “white” or the “other” category gives two sets of bars that grossly bracket the range of possible distributions. The distribution of ethnicities in the random sample is not significantly different from the expected distribution based on the

⁸ It is also conceivable that non-response bias and the exclusion of single family homes and mobile homes from our definition of the population had equal and opposite effects that canceled each other out.

population data. This means that the differences could be expected due to sampling error, and do not appear to reflect non-response bias.⁹

In our sample, 1.7% of respondents classified themselves as Hispanic, compared with 4.1% of rental householders in the 2000 Census. The proportion of Hispanics in our sample is significantly different from that expected based on the population data, indicating either some under-response by Hispanics (with a greater possibility of non-response bias) or a difference caused by the exclusion of rented single family homes and mobile homes from our defined population of interest.

Figure 2: Ethnicity, Random Sample vs. 2000 Census

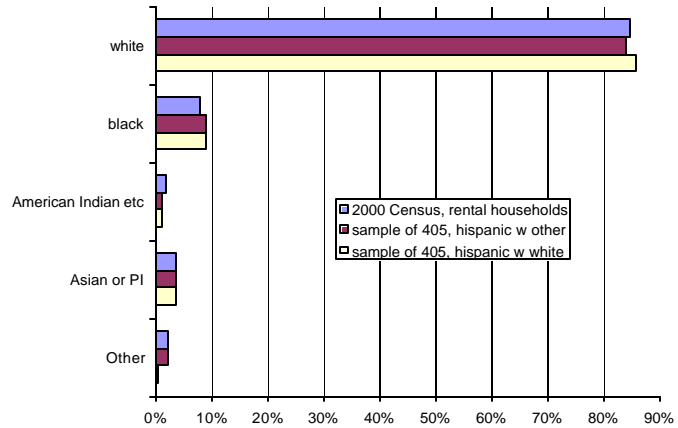
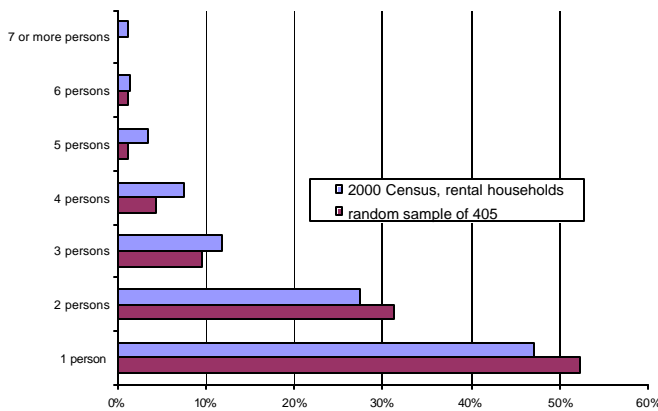


Figure 3 compares the distribution of household size in the random sample (Q 28) with the distribution of household size among renter-occupied housing units in the 2000 Census. The

Figure 3. Number of Persons in Unit: Random Sample vs. 2000 Census

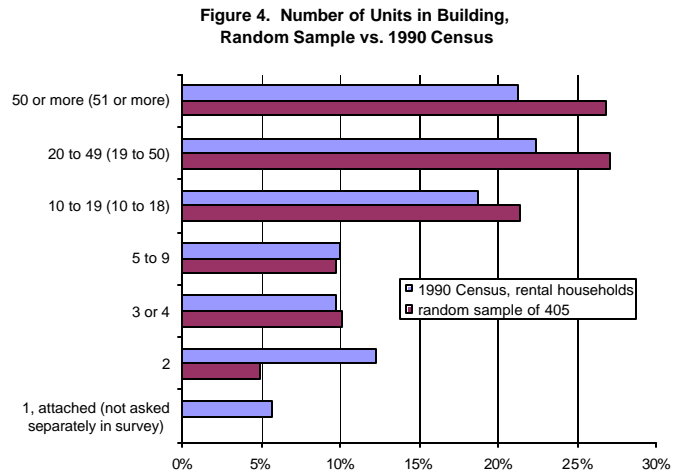


random sample has more small households and fewer large households than the 2000 Census group. The distribution in our sample is significantly different from that expected based on the population data. Whether this difference is due to our exclusion of rented single family homes and mobile homes from the population of interest or to non-response bias cannot be determined from available data, although in this case an effect due to our exclusion of single family homes and mobile homes might be expected.

Figure 4 compares the number of units in the building for the sample, as reported by respondents (Q19), to the number of units in the building for the 1990 Census (the latest data available), with single-family detached housing and mobile homes eliminated from the Census data. The sample has more people in buildings of 10 or more units and fewer people in buildings of two units than the 1990 Census data. Whether this reflects changes in the rental housing stock between the 1990 Census and the date of the survey or non-response bias cannot be determined at this time.

⁹Ditto.

Overall, the random sample is not significantly different from that expected in sampling the Minnesota rental population in terms of age of householder or ethnicity. It does have a lower than expected number of Hispanics and a different distribution of household size, although the latter difference is probably due at least in part to the fact that our population of interest excludes renters in single family homes and mobile homes, where larger families could be expected to be more prevalent. There is apparently some under-response by Hispanics and there may be some with regard to large households as well. In spite of these shortcomings, the sample appears to adequately represent the rental population in Minnesota to meet the objectives of this study.



RESULTS

Incidence of Smoking among Rental Households

Twenty-nine percent of rental households in multifamily buildings in Minnesota have at least one smoker (Q29), based on data from the random sample of 405 renters (Figure 5). Households with children and non-senior households are significantly more likely to have a smoker than other households:

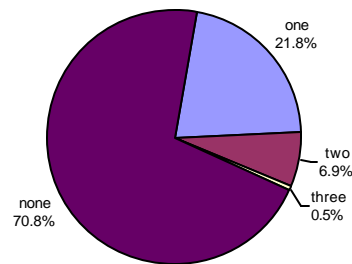


Figure 5. Of the people who live in your apartment, how many smoke?

- Forty percent of rental households with children have at least one smoker, versus 26% of households without children, a difference that is statistically significant ($p = 0.006^{10}$) (Figure 6). However, households with *young* children (less than five years old) are not statistically more likely to have smokers than households without young children (36% vs. 29%, $p = 0.29$).
- Households with respondents under 25 or between 25 and 64 years of age are significantly more likely to have a smoker than households with respondents 65 or older (34%, 34% and 15% respectively, $p = 0.004$).

The other demographic groups investigated show no statistically significant differences in the percentage of households with smokers:

- Rental households with incomes below the federal poverty line for their household size, may be more likely to have a smoker than those above the poverty line (40% vs. 28%), but this difference does not quite reach marginal significance with the sample sizes studied ($p = 0.11$). The same is true of households with incomes below 50% of the Minnesota median income for their household size vs. those above this level (35% vs. 27%, $p = 0.11$). Considering income alone, without reference to household size, there is no systematic change across quintiles¹¹ of income in the percentage of households with smokers present ($p = 0.40$).
- Given the results by income, it is perhaps not surprising that the differences across the spectrum of rent levels are not significant ($p = 0.29$).

¹⁰ p is the probability that the observed differences could have occurred in the sample by chance. Generally, differences are considered to be highly significant if p is less than or equal to 0.01, significant if p is less than or equal to 0.05 and not significant if p is greater than 0.05. Differences are sometimes described as marginally significant if p is greater than 0.05 but less than or equal to 0.10.

¹¹ A quintile is 20% of the sample.

- MPAAT minorities of concern¹² are no more likely than households of other ethnicities to have one or more smokers in the household (p = 0.49).
- There is no difference in the proportion of households with smokers between households located in the Minneapolis-St. Paul Standard Metropolitan Statistical Area (“Metro”) and those outside that area (“Outstate”) (p=0.52).

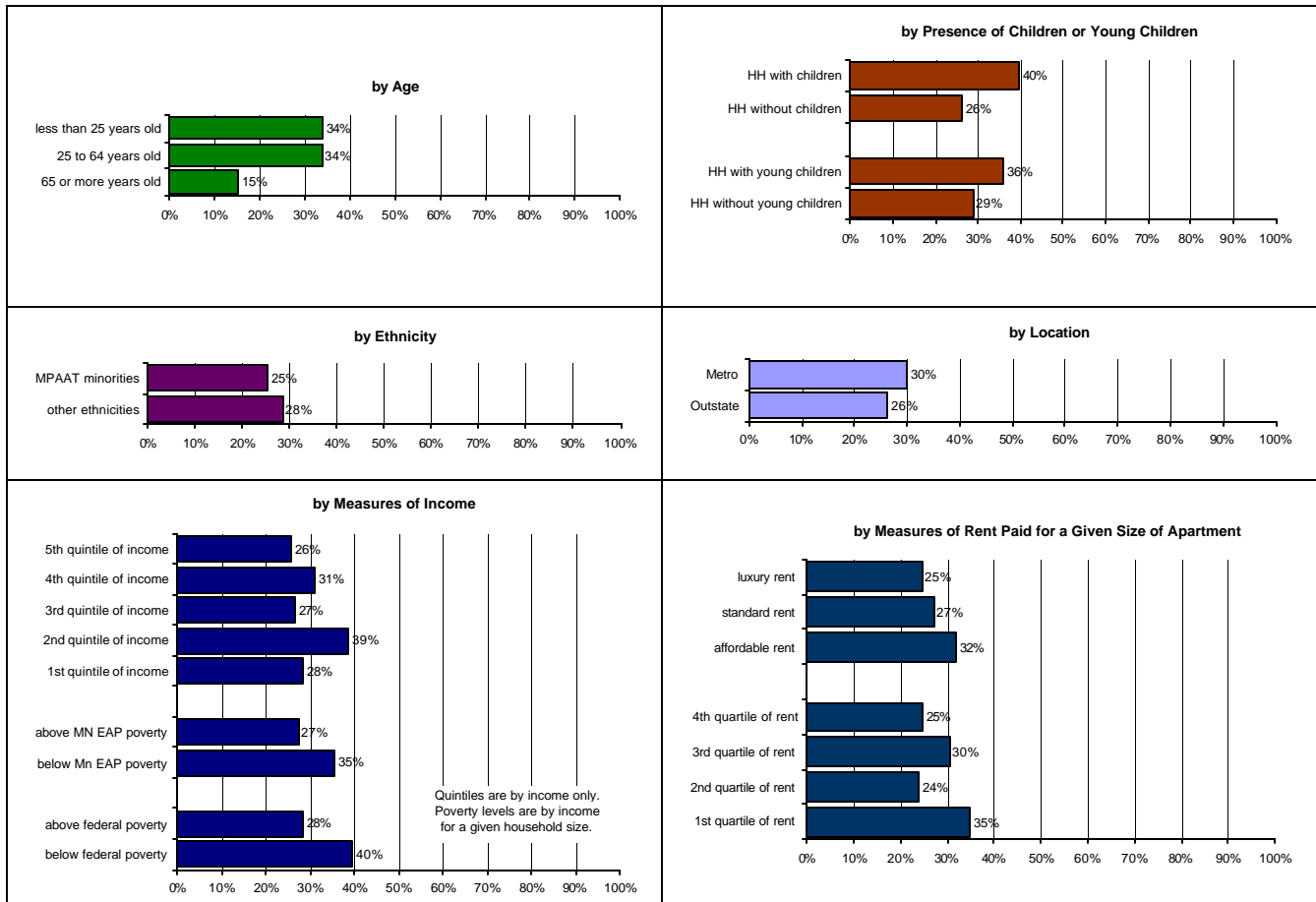
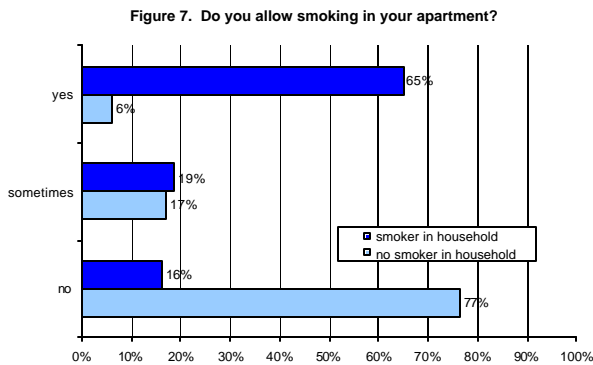


Figure 6. Of the people living in your apartment, how many smoke? (Percent saying one or more smoke)

In sum, few of the population segments analyzed have smokers in more than one third of households, and none has smokers in more than 40% of households. From a market perspective, this means that in almost all market segments the majority of potential tenant households are non-smokers.

¹² See Methodology section. Includes blacks/African-Americans/Africans; Hispanics/Chicanos; Native Americans/American Indians, Southeast Asians (Cambodian, Hmong, Vietnamese, Laotian or Thai) and other Asians.



Twenty-three percent of renters in the random sample said that they allow smoking in their homes, 18% said they “sometimes” allow it, and 59% said they do not allow it (Q9). Not surprisingly, households with one or more smokers are significantly more likely to allow smoking than households with no smokers (Figure 7). Non-minorities, households between 25 and 64, and households that pay lower rents are also more likely to say they allow smoking in their apartments.

Secondhand Smoke Transfer in Multifamily Buildings

Frequency and Severity of Secondhand Smoke Transfer

Forty-eight percent of rental households in Minnesota report that, at times, tobacco smoke odors get into their current apartment from somewhere else in or around the building (Figure 8). Three percent say that this occurs “most of the time” and 7% say that it occurs “often.” Considering the 482,000 rental households in the state, and assuming that roughly 80% of them are in multifamily buildings (as was the case in the 1990 Census), this means that about 25,400 rental households experience secondhand smoke transfer “often” and 11,600 experience it “most of the time.” Another 20% or 76,000 “sometimes” experience secondhand smoke transfer, and 18% experience secondhand smoke transfer “rarely.” Fifty-two percent “never” experience ETS transfer.

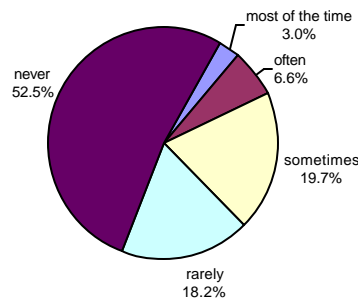


Figure 8. In the past 12 months, how often has... [tobacco smoke odor] gotten into your current apartment from somewhere else in or around the building?

Households with children, very poor households, non-senior households and households in older buildings report significantly or marginally more frequent secondhand smoke transfer in their current apartments:

- Rental households with children experience more frequent secondhand smoke transfer into their apartments than households without children ($p = 0.005$) (Figure 9). Eight percent of households with children experience ETS transfer into their apartments “most of the time,” 10% “often,” and 25% “sometimes” vs. 3%, 6% and 18% of households without children. The difference is even greater when households with children under five are considered ($p =$

0.002). Twelve percent of these households experience ETS transfer “most of the time,” 14% “often,” and 24% “sometimes,” compared to 3%, 6% and 19% of households without young children.

- Very poor rental households, those below the federal HHS poverty level for their household size, report more frequent secondhand smoke transfer than households above the poverty level ($p = 0.014$). Eighteen percent of very poor households say they experience ETS transfer “often” (none said “most of the time”). When a higher poverty cutoff criterion of 50% of median income for Minnesota is used, differences between households above and below the cutoff are not significant ($p = 0.39$).
- Households with a respondent under 65 years old report marginally more frequent secondhand smoke transfer than households with a respondent 65 years of age or older ($p = 0.09$).
- Households in older buildings (based on information from property databases) report marginally more frequent ETS transfer ($p = 0.08$).

The higher incidence of secondhand smoke transfer among the demographic groups listed in the first three bullet points above may be due in part to the moderately higher proportion of households with smokers in these groups, since a given multifamily building tends to have demographically similar occupants.

The other subgroups investigated do not show significant differences in the frequency of problems with secondhand smoke transfer:

- The data suggest that households paying “affordable” rents might experience secondhand smoke transfer more frequently than households paying “luxury” rents, but this difference is not even marginally significant with the sample sizes available ($p = 0.15$). Five percent of households paying affordable rents said they experienced ETS transfer most of the time and 8% often, vs. 0% and 2% of households paying luxury rents.
- MPAAT minorities of concern and respondents of other ethnicities report the same frequency of problems with secondhand smoke transfer ($p=0.46$).
- Households with and without smokers are equally likely to report secondhand smoke transfer into their apartments ($p = 0.44$).
- Metro and Outstate renters report report the same frequency of problems with ETS transfer ($p=0.48$).
- There is no significant difference in the reported frequency of ETS transfer among low-rise, mid-rise and high-rise buildings¹³ ($p = 0.52$). There is no significant difference in the frequency of ETS transfer among buildings of different sizes ($p = 0.54$). In addition, there is no significant difference in the reported frequency of ETS transfer for tenants on lower, middle or upper floors of a building ($p = 0.74$).

¹³ Low-rise is defined as three stories or less, mid-rise as 4 to 6 stories, and high-rise as 7 stories or more.

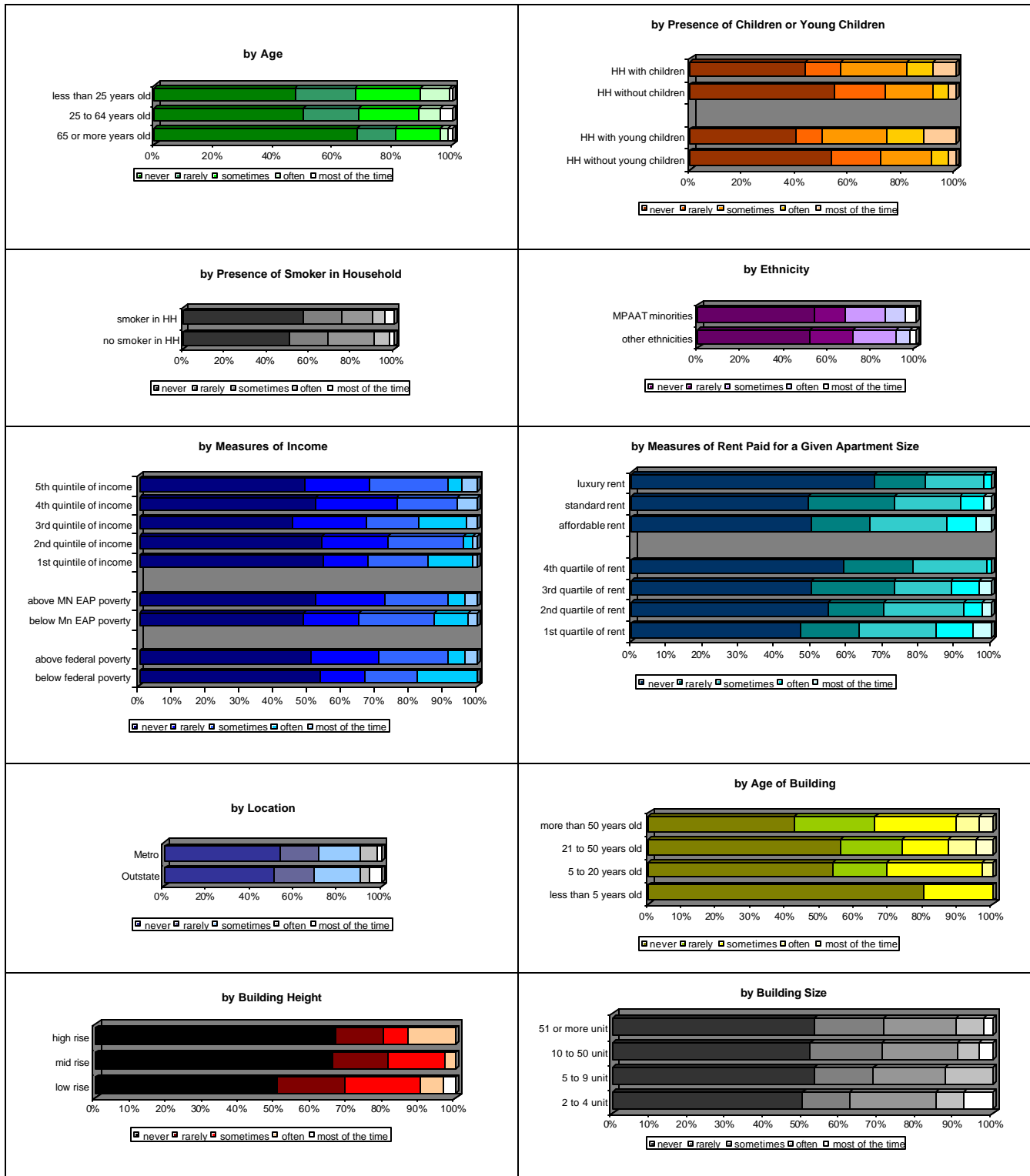


Figure 9. In the past 12 months, how often has [tobacco smoke odor] gotten into your current apartment from somewhere else in or around the building?

Question 7 of the survey provides an additional source of information about the prevalence of problems with ETS transfer in apartment buildings. Respondents were asked, if they had ever had tobacco smoke odor get into their current *or previous* apartment from somewhere else, what they had done about it. There was an option to indicate that they had never had a problem. Of the 395 respondents in the random sample who answered this question, 141 or 36% indicated they had never had a problem, while 254 or 64%, nearly two thirds of all renters, answered all or part of the list of actions, indicating that they had had a problem at some time with tobacco smoke odor getting into their current or previous apartment from somewhere else.¹⁴

The only odor that renters said gets into their current apartment from somewhere else more often than tobacco smoke is cooking odor (Q2b). Seventy-one percent of renters in multifamily buildings say that cooking odors get into their apartment at times. Interviews of owners also indicated that cooking odors and tobacco smoke odors are the two most commonly transferred odors in multifamily buildings. While cooking odors are not harmful, the fact that transfer of cooking odors is widespread is a good indicator of the “leakiness” of multifamily buildings and the prevalence of air transfer between units. Renters’ reports of the frequencies of ETS transfer and cooking odor transfer in their buildings are highly correlated ($p = 0.000$), as would be expected since they would be transported through multifamily buildings by similar processes and routes.

Other odors that renters said get into their apartments from elsewhere at times include candle or incense odors (32%), pet odors (14%), and a wide range of other odors (43%)(Q1c-e), the most common of which were car exhaust/diesel fumes, marijuana/opium, paint, mold/mildew, carpet deodorizer/room freshener and cleaning products.¹⁵

There is no way to obtain an objective measure of the severity of secondhand smoke transfer

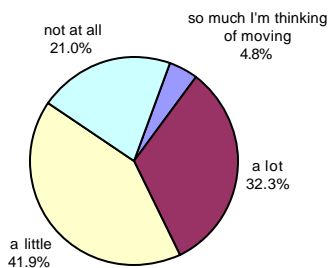


Figure 10. When [tobacco smoke odor] gets into your apartment from somewhere else, how much [does it] bother you?

through a mail/phone survey. As a qualitative indicator, respondents who said that tobacco smoke odor at times gets into their current apartment from somewhere else were asked how much this odor bothers them (Q3a). Five percent of those who are experiencing ETS transfer (2% of all renters) said it bothers them so much that they are thinking of moving (Figure 10). Thirty-two percent of those who are experiencing it (15% of all renters) said it bothers them “a lot,” and 42% of those who are

¹⁴ The format of this question may appear a little complicated, but most respondents clearly understood it. Of 600 respondents in all sample groups, 209 checked “never had a problem,” while 378 circled yes or no for at least one of the possible actions. Of these 378, 326 properly circled one of these answers for every possible action, and only 52 answered only part of the list of actions. No respondent checked both “never had a problem” and circled yes or no for any of the possible actions. Only 13 did not answer Q7 at all. Thus 89% of the 600 respondents understood that they were to check either “never had a problem” or to indicate yes or no for the entire list of actions.

¹⁵ None of the “other” odors included in the 43% was mentioned by more than 3% of respondents.

experiencing it (20% of all renters) said it bothers them “a little.” Twenty-one percent of those experiencing it (10% of all renters) say it does not bother them at all. These findings imply that, statewide, about 7,700 rental households are currently experiencing ETS transfer severe enough that they are thinking of moving, while another 58,000 households are experiencing ETS transfer to a degree that bothers them “a lot.” The comparable figures for cooking odors are 3,100 and 40,000 households.

Households that experience more frequent ETS transfer are more bothered by it ($p = 0.000$). For example, no one who said that ETS gets into their apartment only rarely is bothered by it so much that they are thinking of moving, and only 4% of those who said ETS gets into their apartment sometimes are bothered by it so much that they are thinking of moving. On the other hand, 12% of those who said ETS gets in often and 25% of those who said it gets in most of the time are bothered by it so much they are thinking of moving (Table 9).

Table 9. Cross-tabulation of extent to which tenants are bothered by tobacco smoke odor against how often the odor gets into their current apartment from elsewhere in or around the building.

			Q3a. How much do they bother you - tobacco smoke odor?				Total	
			Not at all	A little	A lot	So much I'm thinking of moving		
Q2a. How often have any of the following odors gotten into your current apartment from somewhere else in or around the building - tobacco smoke odor?	Rarely	Count % within Q3a. How much do they bother you - tobacco smoke odor? (7 defined as missing)	23 62.2%	32 42.1%	12 20.3%		67 37.0%	
	Sometimes	Count % within Q3a. How much do they bother you - tobacco smoke odor? (7 defined as missing)	9 24.3%	36 47.4%	28 47.5%	3 33.3%	76 42.0%	
	Often	Count % within Q3a. How much do they bother you - tobacco smoke odor? (7 defined as missing)	3 8.1%	4 5.3%	16 27.1%	3 33.3%	26 14.4%	
	Most of the time	Count % within Q3a. How much do they bother you - tobacco smoke odor? (7 defined as missing)	2 5.4%	4 5.3%	3 5.1%	3 33.3%	12 6.6%	
Total			Count % within Q3a. How much do they bother you - tobacco smoke odor? (7 defined as missing)	37 100.0%	76 100.0%	59 100.0%	9 100.0%	181 100.0%

There are only a few significant or suggestive differences across subgroups in how much secondhand smoke transfer bothers renters:

- Households with no smokers are much more bothered by ETS transfer than households with smokers ($p = 0.000$)(Figure 11). Six percent of non-smoking households who are experiencing ETS transfer said it bothers them so much they are thinking of moving, and 39% said it bothers them a lot, compared to 2% and 14%, respectively, of households with smokers.

- ETS transfer bothers renters with young children in the household significantly more than it does renters without young children ($p = 0.03$). Thirteen percent of rental households with young children who are experiencing ETS transfer said that it bothers them so much that they are thinking of moving, compared with 3% of households without young children. The data also suggest that households that are experiencing ETS transfer and have children of any age may be somewhat more bothered by it than households without children although this difference does not quite reach marginal significance ($p = 0.11$).

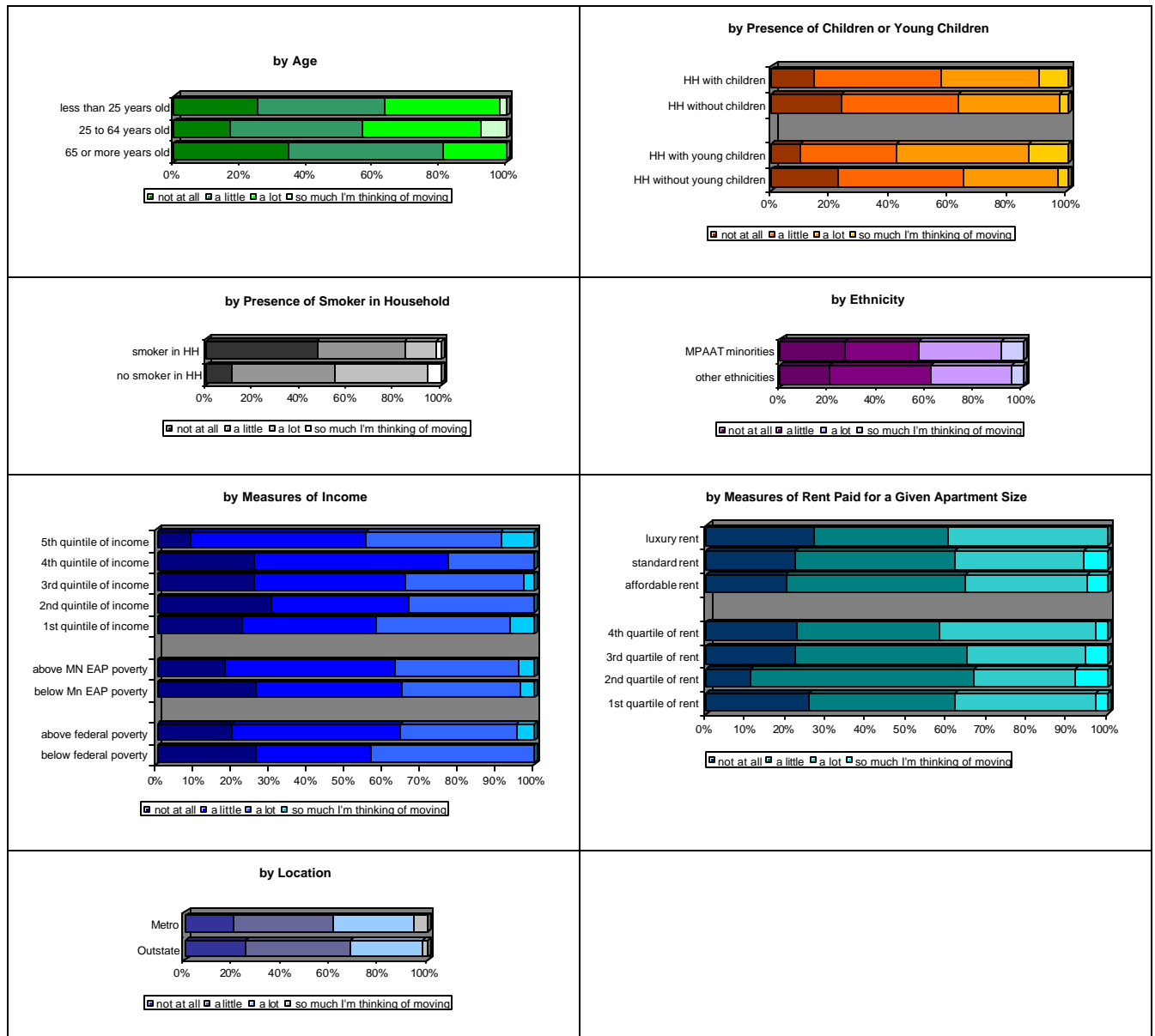


Figure 11. When [tobacco smoke odor] get[s] into your apartment from somewhere else, how much do[es this] bother you?

Routes of Entry of Secondhand Smoke

Among those in the random sample who experience ETS transfer in their current apartments, 43% said that the most common way the tobacco smoke gets into their apartment is via the hallway (Q5). Twenty-three percent said that the most common route is through their windows when they are open, 9% said the most common route is through air leaks from other apartments and 6% said the most common route is through bathroom or kitchen fans. Twelve percent selected more than one of the routes listed on the survey instrument, in spite of directions to mark the one most common way (These were recoded into the response “another way.”) Three percent specified a different route from those listed or gave no route, while 1% apparently misunderstood the question and said that the smoke was from their guests or themselves. Three percent said they did not know the most common route by which the ETS entered their apartment.

Both renters and the owners interviewed earlier in the project¹⁶ most often identified hallways as the most common route by which ETS enters apartments from elsewhere. Renters were more likely than owners to attribute ETS transfer to open windows and less likely to attribute it to fans or the mechanical ventilation system (Table 10).

Table 10. Renters’ and Owners’ Perceptions of the Most Common Route by which Secondhand Smoke Enters Apartments from Elsewhere in or around the Building.

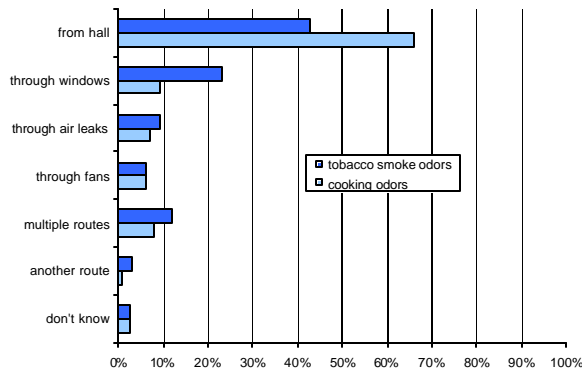
	renters	owners
from hallways	43%	41%
through open windows	23%	7%
leaks from other apartments	9%	15%
fans/ventilation system	6%	22%
multiple routes, different route	16%	11%
don’t know	3%	4%

The relationship between the most common route by which ETS enters and the characteristics of the building was investigated for possible insights into the planned buildings research. Only the answers that indicated hallways, windows, leaks or fans are the most common route of ETS transfer were included in this analysis, since “don’t know” and “doesn’t get into my apartment at all” were not of interest and the “another way” response included mostly people who checked off more than one of the first four routes. Cross-tabulations uncovered no significant differences in the routes of ETS transfer as a function of building age, number of floors, which floor the respondent was on, or rent category I or II (used as a rough proxy for building condition). A discriminant analysis of routes of smoke transfer as a function of building characteristics did show that the number of units in the building, the rent category, and the age are somewhat different for groups of cases with different “most common” routes of entry, but the relationships

¹⁶Owner information from *Survey of Multifamily Building Owners and Managers in Minnesota Regarding Movement of Secondhand Smoke in Buildings and Designation of Smoke-Free Buildings*. Minneapolis, MN: Center for Energy and Environment and Association for Nonsmokers-Minnesota, 2000.

were so weak as to be of little practical value in distinguishing differences between buildings most likely to have one or another route as most common.¹⁷

Figure 12. What is the most common way that the following odors get into your current apartment from somewhere else?



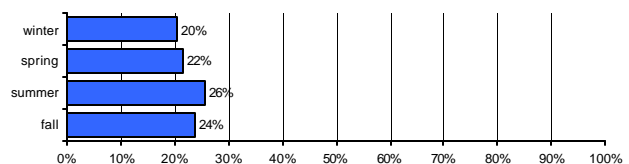
Sixty-six percent of renters who said cooking odors get into their apartments from elsewhere identified the hallways as the most common route by which these odors enter (Q5)(Figure 12). Only 9% of renters identified open windows as the most common route of entry for cooking odors. Seven percent said air leaks from other apartments are the most common route and 6% said kitchen or bathroom fans are. Eight percent selected more than one of the routes listed on the survey instrument, in spite of the

direction to mark the one most common way. One percent specified a different route from those listed.

The fact that renters say tobacco smoke odor most commonly enters their apartments from the hallways does not necessarily mean that it is being generated in the hallways. Cooking odors, for which hallways are even more often mentioned as the most common entry route, are obviously not generated in the hallways. Minnesota statutes (144.414 subd. 1) prohibit smoking in public places except in designated smoking areas, and common areas of rental apartment buildings are included in the definition of public places (144.413 subd. 2). Proprietors are required to make reasonable efforts to prevent smoking in public places not designated as smoking areas, including posting signs and asking smokers to refrain from smoking upon request of a client suffering discomfort from the smoke (144.416). Fifty-three percent of renters in the random sample said that the landlord prohibits smoking in the hallways of their building, while 15% said they don't know, 28% said the landlord does not prohibit it, and 3% said this question was not applicable because their building does not have hallways. Thermal (stack) effects, wind effects and mechanical ventilation could all move ETS from one unit to another via the hallways.

Secondhand smoke transfer does not appear to be particularly seasonal. Twenty-six percent of renters said they experience secondhand smoke transfer in the summer, 24% in the fall, 21% in winter and 22% in the spring (Q6)(Figure 13).¹⁸ The fact that the frequencies are fairly even across seasons suggests that interior routes, rather than open windows, play the dominant role in ETS transfer.

Figure 13. Does tobacco smoke odor get into your current apartment from somewhere else during:



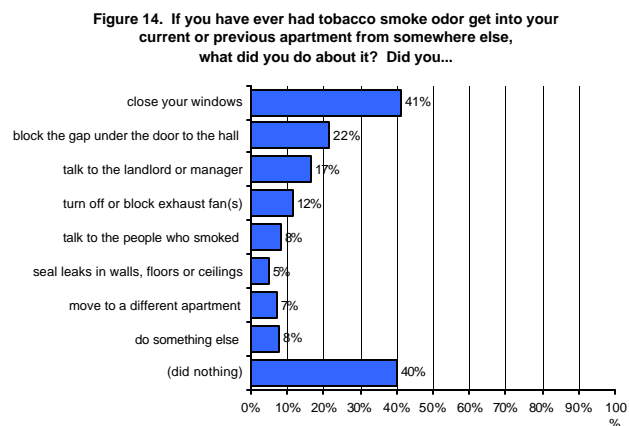
¹⁷ The canonical correlation was 0.47 for the first discriminant function, 0.17 for the second, and 0.06 for the third.

¹⁸ Some people answered all of these questions even though they had lived in the building less than a year. However, when limited to only those who have lived in the building 13 months or more (based on Q18), the results were not much different – 28% said they experienced ETS transfer in summer, 25% in fall, 22% in winter and 23% in spring.

Actions Taken by Tenants to Reduce Secondhand Smoke Transfer

Of the 254 respondents in the random sample who had had tobacco smoke odors get into their current or previous apartment at some time, 152 or 60% had taken one or more actions to address it (Q7) (Figure 14):

- Forty-one percent closed their windows, 22% blocked the gap under the door to the hallway and 12% turned off or blocked their bathroom or kitchen fan.
- Seventeen percent talked to the landlord or manager, and 8% talked to the people who smoked.
- Seven percent moved. Three percent moved to a different apartment that was not in the same building or complex, and four percent moved to a different apartment that was in the same building or complex.
- Five percent sealed leaks in walls, floors or ceilings.
- Eight percent took some other action, the most common of which were to open the windows; use air fresheners, candles or incense; or turn on the air conditioner.

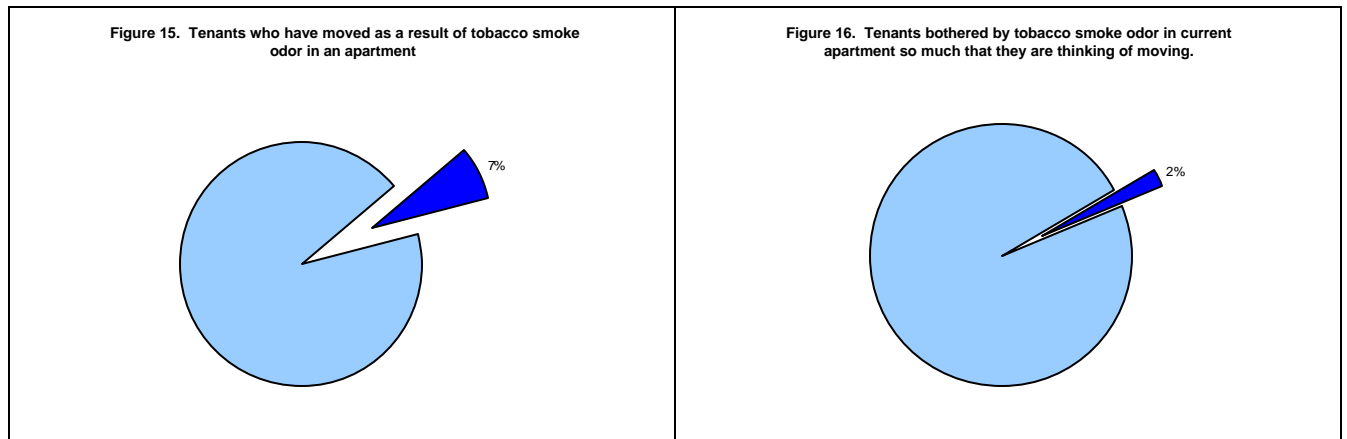


Moving was the most effective strategy. Fifty percent of those who moved to a different apartment not in the same building or complex said this helped “a lot,” and 44% of those who moved to a different building in the same building or complex said it helped a lot. Of the physical modifications made by tenants, closing windows was most effective – 47% of those who did this said it helped a lot. Thirty percent of those who blocked the gap under the door to the hallway said it helped a lot, 27% of those who blocked off kitchen and bathroom fans said it helped a lot, and 17% of those who sealed leaks in walls, floors or ceilings said it helped a lot. Of those who talked to the people who smoked, 15% said this helped a lot, while 13% said talking to the landlord helped a lot.

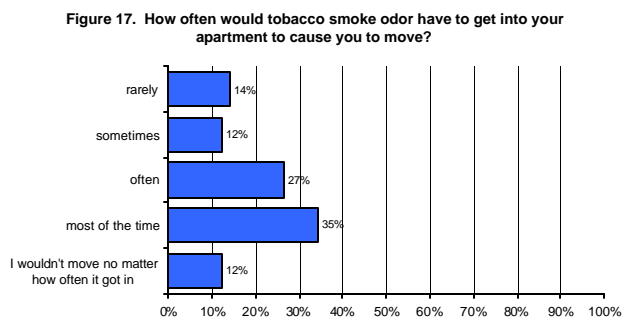
In 45% of the cases where renters talked to the landlord, he or she either did nothing, just listened, told the renter to live with it, or promised action but didn’t follow through, according to the respondents (Q8). In 17% of cases where renters talked to the landlord, he or she posted signs, posted additional signs, or sent out notices. In 14% of cases the landlord talked to the smoker. In one or two cases each, the landlord installed something to close the gap under the tenant’s door, tried sealing air leaks in the tenant’s walls, cleaned the tenant’s apartment or evicted the smoker.

Potential Effects of Secondhand Smoke Transfer on Turnover

As noted earlier, 7% of tenants say that they have moved at some time in response to secondhand smoke transfer into their apartment (Figure 15). Two percent of all renters say that they are currently experiencing secondhand smoke transfer that bothers them to such an extent that they are thinking of moving (This is 5% of those who are experiencing any degree of ETS transfer)(Figure 16).



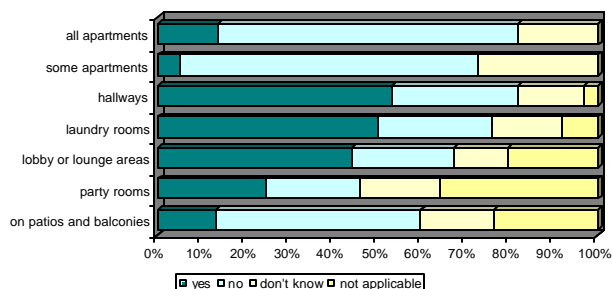
We also asked a hypothetical question as to how often tobacco smoke odor would have to get into a tenant’s apartment to cause them to move (Q17). Twelve percent of the random sample said they would not move no matter how often tobacco smokes got in (30% of households with a smoker and 5% of households without a smoker)(Figure 17). Thirty-five percent said that ETS would have to get in “most of the time” to cause them to move (31% of smokers and 36% of non-smokers). Twenty-seven percent said they would move if ETS got in “often” (16% of smokers and 31% of non-smokers). Twelve percent said they would move if ETS only got in “sometimes” (3% of smokers and 17% of non-smokers). Fourteen percent said they would move if ETS only got in “rarely” (20% of smokers and 12% of non-smokers).



Current Extent of Smoke-Free Designation of Apartment Buildings

Fourteen percent of renters in the random sample said that they live in buildings where the landlord prohibits smoking in all apartments (Figure 18). This proportion seemed implausibly high based on our familiarity with the rental housing market in Minnesota, so we sought to verify this information by contacting the building owners. Within the time available, we were able to identify and contact the owners of 36 of the 53 buildings (68%) in the random sample where the renters reported that smoking is prohibited in the apartments. Only 18% of these owners said that they did in fact prohibit smoking in all apartments in the building. This leads to a corrected estimate that only 2.4% of Minnesota renters (13.6% reported times 17.6% confirmed) live in buildings where smoking is prohibited in all apartments. Follow-up calls were made only in those cases where the renter claimed the apartments were smoke-free, so this process corrected for false positives (renter says smoking is prohibited in all apartments but owner says it is not) but not for false negatives (renter says smoking is not prohibited in all apartments but owners says it is). This approach was based on the assumption that false negatives would be unlikely: if an owner wanted to implement an unusual policy of prohibiting smoking in the apartments, it seems likely that this policy would be stressed in communications to renters. Thus the estimate of 2.4% must be considered a minimum, although we feel that it is not likely to be in error to a significant degree.

Figure 18. Does the landlord prohibit smoking in any of the following areas of your building?



We also asked the 36 owners we contacted about their smoking policies for hallways, laundry rooms, etc. Here, there was much greater agreement between information from renters and information from owners. Where renters had said that smoking was prohibited in hallways, laundry rooms, lobby/lounge areas and party rooms, owners confirmed this in 87 to 92% of cases, suggesting that the rate of false positives was only around 10% for these questions.

The results showed false negatives, too. Among this group (which, again, included only cases where the renters had said smoking was prohibited in the apartments), renters sometimes thought that smoking was allowed in hallways, laundry rooms, lobby/lounge areas and party rooms where owners said it is not allowed. For this particular group, the number of false negatives was more than enough to cancel out the false positives. More exact estimates of smoking policies in rental housing in Minnesota would require a survey of a large sample of owners.

Market for Smoke-Free Rental Units

Interest in Smoke-Free Buildings

Minnesota renters express a high degree of interest in smoke-free buildings. Twenty-six percent of respondents in the random sample said they would be “extremely interested” in living in a building where smoking is not allowed anywhere, and 20% said they would be “very interested” (Q13)(Figure 19). These two together comprise 47% of the rental market, clearly a viable market segment. Twenty-four percent of renters said they would be somewhat interested. Ten percent are not very interested, and 19% are not at all interested.

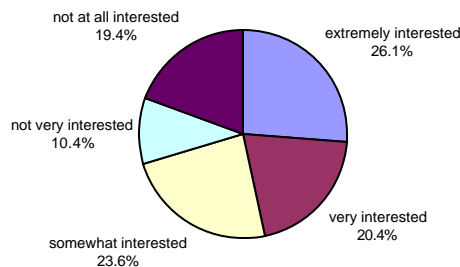


Figure 19. How interested would you be in living in a building where smoking is not allowed anywhere?

- The level of interest is profoundly different for households with no smokers vs. households with smokers ($p = 0.000$)(Figure 20). Among the 71% of rental households with no smokers, interest in living in a building where smoking is not allowed anywhere is very high: 36% would be extremely interested and 27% would be very interested. Twenty-four percent would be somewhat interested, 7% not very interested, and 7% not at all interested. Among the 29% of rental households with at least one smoker, only 3% would be extremely interested in living in a building where smoking is not allowed and 4% would be very interested. Twenty-four percent would be somewhat interested, 19% would be not very interested, and 50% would be not at all interested.
- MPAAT minorities of concern are more interested in living in a building where smoking is not allowed anywhere than are people of other ethnicities ($p=0.001$). Forty-two percent of MPAAT minorities are extremely interested, vs. 23% of people of other ethnicities. Only 9% of MPAAT minorities are not at all interested, vs. 21% of others.
- There is a suggestion of small differences in interest between Metro and Outstate renters, with Metro renters more likely to be “not at all interested,” but the difference is not quite marginally significant ($p=0.12$).
- There are no significant differences in the level of interest in smoke-free buildings by quintiles of income, by poverty status, by rent category, by age or by presence of children in the household.

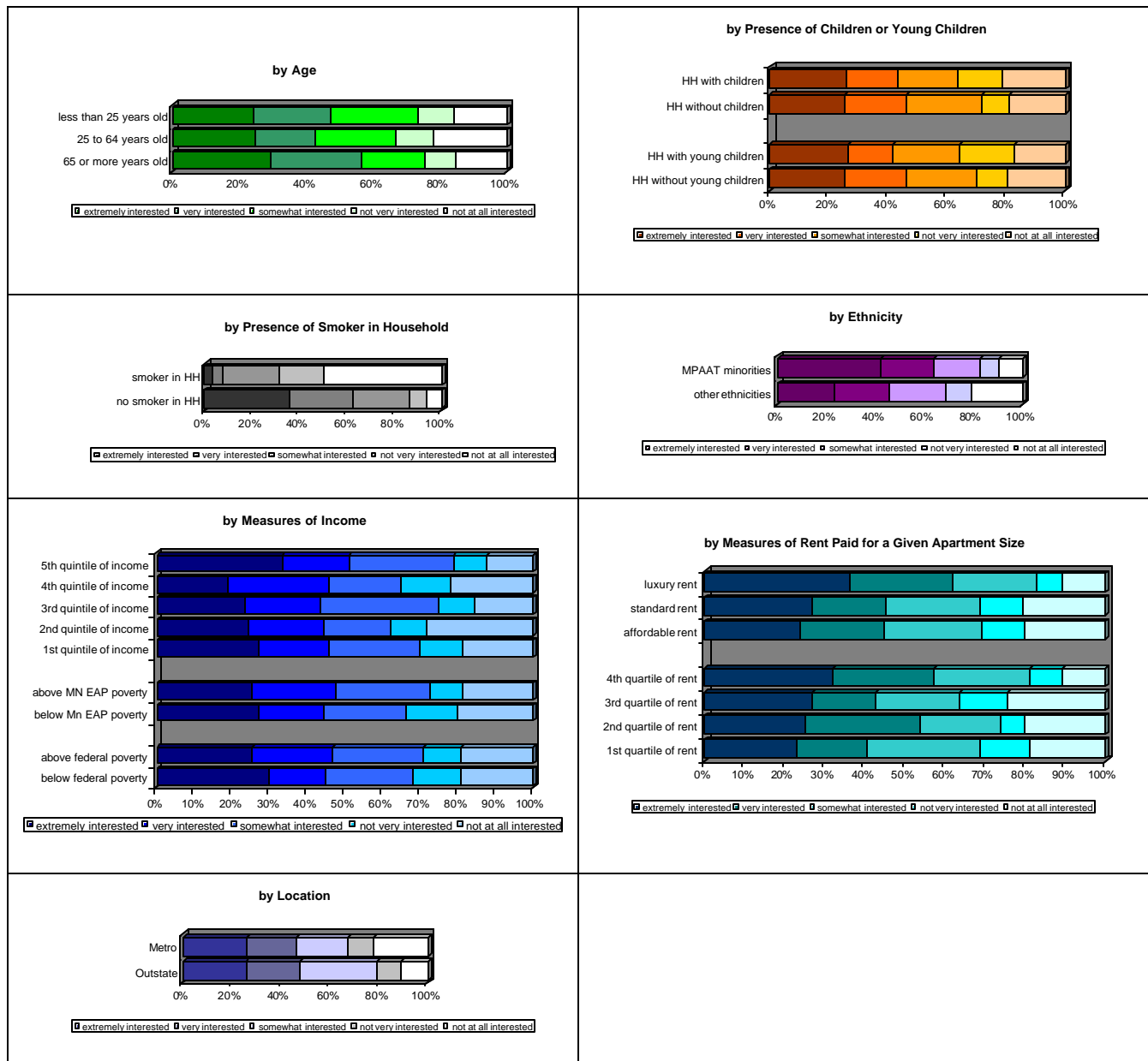


Figure 20. How interested would you be in living in a building where smoking is not allowed anywhere?

Importance of Smoking-Permitted Buildings

Looking at the issue from a different perspective, 20% of renters said that it is very important to them to live in a building that allows smoking, 12% said it is somewhat important, 16% said it is not very important, and 52% said it is not at all important (Q10)(Figure 21). There is a profound difference between households with no smokers and households with smokers on this issue. Among the 71% of rental households that do not have any smokers, 11% said it is very important to them to live in a building that allows smoking, 11% said it is somewhat important, 16% said it is not very important, and 63% said it is not at all important. Among the 29% of rental

households that have one or more smokers, 43% said it is very important to them to live in a building that allows smoking, 15% said it is somewhat important, 17% said it is not very important, and 25% said it is not at all important.

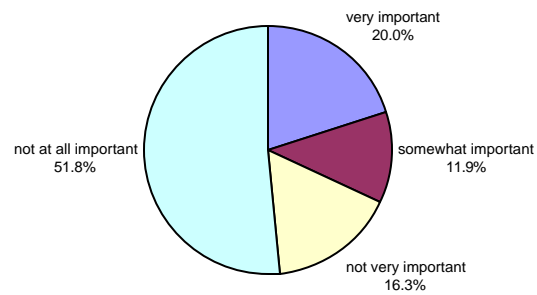


Figure 21. How important is it to you to live in a building that allows smoking?

Older renters and low income renters are significantly more likely to say it is important to them to live in a building that allows smoking, and households with children and households who pay lower rents are marginally more likely to say a smoking-permitted building is important:

- Twenty-three percent of seniors and 22% of those 25 to 64 say that a smoking-permitted building is very important, vs. 8% of adults under 25 ($p = 0.03$)(Figure 22).
- Households below 50% of the median Minnesota income for their size are more likely to say that living in a building that allows smoking is “somewhat important” and less likely to say it is “not at all important” than are households above 50% of the median income ($p=0.04$).
- Households with children are marginally less likely to say it is “not at all” important than households without children ($p=0.07$).
- Households who pay somewhat lower rent for apartments of a given size are marginally more likely to say that living in a building that allows smoking is important than are households who pay somewhat more for rent ($p = 0.10$).

There are no significant differences in the importance of a smoking-permitted building by quintiles of income, minority status, or Metro vs. Outstate location.

People who allow smoking in their home are more likely to say it is important to live in a building where smoking is allowed, even if no one who lives in the household is a smoker.

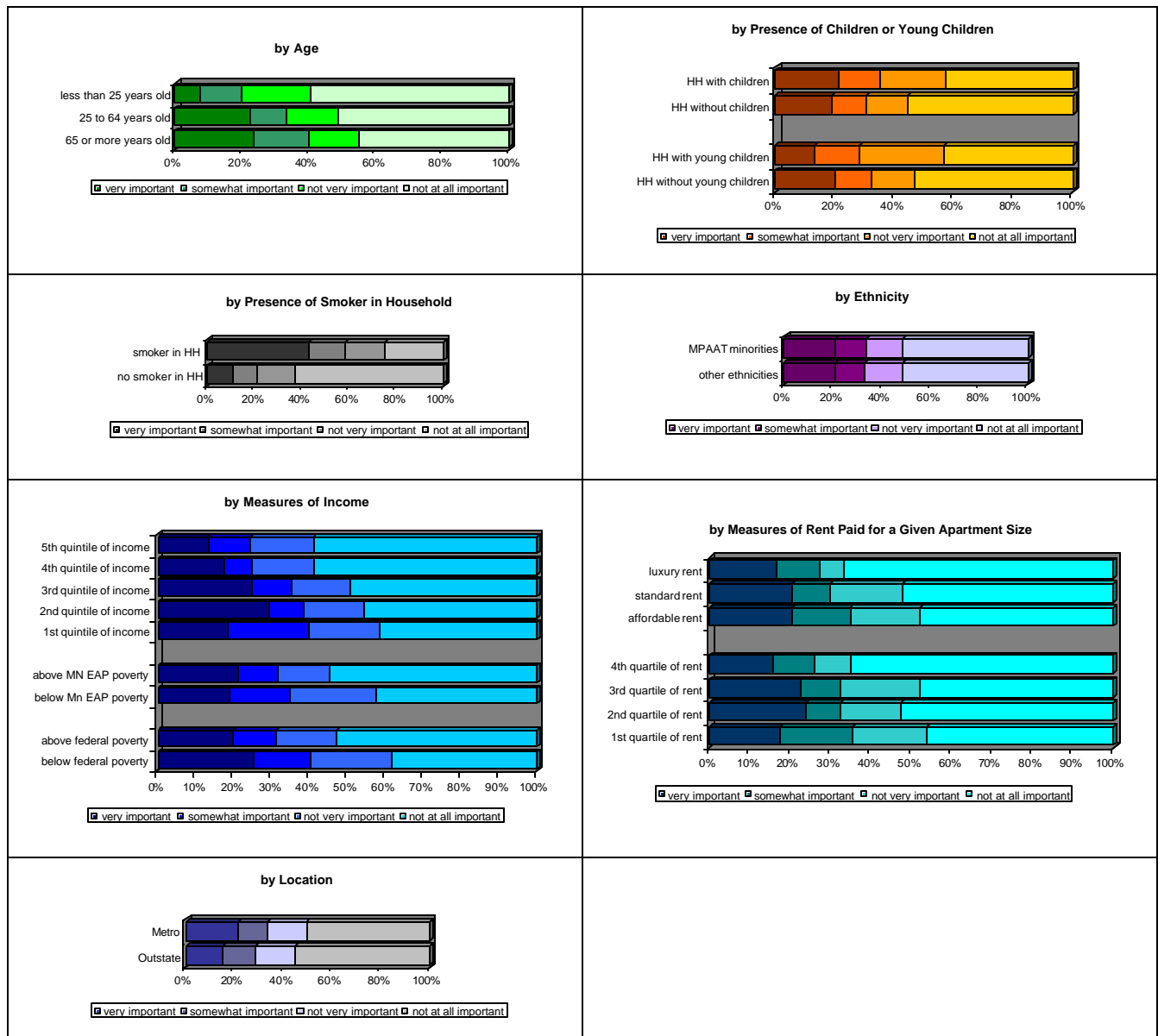


Figure 22. How important is it to you to live in a building that allows smoking?

Likelihood of Choosing Smoke-Free Buildings over Other Buildings

Among both smoke-free and non-smoke-free owners interviewed in Task 1, less than half thought that smoke-free designation would be important enough to affect tenants' choice between two buildings that were otherwise similar in terms of the key criteria tenants consider in choosing an apartment. To obtain renters' perspective on this, we asked them, "If two apartment buildings were the same in every way including rent, except that one did not allow smoking anywhere, how likely would you be to choose the 'no smoking' building over the building where smoking was permitted?" (Q15). Among the random sample as a whole, 54% said they would

be “very likely” to choose the smoke-free building, 19% said they would be “somewhat likely,” 9% said they would be “not very likely,” and 18% said “not at all likely” (Figure 23).

- Not surprisingly, households without any smokers are significantly more likely to say they would choose the smoke-free building ($p = 0.000$)(Figure 24). Seventy-two percent of households without smokers said they would be very likely to choose the smoke-free building and 16% say they would be somewhat likely, but among households with at least one smoker, only 11% would be very likely and 25% would be somewhat likely to choose the smoke-free building.

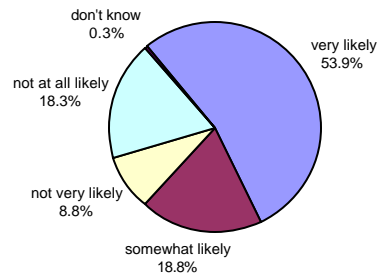


Figure 23. If two apartment buildings were the same in every way including rent, except that one did not allow smoking, how likely would you be to choose the "no-smoking" building over the building where smoking was permitted?

- Seniors are significantly more likely to say they would choose the smoke-free building than non-seniors ($p=0.01$). Sixty-six percent of seniors said they would be very likely to choose the smoke-free building, compared to 50% of people 25 to 64 and 54% of people less than 25 years old.
- MPAAT minorities of concern are more likely to say they would choose the smoke-free building ($p= 0.02$): 69% of MPAAT minorities said they would be very likely to choose the smoke-free building, vs. 52% of renters of other ethnicities.
- Households in different quintiles of income are marginally different in the likelihood that they would choose the smoke-free building ($p = 0.095$), a result that seems to be primarily due to a difference between the highest quintile and the other four quintiles, rather than a consistent pattern across quintiles.
- There is no difference in the likelihood of choosing the smoke-free building by rent category, by poverty status, by presence of children, or by Metro vs. Outstate location ($p = 0.43$).

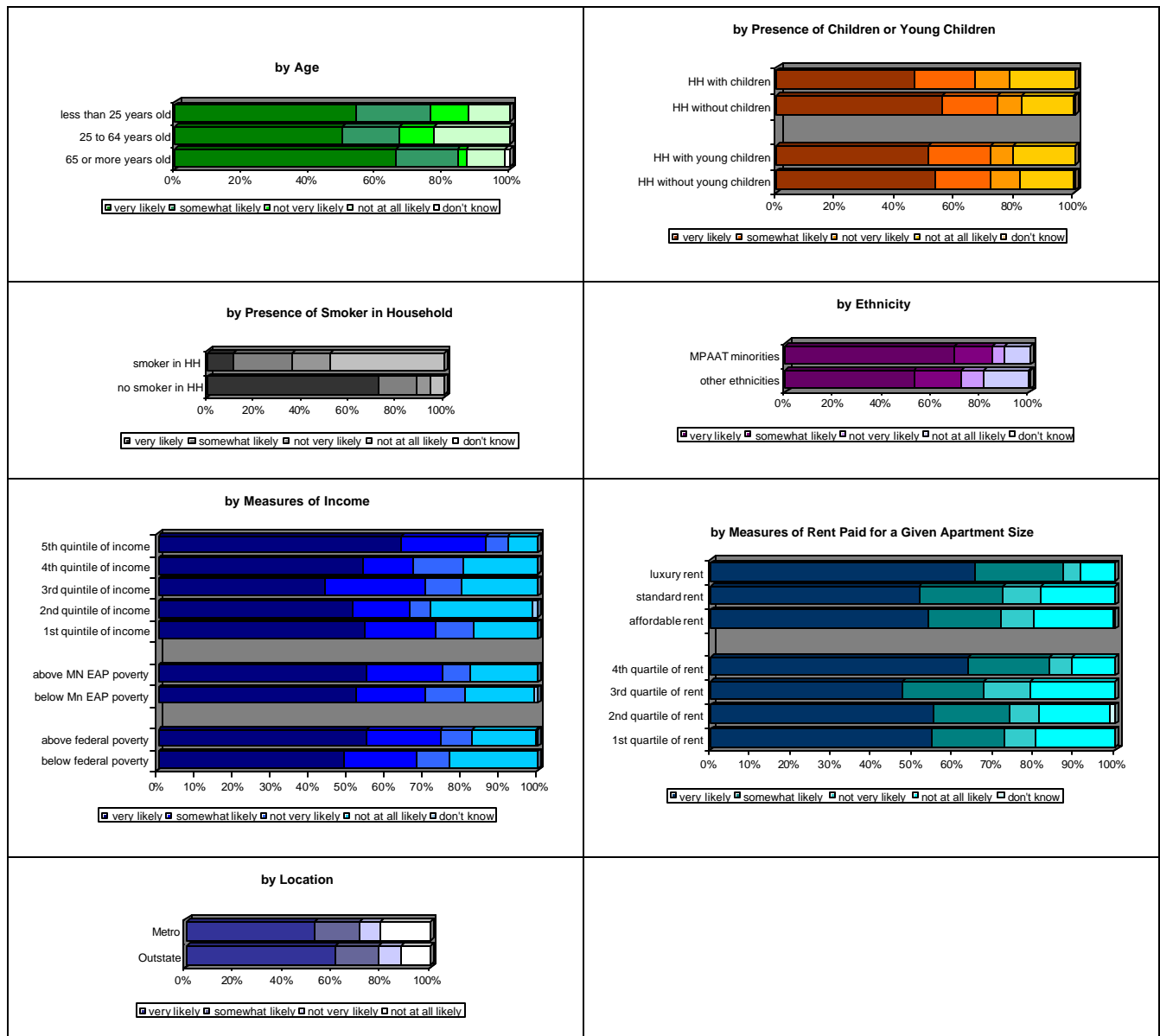


Figure 24. If two apartment buildings were the same in every way including rent, except that one did not allow smoking anywhere, how likely would you be to choose the “no-smoking” building over the building where smoking was permitted?

Willingness to Pay More Rent for Smoke-Free Buildings

Generally, the owners interviewed in Task 1 of this project consider location, rent, and size of apartment or number of bedrooms to be the three most important criteria tenants consider in choosing an apartment building. Of all the owners interviewed, only one smoke-free owner thought that smoke-free designation was important enough to tenants to override one or more of their top three criteria in choosing a building. We asked tenants several questions to determine

how they would trade off smoke-free designation against other features. One of these was whether tenants would be willing to pay more to live in a smoke-free building.

Overall, 34% of renters said they would be willing to pay more to live in a smoke-free building (Q14)(Figure 25). Fourteen percent would be willing to pay \$5 to \$15 more per month, an additional 8% would be willing to pay \$16 to \$25 more per month, and another 8% would be willing to pay \$26 to \$50 more per month. A few would be willing to pay \$51 to \$75 more per month (1%) or even \$76 or more per month (3%).

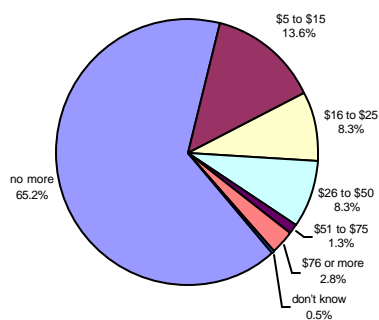


Figure 25. If two apartment buildings were the same, except that one did not allow smoking anywhere, how much more would you be willing to pay per month to live in the "no-smoking" building?

Non-smokers, households with higher incomes, MPAAT minorities of concern and young households are more likely than others to be willing to pay some amount to live in a smoke-free building:

- Non-smokers are much more willing to pay something to live in a smoke-free building than are smokers ($p=0.000$)(Figure 26). Forty-five percent of non-smokers said they would be willing to pay something additional to live in a smoke-free building, vs. only 9% of households with a smoker. Among the non-smoking households, 18% would be willing to pay \$5 to \$15 more per month, 11% would be willing to pay \$16 to \$25 more, 11% would be willing to pay \$26 to \$50 more, and 5% would be willing to pay even more than that.
- Households with higher incomes are significantly more likely to say they would pay more to live in a smoke-free building ($p=0.001$). Forty-nine percent of those in the highest quintile of income would be willing to pay more, but this drops to 23% in the lowest quintile of income. Households with incomes at or below 50% of the Minnesota median income for a household of that size are much less likely to be willing to pay more (21% vs. 41%, $p=0.000$). Given that there is no difference in the level of interest in smoke-free buildings as a function of income or poverty status and only a marginal difference in the likelihood of choosing a smoke-free building over another similar building at the same rent, the difference in willingness to pay more appears to reflect a difference in financial means more than a difference in preferences.
- Similarly, households that pay higher rents (for a given size of unit) are significantly more likely to be willing to pay more. Forty-five percent of households in the top quartile of rent paid for a given size of unit would be willing to pay more to live in a smoke-free building, vs. 22% of households in the bottom quartile. Given that there is no significant difference across rent categories in the level of interest in smoke-free buildings or likelihood of choosing a smoke-free building over another similar building at the same rent, the difference in willingness to pay more also appears to reflect a difference in financial means more than a difference in preferences.

- MPAAT minorities of concern are significantly more likely to be willing to pay more to live in a smoke-free building (49%, vs. 34% of those of other ethnicities, $p = 0.002$).
- Younger renters are significantly more likely to say they would pay more to live in a “no-smoking” building ($p=0.03$). Forty-three percent of renters under 25 said they would pay more to live in a smoke-free building, vs. 36% of renters 25 to 64 and 23% of renters 65 or older. Given that there is no difference across age groups in the expressed level of interest in smoke-free buildings, and that seniors are actually more likely to say that they would choose a smoke-free building, all other things (including rent) being equal, the fact that younger renters are more likely to be willing to pay more appears to reflect the fact that their incomes are significantly higher than the incomes of renters 65 and over ($p = 0.000$).

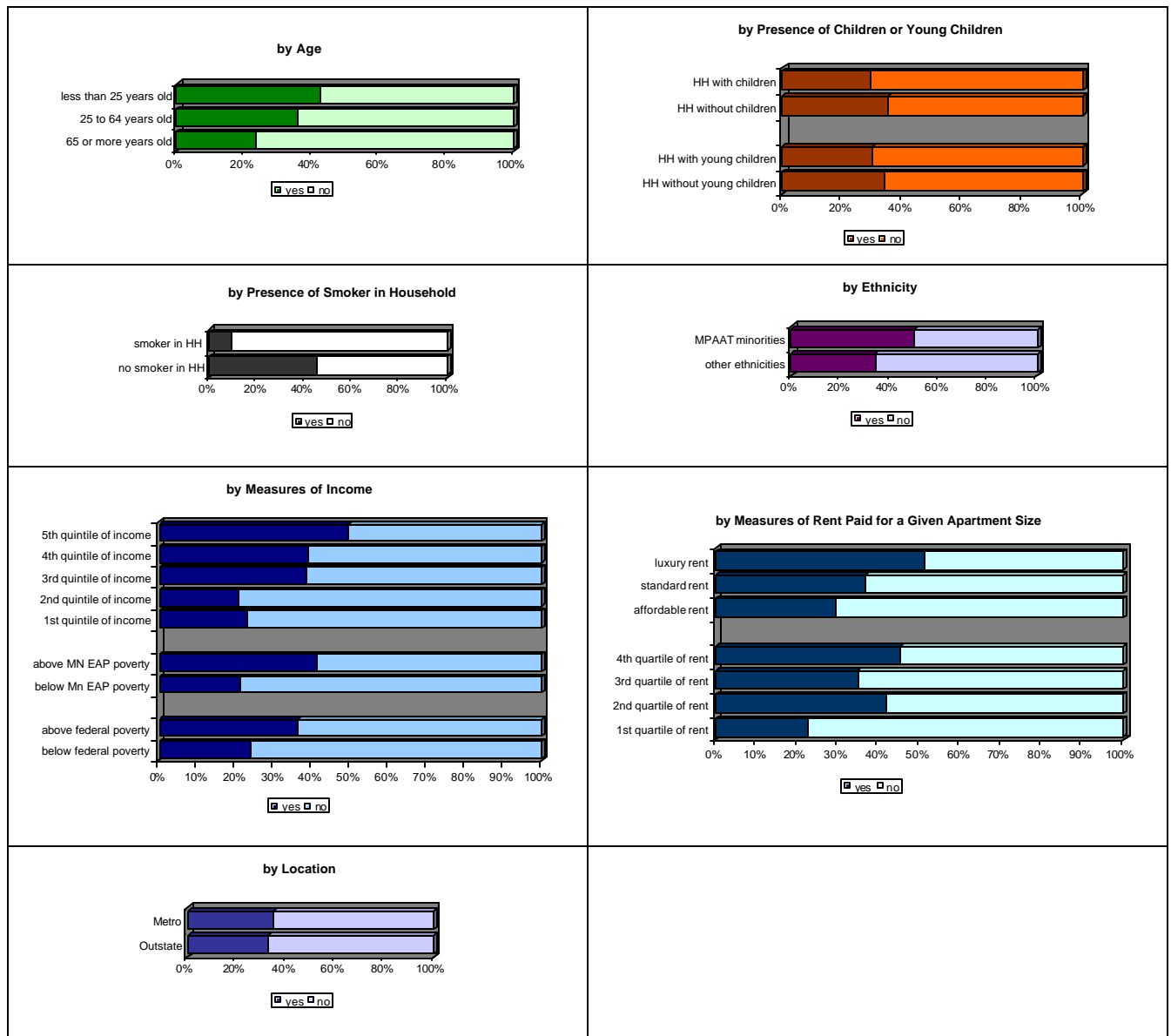


Figure 26. If two apartment buildings were the same, except that one did not allow smoking anywhere, how much more would you be willing to pay per month to live in the “no-smoking” building?

Households with children and without children and households in Metro and Outstate areas are equally likely to say they would pay more to live in a no-smoking building.

Willingness to Trade Off Other Features to Live in an Apartment with No Tobacco Smoke Odor

To get a better sense of the importance of a smoke-free environment to tenants, we asked respondents whether, if they were planning to move, they would be willing to forego certain other features in order to live in an apartment with little or no tobacco smoke odor (Q16). Owners are accustomed to marketing their buildings in terms of location, space, amenities and so on and have a working knowledge of the value of these features to tenants. As mentioned previously, the owners interviewed in Task 1 generally consider location and size of apartment/number of bedrooms to be two of the three most important criteria tenants consider in choosing a building. Asking tenants whether they would trade away some of these features for a smoke-free environment provides information that owners can use to “calibrate” their sense of the importance of a smoke-free environment against attributes they understand well.

About a third of tenants would be willing to live in a moderately less convenient location in order to live in an apartment with little or no tobacco smoke odor: 30% would be willing to drive ten minutes farther to work; 36% would be willing to travel 10 minutes farther to parks or lakes; and 31% would be willing to walk three blocks further to a bus line (Figure 27).¹⁹

Not too many tenants are willing to trade space for a smoke-free environment. Only 13% said they would be willing to live in an apartment with one less bedroom (and this did not vary much depending on how many bedrooms respondents currently have), and only 11% said they would be willing to live in an apartment with smaller rooms.

In terms of amenities, only 12% said they would be willing to live in an apartment with older carpets, paint and cabinets. Thirty-seven percent would be willing to live in a building without underground parking in order to live in an apartment with little or no tobacco smoke odor, but, among those who currently have underground parking, only 14% would be willing to do so. Thirty-four percent would be willing to live in an apartment without a dishwasher, but among those who currently have a dishwasher, only 18% would be willing to do so. Thirty percent would be willing to live in a building that was 20 years older, and this did not vary significantly by the age of the building respondents currently live in. Seven percent would be willing to live in a somewhat noisier neighborhood.

Twelve percent would be willing to live in a building with less security, but only 6% would be willing to live in a somewhat less safe neighborhood in order to live in an apartment with little or no tobacco smoke odor.

¹⁹ Each comparison excludes those who said the particular tradeoff was “not applicable” for them.

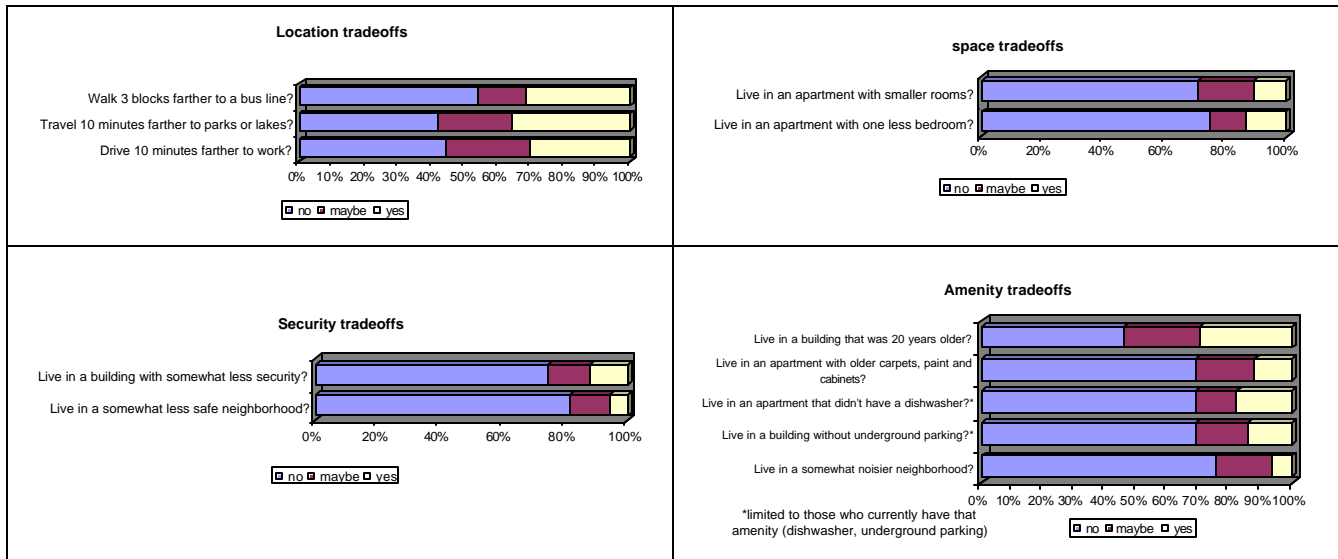


Figure 27. If you were planning to move, would you be willing to do the following to live in an apartment with little or no tobacco smoke odor?

Households without any smokers are much more likely than households with smokers to be willing to make these tradeoffs. There are significant differences between non-smoking and smoking households on all but the security features, and even these are marginally different. For example, 38% of households without smokers would be willing to drive 10 minutes farther to work, vs. 12% of households with smokers ($p=0.000$), and 39% of households without smokers would be willing to walk 3 blocks farther to a bus line, vs. 14% of households with smokers.

There are also some significant differences across demographic groups in willingness to make these tradeoffs:

- MPAAT minorities of concern are more willing to travel farther to work, parks and lakes, or bus lines or to live in a somewhat less safe neighborhood in order to live in an apartment with little or no tobacco smoke odor than are households of other ethnicities, but are no more or less willing to make the other tradeoffs than households of other ethnicities.
- Households with children are less willing to live in an apartment with one less bedroom or with smaller rooms and less willing to live in an apartment with older carpets, paint and cabinets in order to live in an apartment with little or no tobacco smoke odor than are households without children.
- Younger households are marginally more likely to say that they would or might be willing to live in an apartment with no underground parking, live in a somewhat noisier neighborhood or live in an apartment with smaller rooms in order to live in an apartment with little or no tobacco smoke odor than are senior households.
- Households that are below one of the poverty definitions are less willing to travel longer distances to work, parks and lakes or bus lines or to live in an apartment with smaller rooms and more willing to live in a building with somewhat less security to live in an apartment with little or no tobacco smoke odor than are non-poor households. There are significant but

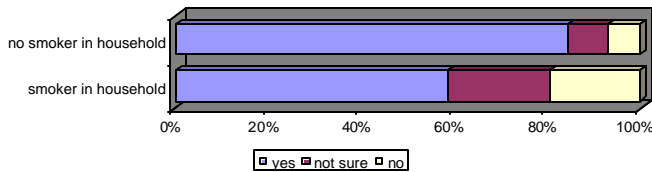
irregular differences across quintiles of income in willingness to walk further to a bus line or live in an apartment with one less bedroom, and marginal and irregular differences across quintiles of income in willingness to live in an apartment without a dishwasher.

- Households that pay lower rents for an apartment of a given size are more willing to live in an apartment without underground parking or a dishwasher or with somewhat less security, and are marginally more willing to live in a somewhat less safe neighborhood, in order to live in an apartment with little or no tobacco smoke odor than are households that pay higher rents.

Willingness to Enforce Smoke-Free Designation

Seventy-seven percent of renters in the random sample say that if they lived in a smoke-free building, they would insist that no one smoke in their apartment, including guests (Q12). Twelve percent say they are not sure whether they would or not, and 11% say they would not insist on it. Households with no smokers are much more likely to say they would insist on it than are households with at least one smoker (85% vs. 59%, $p = 0.000$)(Figure 28).

Figure 28. If you lived in a building where smoking was not allowed, would you insist that no one smoke in your apartment, including guests?



DISCUSSION

Secondhand smoke transfer appears to be a very common occurrence in multifamily buildings in Minnesota, with almost half of renters experiencing it in their current apartments and almost two-thirds having experienced it in some apartment they have lived in. Ten percent of renters say ETS comes into their apartments from elsewhere often or most of the time. The design and construction of existing multifamily buildings in Minnesota clearly is not isolating renters from contaminants generated outside their own apartments.

There appears to be strong market potential for smoke-free buildings. Only three in ten rental households include someone who smokes, and no market segment we looked at has smokers in more than four out of ten households. Almost half of Minnesota renters are extremely or very interested in living in a smoke-free building. Market potential appears to be high across all demographic segments we investigated, ranging from a high of 64% extremely or very interested among minorities to a low of 40% extremely or very interested among those in the lowest quartile of rent paid.

Offering smoke-free buildings appears likely to be profitable to private owners. Over half of rental households said they would be very likely to choose a smoke-free building over a smoking-permitted building that was the same in all other ways, suggesting that owners could differentiate their properties simply by designating them smoke-free. Ninety-five percent of the smoke-free owners interviewed earlier said that smoke-free designation had had neutral or positive effects on turnover, vacancy and amount of rent charged, and over half said that smoke-free designation had reduced turnover costs (for painting, decorating and leasing). Only one of twenty smoke-free owners had had to enforce his lease against a tenant who smoked. These experiences suggest that operating costs for smoke-free buildings would be the same or lower than those for smoking-permitted buildings. Over a third of renters said they would be willing to pay more to live in a smoking-permitted building, suggesting that smoke-free designation has the potential to increase income as well as decrease operating costs.

The results also suggest that many clients of public and publicly-assisted housing are very interested in smoke-free housing. Six in ten households below the federal HHS poverty line (about 25% of Minnesota median income) and almost two-thirds of households below 50% of Minnesota median income have no smokers. Very low income households are more likely to experience ETS transfer in their current apartments and very low and low income households are as likely to be bothered by ETS transfer as higher income renters. These households have a level of interest in smoke-free buildings that is almost identical to that of higher income households – 45% of very poor households and 44% of poor households are extremely or very interested. For obvious reasons, though, these households are less likely to say they would pay more to live in a smoke-free building.

Only about one in forty Minnesota rental households live in a building where the landlord prohibits smoking in all apartments. This appears to indicate that Minnesota owners have successfully implemented smoke-free policies in a few buildings. The qualitative survey of owners also identified successful experiences with smoke-free designation in Minnesota.

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