

Tenant perceptions of drifting
environmental tobacco smoke in multi-unit
dwellings

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Background and Objectives: Environmental tobacco smoke (ETS) is widely recognized as a serious health hazard. No safe level of exposure to ETS has been identified (USDHHS, 2006; WHO, 2007). The importance of smoke-free spaces in improving health outcomes for both smokers and non-smokers is clearly understood and as such, many individuals living in Ontario have made their homes smoke-free. Although those living in units within multi-unit dwellings (MUDs) have the option of making their own unit smoke-free, they may still be involuntarily exposed to ETS drifting from smoking units to their unit. The present study explores tenant's perceptions of this drifting ETS and the potential market for smoke-free rental housing.

Methods: Anonymous surveys were sent to 3724 households within rented MUDs (apartments and row housing) with five or more units in Kitchener, Ontario. In addition to demographic questions, the survey addressed respondents' experiences with, perceptions of, and reactions to drifting ETS and their views on smoke-free rental housing. Three hundred and five surveys were returned, and 291 met the final inclusion criteria to be included in the analysis. Survey data were weighted by age and education level. Descriptive analyses and logistic regression models were run to answer the research questions.

Results: Over half of the respondents who do not smoke in their unit on a daily basis indicated they were exposed to drifting ETS in their home at least 'sometimes'. Of those who were exposed, 89.5% were bothered and nearly half were bothered 'a lot'. This suggests drifting ETS is a concern for many tenants living in MUDs. The majority of tenants indicated they did not live in a smoke-free building however there was a strong interest in smoke-free rental housing. Nearly 90% of tenants showed at least some interest in smoke-free rental housing, and many tenants would prefer to live in a building with the strongest possible restrictions on smoking in place. Younger tenants, non-smokers, those who spent less time at home on weekends and those who perceived indoor smoking as a fire risk were more likely to be interested in smoke-free rental housing.

Conclusions and Significance: This study provides insight into the magnitude of the problem of drifting ETS in MUDs and can be used to inform policy on smoke-free MUDs. Many respondents indicated they were exposed to drifting ETS and the majority of those who were exposed were bothered by this exposure. There also appears to be a strong market for smoke-free rental housing. The response rate for this study was low at 8.5% and as such the results must be interpreted with

caution. Future research should be completed in other jurisdictions and with larger sample sizes. Landlord surveys and air quality monitoring studies are also needed. While additional research is needed, the current study suggests this is an important public health issue, and provides additional evidence supporting the need to explore policy options in the public and private realm for smoke-free housing.

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Chapter 1

Introduction and Overview

Tobacco use is a worldwide epidemic. Over 1.3 billion individuals smoke worldwide and it is expected that half of those individuals will die prematurely due to tobacco related diseases (World Health Organization (WHO), 2006). Tobacco use not only affects the individual directly puffing on the cigarette, but also those around them. Environmental tobacco smoke (ETS), smoke from the burning end of the cigarette and smoke exhaled by the smoker, contains many chemicals, 250 of which are known to either be carcinogenic or toxic to humans (WHO, 2007). Exposure to ETS is known to be extremely harmful. No safe level of exposure to ETS has been identified and exposure, even at low levels, can negatively affect an individual's health (U.S. Department of Health and Human Services (USDHHS), 2006; WHO, 2007). In children, exposure to ETS is associated with lower respiratory tract infections, ear infections, increased severity of asthma, and an increased risk of sudden infant death syndrome (SIDS). In adults, exposure is associated with cancers, acute coronary diseases, chronic respiratory conditions, reduced lung function, and the exacerbation of asthma (USDHHS, 2006; WHO, 2005).

Since the 1970s when the evidence that ETS is harmful began to mount, municipalities and provinces have increasingly developed and implemented policies to protect individuals from exposure to ETS (Brownson et al, 1997; Callinan et al., 2006; Nykiforuk et al., 2008; Shields, 2007; WHO, 2007). Smoke-free spaces regulations have been shown to reduce health risks as well as help smokers quit and remain abstinent from smoking (Callinan et al., 2006; Fichtenberg et al., 2002; Hammond et al., 2004). Even with the many restrictions in place on smoking in public spaces, exposure to ETS still occurs at high levels. The home is one of the few places left without smoking restrictions and has become an important point of intervention to reduce exposure to ETS. Although many individual families are electing to make their homes smoke-free, in 2005, 1.8 million Canadians reported being regularly exposed to ETS in their home (Statistics Canada, 2005). When individuals elect to make their own homes smoke-free, not only does it

reduce the household members' exposure to ETS, but it also increases the likelihood that smokers living in the home will quit smoking, or reduce their daily cigarette consumption (Gilpin et al., 1999; Messer et al., 2008; Shields et al., 2007).

Multi-unit dwellings (MUDs), buildings with two or more residential units which share a floor, ceiling or wall, pose a unique set of concerns related to ETS exposure. Individuals may elect to make their own homes smoke-free, yet the smoking behaviours and decisions of other tenants in the building or complex can affect them. Specifically, ETS can drift via cracks in the walls, hallways and the ventilation system from a smoking unit to other units within the building or complex (Spengler, 1999). This drifting can lead to individuals being involuntarily exposed to ETS in their homes regardless of their personal decisions regarding smoking.

Knowledge of the benefits of smoke-free spaces and homes coupled with the potential for ETS to drift through buildings has led to an increased interest in developing smoke-free MUDs policies. As awareness of the issue has increased, some landlords, municipalities and regions across Canada and the United States have begun to consider no-smoking policies in MUDs. There is, however, little research available on this issue.

The purpose of the present study was to investigate tenant perceptions of, and experiences with, drifting ETS in their homes. Given the understanding that ETS exposure can lead to negative health outcomes, the benefits of smoking restrictions in homes, public places and workplaces, and the fact that the home is quickly becoming one of the few places where an individual may be exposed to ETS, greater focus on the issue of smoking in MUDs is needed. Evidence is needed on tenants' beliefs and experiences surrounding drifting ETS, and what demand, if any, there is for smoke-free rental housing.

Chapter 2

Literature Review

2.1 Environmental Tobacco Smoke

Environmental tobacco smoke (ETS) is known to be harmful to people's health. Over fifty carcinogens have been identified within ETS and in 1992, the U.S. Environmental Protection Agency classified tobacco smoke as a Group A Carcinogen, a classification that is given to the most toxic chemicals (USDHHS, 2006). ETS is clearly a toxic substance, and exposure to ETS can cause negative health outcomes and premature death in adults and children who do not smoke. In 2002, 831 Canadian deaths were attributed to ETS exposure (Baliunas et al., 2007). Fichtenberg et al. (2002), suggests in the United States one non-smoker dies as a result of exposure to ETS for each eight smokers that die as a result of tobacco use. Exposure to ETS can have a range of impacts from short-term implications such as nasal irritation, to long-term implications such as coronary heart disease and cancers (USDHHS, 2006).

2.1.1 Composition of environmental tobacco smoke

Environmental tobacco smoke (ETS) is formed from exhaled mainstream smoke, sidestream smoke and compounds which have diffused through the cigarette's paper. Sidestream smoke, the smoke which comes from the lit end of the cigarette, is the greatest contributor to ETS (California Environmental Protection Agency (CEPA), 2005; Daisey, 1999). The composition of mainstream and sidestream smoke are almost identical. Some compounds, however, are emitted at much higher concentrations, up to ten times higher, in sidestream smoke compared to mainstream smoke (Brownson et al., 1997; USDHHS, 2006). According to an International Agency for Research on Cancer review (2004), 4,000 mainstream tobacco smoke compounds have been identified. Of the compounds identified in tobacco smoke, at least 250 are known to be toxic or carcinogenic to humans (USDHHS, 2006). The carcinogens in tobacco

smoke include polycyclic aromatic hydrocarbons, nitrosamines, heterocycles, metals and miscellaneous organic compounds (USDHHS, 2006).

2.1.2 Health impacts of environmental tobacco smoke

Environmental tobacco smoke is a carcinogenic substance which has many negative health impacts for those who are exposed. Exposure at anytime during the lifespan can lead to a variety of health issues.

Prenatal and childhood exposure. Exposure to ETS during the prenatal period can lead to reduced growth of the fetus in utero and lower weights and shorter lengths at birth (Kharrazi et al., 2004).

Exposure may also be associated with preterm delivery (USDHHS, 2006). The impact of ETS exposure in the prenatal period continues into childhood. Prenatal exposure to ETS is a key risk factor for SIDS and may be associated with the development of childhood leukemia and childhood brain tumours (USDHHS, 2006).

Exposure to ETS in early childhood can also have a variety of long term health effects for the child. Postnatal exposure is a risk factor for SIDS independently of prenatal exposure, and there is a potential dose-response relationship between exposure and the incidence of SIDS (CEPA, 2005; Cook et al., 1999). A study by McMartin et al. (2002) found those children who died of SIDS had a much higher concentration of nicotine in their lungs than children who died of other causes. In later childhood, exposure to ETS can lead to lower respiratory illnesses, asthma, middle ear disease, coughs and breathlessness (DiFranza & Lew, 1996; USDHHS, 2006). A meta-analysis by DiFranza & Lew (1996) suggests in the United States, household smoking accounts for up to 13% of the cases of asthma in children less than 15 years of age. Specifically, in the United States, exposure to ETS is responsible for 8,000 to 26,000 new cases of asthma and the development of asthma symptoms in 200,000 – 1,000,000 children every year (Best, 2009). Exposure to ETS is associated with higher rates of tonsillectomies and adenoidectomies in children, approximately a quarter of all tonsillectomies and adenoidectomies in the

United States are due to a child's exposure to ETS because their parents smoke (DiFranza & Lew, 1996). Parental smoking has an especially large impact on the child, however exposure from any source is detrimental.

Exposure to ETS not only manifests as specific health concerns, but also has an impact on other areas of the child's life. Research from the United States suggests children who are exposed to ETS are twice as likely to miss six or more days of school per year as children who are not exposed to ETS (Best, 2009). Although it is difficult to determine causality, correlations have been made between childhood exposure to ETS and lower scores on cognitive functioning tests, and increases in behavioural problems such as conduct disorders, hyperactivity and reduced attention spans (WHO Tobacco Free Initiative, 2009).

Adult exposure. During adulthood exposure to ETS can lead to many negative health outcomes. Current exposures to ETS as well as cumulative exposure over the life course are important at this time.

ETS exposure can have major effects on the cardiovascular system leading to chronic heart disease. Effects include inflammation and infection of the cardiovascular system, increased oxidative stress, atherosclerosis and increased risk of coronary disease events (Barnoya & Glantz, 2005). The effects of ETS exposure on a non-smoker's risk of heart disease are substantial; a non-smoker who is exposed to ETS has 80 – 90% of the risk of heart disease that an active smoker has (Barnoya & Glantz, 2005). An estimated 579 Canadians died from ischemic heart disease related to ETS exposure in 2002 (Baliunas et al., 2007).

ETS exposure can also cause lung cancer in non-smokers. In 2002, an estimated 252 Canadians died from lung cancer related to ETS exposure (Baliunas et al., 2007). Respiratory effects including cough, phlegm production and decreased lung function also often occur following ETS exposure (Brownson et al., 1997). A case-control study in Finland found that ETS exposure, at work and at home in the last year, as well as cumulative exposure was associated with new cases of asthma in adults (Jaakkola et al., 2003).

Although lung cancer is the most commonly thought of cancer when considering exposure to ETS, exposure may also be related to nasal sinus cancer and breast cancer (USDHHS, 2006). ETS exposure has been linked to breast cancer in younger, pre-menopausal women. In the 2006 Surgeon General report on second-hand smoke exposure, it was reported the evidence was “suggestive but not sufficient to infer a causal relationship between second-hand smoke and breast cancer” (USDHHS, 2006). The California Environmental Protection Agency reviewed the evidence on this issue and in a 2005 report concluded “regular ETS exposure is causally related to breast cancer diagnosed in younger, primarily pre-menopausal women” (CEPA, 2005). A review of the literature by Johnson & Glantz (2008) found the evidence to support this causal pathway was stronger in 2005 than the evidence for the causal pathway between ETS and lung cancer in 1986 when the risk of lung cancer due to ETS was accepted. A Canadian expert panel on tobacco smoke and breast cancer risk suggest the association between breast cancer and exposure to ETS is consistent with causality for younger, premenopausal women, but the evidence is not clear for older, postmenopausal women (Collishaw et al., 2009).

Other health conditions which the evidence suggests may be associated with ETS exposure include an increased risk of periodontal diseases (Arbes Jr. et al., 2007), stroke, nasal irritation, acute respiratory symptoms, adult-onset asthma, worsening of pre-existing asthma and chronic obstructive pulmonary disease (COPD) (USDHHS, 2006).

ETS exposure is associated with negative health impacts regardless of when the exposure takes place. Household and workplace ETS exposure have both been shown to be important in the development of disease. In Canada, workplace exposure to ETS has been greatly reduced through smoke-free spaces regulations and many individual families have made the decision to make their home smoke-free. Those living in multi-unit dwellings however may be involuntarily exposed to ETS through the decisions of the other tenants in their building to smoke indoors, and this could have a negative impact on their health outcomes.

2.2 Smoke-Free Environments

Smoke-free public environments are becoming the norm in Canada. Many municipalities have implemented their own smoke-free spaces regulations and provincial regulations have been implemented across the country. Generally these regulations limit indoor smoking in public spaces. The Smoke-Free Ontario (SFO) Act, for example, sets specific restrictions on where smoking is permitted in a variety of settings and includes direction on enforcement and fines for those who do not comply. The SFO Act prohibits smoking in all enclosed public places and workplaces, removed smoking rooms from restaurants and extended the number of places where smoking is banned (Smoke-Free Ontario, 2008). The SFO Act does address smoking in multi-unit dwellings, banning smoking in all common areas including but not limited to, elevators, party rooms, hallways and lobbies, but does not address smoking in private areas of MUDs such as within individual units or in outdoor spaces (Smoke-Free Ontario, 2008).

The impact of smoke-free environments is not limited to reducing individual's exposure to ETS. The introduction of smoking bans can also change the behaviour of the smokers themselves and change the social norms surrounding tobacco use. An International Agency for Research on Cancer (IARC) working group reviewed the literature on smoke-free spaces regulations and found there is strong evidence to support their effectiveness (Pearce et al., 2008). Specifically IARC found evidence to support the relationships between smoke-free workplaces and reduced adult smoking rates and, smoke-free policies and decreased tobacco use in youth. Sufficient evidence was found to support a reduction in respiratory symptoms in workers with smoke-free workplaces and a reduction in heart disease morbidity following the introduction of smoke-free legislation. Strong evidence was also found suggesting smoke-free home policies lead to reduced smoking in youths (Pearce et al., 2008). A systematic review of studies on the effect of smoke-free workplaces on smoking behaviour published by Fichtenberg et al. (2002), suggested if all workplaces in the United States and the United Kingdom that were not smoke-free became smoke-free the overall smoking rate in the population would decrease by 4.5% and 7.6%, respectively.

Smokers who live or work in a smoke-free environment are more likely to adapt their smoking behaviours than smokers living and working in smoking permitted environments. Using data from the 2005 Canadian Tobacco Use Monitoring Survey (CTUMS), Shields (2007) found individuals living in homes or working in offices where smoking was banned were more likely to be at a later stage of change as suggested by the transtheoretical model of change in relation to smoking cessation. The number of cigarettes smoked per day varied greatly based on the smoking restrictions in place. In 2005, smokers who lived in homes without smoking restrictions smoked an average of 16 cigarettes per day, whereas those living in smoke-free homes smoked an average of nine cigarettes per day (Shields, 2007). In an American study, it was found those individuals who made their homes smoke-free were almost five times more likely to have quit smoking and maintained a quit for greater than ninety days at follow-up than those who had not implemented smoke-free policies. Relapse to smoking rates were much higher for those individuals who did not maintain the smoke-free home policy than for those who did (Messer et al., 2008). Having a smoke-free home is also associated with a longer time to the first cigarette of the day (Borland et al., 2006; Gilpin et al., 1999). These results, however, may be attributed to the fact that those who are more likely to quit smoking or who are in the beginning stages of quitting may be more likely to implement a smoke-free policy in their home (Borland et al., 2006). In a review of research completed on smoke-free homes to date, Mills et al. (2009) found longitudinal studies on the impact of a smoke-free home consistently find an increase of 50 – 70% in the odds of abstinence, even among heavy smokers, for those who quit smoking with a smoke-free home policy in place compared to those without a smoke-free home policy (Mills et al., 2009).

The research clearly suggests there is a link between smoking restrictions in the home, reduced rates of smoking and increased rates of cessation. While individuals living in MUDs may implement their own smoke-free policy in their unit, they may still be involuntarily exposed to ETS. It is understood a smoke-free home can increase the odds that a smoker will be able to maintain a quit, however how these odds are

affected if they are involuntarily exposed to ETS in their home, even with a smoke-free policy in place, is unknown.

2.3 Fire Risk Associated with Indoor Smoking

The risk of fire within a dwelling is greatly increased if individuals smoke inside the home. According to statistics from the Council of Canadian Fire Marshals and Fire Commissioners (CFMFC), smoker's materials and open flames were responsible for 9,414 fires, 668 injuries, 94 deaths and \$231 million dollars in damages between 1993 and 2002 (CFMFC, 2002). In Ontario, eight per cent of fires between 2003 and 2007 were caused by cigarettes specifically which corresponds to 587 fires (Ontario Office of the Fire Marshal, 2008). Lit smoking materials were the fourth most common ignition source in Ontario fires during this time period, but were the number one ignition source in fatal fires (Ontario Office of the Fire Marshal, 2008). These numbers only include the fires the fire department was called to, and not those where the individuals dealt with the fire on their own. It is likely the fire department was called to all major and fatal fires, but many minor fires likely go unreported. If these unreported fires were included in the statistics it is expected the number of fires attributed to smoking materials would be even higher.

A study by O'Connor et al. (2007) surveyed 591 Ontario smokers about their smoking behaviours and the risk of fire. Of the smokers who were surveyed, ten indicated they had experienced a fire in their home caused by their smoking behaviours. Seven of the individuals were able to put out the fire themselves, and the fire department was called in four cases (O'Connor et al., 2007). Forty-eight per cent of smokers reported burning their clothing and twenty-nine per cent reported burning furniture with a lit cigarette at some point in their lives (O'Connor et al., 2007). O'Connor et al. (2007) also asked respondents about specific behaviours which they classified as 'fire risky'. The results, which were weighted to Ontario smoking rates for gender and age, indicated 46.6% had left a burning cigarette unattended, 10.7% had dozed off and 7.1% had fallen asleep while smoking and 37.8% had smoked in

bed. All of these behaviours increase the overall risk of fire. O'Connor et al. (2007) found that although smokers are not overly concerned about starting fires as a consequence of their smoking behaviours, many do engage in fire risky behaviours.

In MUDs fire safety is not only important for the individual smoking and their family members or roommates, but also for the safety of the other tenants. While individuals appear to not be overly concerned with the risks of fire related to their smoking behaviours, others in the building may have concerns or may be unaware of the unsafe practices which are occurring that put the health and safety of not only the smoker, but all individuals in the building at risk. Reducing or eliminating smoking in MUDs could not only improve health by reducing ETS exposure, but could also reduce the risk of fire and consequently the fire related losses, deaths and injuries.

2.4 Air Movement and ETS Drift in Multi-Unit Dwellings

To understand how a tenant's smoking behaviours could affect other tenants in a multi-unit dwelling, it is important to understand how air moves through buildings allowing ETS to drift from one area of the building to another.

The concentration of ETS in a room after a cigarette is smoked indoors is dependent on a variety of factors including, (1) the emission rate of sidestream and mainstream tobacco smoke, (2) the volume of the room into which the smoke is being emitted, (3) the rate of removal by natural and engineered ventilation systems and, (4) sorption and desorption of the ETS onto indoor surfaces (Daisey, 1999). ETS undergoes chemical changes over time due to sorption and desorption onto indoor surfaces and chemical reactions which occur in the air (Daisey, 1999). The ETS that is present in the room where the individual smokes can easily move into other rooms and areas within the building. A study by Lofroth (1993) examined how ETS moves within a home following the smoking of a cigarette indoors. A three bedroom apartment and a three story townhouse were used for the experiment. Lofroth (1993) found the

concentrations of all components in the ETS, except nicotine, were similar in all areas of the house with the only reduction being in the most remote room of the townhouse compared to where the smoking took place. According to Lofroth (1993) this implies you cannot escape ETS if you live in a home with a smoker who smokes inside. Keeping the door shut while smoking may offer some reduction in the levels of ETS in the home however dispersion of the ETS will begin as soon as the door is opened. The room where the smoking occurred would need to remain closed off without anyone exiting or entering for a number of hours to allow the ventilation system to completely remove the ETS from the room to avoid dispersion, which is not a practical solution (Lofroth, 1993).

Air moves within larger buildings, including multi-unit dwellings, in a variety of ways. Ventilation systems move air from one unit to another, mixing indoor air with outdoor air and spreading the air throughout the building. Air can also move due to the impact of wind on the building moving indoor air from the windward side of the building to the leeward side; mechanical or exhaust air flow can cause imbalances in pressure forcing air to move from over-pressurized areas to under-pressurized areas and air will move from floor to floor due to differences in temperature (Hewett et al., 2007). In a study addressing air movement in MUDs it was found the amount of air flow between units varied based on the building's design and the age of the building. The amount of air flow also depended on where the unit was within the building. As researchers moved up the building to higher floors, the proportion of air within a unit which came from other units increased. On the lowest floor 2% of the air in the unit was from other units, this increased to 7% for units on the middle floors and to 19% for units on the highest floors (MCEE, 2004).

The amount of air that drifts between apartments can change due to a thermal stack effect. This suggests during the heating season (the winter primarily) the air inside the building, which is warmer, is less dense than the cool outdoor air. Air enters from the outside into the building primarily on the lower floors and then the air rises through the building exiting at the top of the building. As such, the lower

floors get the outdoor air and the upper floors get air from the apartments surrounding them (MCEE, 2004). Even though this trend was present in buildings in the MCEE study, the amount of air which leaks into a specific unit will vary greatly based on the cracks and openings in the unit (MCEE, 2004). This suggests individuals within the same multi-unit building will not be affected by drifting ETS in the exact same way across units as many factors play a role in determining air flow.

Cracks in walls, openings around fans and other fixtures and gaps around ducts all provide ways for ETS to transfer from unit to unit. Research has clearly shown particulate matter between 0.1 and 1.0 μm can easily penetrate through cracks in buildings (Fromme et al., 2005; Thatcher et al., 2003). Given the fact the mass median aerodynamic diameter of ETS particles is approximately 0.2 μm , this suggests particulate matter from ETS can easily drift from one unit to another (Daisey, 1999). In 2005, the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) published a position piece on ETS in buildings. The piece examined the use of ventilation technologies to reduce ETS exposure. ASHRAE (2005) felt there was nothing safer than a complete ban on smoking indoors and indicated they supported such bans. They did concede, however, in the absence of a complete indoor ban on smoking, techniques should be used to attempt to minimize exposure through ventilation systems. They were unable to set specific standards on what level of ETS should be reached to be considered acceptable as they recognized no health organization has identified a safe level of exposure to ETS (ASHRAE, 2005).

Concerns have been raised with the techniques that can be used to minimize ETS exposure in buildings. For example, mechanical ventilation systems can be used to dilute the ETS present, but they can also lead to the ETS being distributed throughout the building via recirculation of the air and can therefore increase the individual levels of exposure (Spengler, 1999). In a study by the Minnesota Centre for Energy and Environment (MCEE) various ventilation options were explored to reduce ETS transfer (MCEE, 2004). Utilizing data from previous surveys and interviews with landlords, buildings with high ETS transfer

issues were identified for inclusion in the study. While no technique attempted by MCEE completely eliminated the issue of drifting ETS in the building, some techniques were useful. Air sealing and ventilation treatments were found to reduce the flow of air between units in approximately half of the buildings. The results suggest when completing sealing work, the focus should be on the largest, most concentrated leaks. To avoid issues, the authors suggest a greater emphasis should be placed on air sealing at the time of construction or renovation as it is difficult to fix these issues after construction is completed (MCEE, 2004).

As part of the 2004 MCEE study, measurements of particulate matter less than 2.5 μg ($\text{PM}_{2.5}$), a common component of ETS, were taken in multi-unit dwellings for a week to determine the level of ETS transferred from unit to unit. Various problems with the measurements including high background levels of $\text{PM}_{2.5}$ limited the use of the results. Results indicated the concentrations of $\text{PM}_{2.5}$ in smoking units ranged from 71 to 250 $\mu\text{g}/\text{m}^3$ and for non-smoking units ranged from 4.8 to 7.0 $\mu\text{g}/\text{m}^3$. In this study, the $\text{PM}_{2.5}$ concentrations in non-smoking units were less than 10% of the concentration in smoking units (MCEE, 2004). In a 2009 study by King et al., $\text{PM}_{2.5}$ concentrations were measured in smoking and non-smoking units as well as in hallways. The results indicate the air in smokers units and in the hallways outside of smokers units was heavily polluted and the pollution was at a level above what is considered 'safe' by the U.S. Environmental Protection Agency (EPA). The living spaces of smoke-free units also had $\text{PM}_{2.5}$ levels which were above the EPA standard for 'good' air and higher than the average outdoor levels, suggesting ETS did drift from the smokers unit to non-smokers units (King et al., 2009a). The results of these studies suggest that although levels of $\text{PM}_{2.5}$ in non-smoking units are lower than the $\text{PM}_{2.5}$ levels found in smoking units, $\text{PM}_{2.5}$ is present and levels are above the average outdoor levels, suggesting non-smokers are being involuntarily exposed to ETS through drifting air in MUDs.

2.5 Smoke-Free Multi-Unit Dwellings

There is limited research available on the issue of drifting ETS in MUDs. The peer reviewed literature is limited to several legal opinions, and three surveys, two of which were out of Minnesota and one from the state of New York (Henrikus et al., 2003; Hewett et al., 2007; King et al., 2009b). Additional surveys of landlords and tenants from the United States and Canada are available in the grey literature. The following section will address the landlord and tenant surveys and research completed to date and the legalities of smoke-free MUDs policies. It will also provide an overview of the current smoke-free MUDs policies in place in Canada and the United States.

2.5.1 Tenant surveys

United States. Two peer-reviewed, published papers in this field specifically presented data on tenant surveys conducted in the United States. Henrikus et al. (2003) surveyed tenants from the seven largest apartment buildings in a suburb of Minneapolis, and Hewett et al. (2007) surveyed a random sample of tenants from Minnesota. Issues addressed in both surveys included how the tenants had been affected by drifting ETS, their response to drifting ETS, the building's current smoking policies and their policy preferences related to smoking in MUDs.

Just under half (48% and 46%) of the tenants surveyed by Hewett et al. (2007) and Henrikus et al. (2003) reported noticing tobacco smoke entering their unit from somewhere else within the building. Of those who did note ETS entered their unit the majority were bothered by it and Hewett et al. (2007) found five per cent of those individuals were bothered so much they were considering moving. The more frequently drifting ETS was noticed within the unit, the more likely the individual was to be bothered by it (Hewett et al., 2007). Both studies found there was a strong market for smoke free housing. Hewett et al. (2007) found 46% of respondents were extremely or very interested in smoke-free buildings and

Hennrikus et al. (2003), found 64.4% of individuals would strongly or somewhat prefer a smoke-free designation in their building.

These studies provide insight into the issue of smoke-free housing and the extent of the concern over drifting ETS in MUDs. There were however issues with the generalizability of the study. Hennrikus et al. (2003) while having a final sample of 301, focused only on seven apartment buildings specifically selecting the seven largest buildings in the municipality for the inclusion in their sample. While this makes good sense in terms of feasibility, there may be similarities among those living within a building based on shared experiences and circumstances. There may also be differences between the experiences of those living in MUDs with many units and those in buildings with fewer individual units and as such the results may not be representative of all tenants living in buildings in the area. The samples for both the Hewett et al. (2007) and Hennrikus et al. (2003) studies were from Minnesota. Minnesota is one of the states which has taken the issue of smoke-free housing to a new level and has placed a great deal of emphasis on its importance. As this is the case, the individuals surveyed are likely to have been exposed to information on the issue which may have influenced their views, making their experiences and understandings less generalizable to other jurisdictions where there has been less emphasis placed on smoke-free housing.

Ferris et al. (2009) completed a follow-up study to the MCEE study, as reported in Hewett et al., 2007. The study found the proportion of individual tenants who were bothered by drifting ETS had increased since the original study was conducted. Not only were individuals overall more bothered by drifting ETS, but the proportion of tenants who indicated they were bothered so much they were considering moving jumped from 5% in 2001 to 34% in 2009 (Smoke-Free Multi-Housing Program, 2009). The authors suggest this change could be due to the fact that more individuals are aware of the effects of ETS exposure (Smoke-Free Multi-Housing Program, 2009). Minnesota has also been a state which has had

great success in moving the smoke-free housing initiative forward, so increased awareness of this initiative and of smoke-free rental housing options may be another explanation for this increase.

There have also been a variety of tenant surveys completed in the state of California. California, like Minnesota, has placed an emphasis on the issue of smoke-free MUDs. Many jurisdictions in California have implemented county wide no-smoking regulations in both public and private MUDs. As of 2008, seven surveys had been completed in California on this issue (Centre for Tobacco Policy & Organizing (CTPO), 2008). The results of these surveys suggest tenants are exposed to drifting ETS and there is support for smoke-free rental housing. Across the seven surveys, results suggested between 41% and 63% of tenants had experienced ETS drifting into their unit. Within three of the studies tenants were specifically asked if they would prefer to live in a building that was either smoke-free or had smoke-free sections and overall there was support for this option with a low of 82% and a high of 95% of respondents indicating they would be interested (CTPO, 2008).

The overall message from all of these studies is that many tenants do perceive drifting ETS as a problem, many say they are exposed to drifting ETS in their home and overall there does appear to be a market for smoke-free rental housing.

Canada. Although there is little peer reviewed literature available on drifting ETS in MUDs from the Canadian context, there have been a variety of research reports developed as well as research presentations and surveys completed.

Health Canada consulted with Decima Research to have a telephone survey of Canadians' views, knowledge and behaviours surrounding ETS in MUDs conducted in the winter of 2007 (Decima Research, 2007). The survey sample included both those who rented units in MUDs and those who owned condominiums. This survey suggested that the majority of individuals were not exposed to drifting ETS on a regular basis. Sixty-four per cent of respondents said that smoke has never drifted into their

apartment and 15% said it rarely happened (Decima Research, 2007). Interestingly, the research suggests condominium residents are less likely than rented MUD residents to notice drifting ETS. This may suggest, at least in part, the difference in rates of perceived exposure between this study and previous studies as many previous tenant surveys have excluded condominiums and focused solely on renting populations. Interestingly, when asked if the property had a smoke-free policy, condominiums were more likely to have a policy, compared to rental MUDs (Decima Research, 2007).

A survey was conducted by Context Research Inc. on behalf of the Heart and Stroke Foundation of B.C. & Yukon as part of the Smoke-Free MUDs Initiative in order to investigate the extent of the problem of drifting ETS in MUDs and the potential market for smoke-free MUDs (Context Research Inc., 2008). A telephone survey was conducted in the winter of 2008. The sample population included British Columbia residents over the age of 18 years who owned or rented a unit in a MUD. One thousand individuals were surveyed. The results of the study suggested that renters were more likely to be smokers than owners as 27% of renters indicated they smoked everyday compared to only 9% of owners indicating they smoked every day. Respondents were asked if they were exposed to ETS in their home. Overall, 34% of respondents indicated they were exposed. When the sample was limited to respondents who reported that no smoking occurred in their unit, 26% of respondents indicated they were exposed. Of the respondents who indicated they were exposed to ETS in their home, 68% said they were bothered 'somewhat' or 'quite a bit'. For some, this exposure was so bothersome that they made the decision to move. Tenants were more likely to move due to drifting ETS than owners were. Approximately one in ten renters reported moving in the past due to drifting ETS and one in five said they were 'very likely' or 'somewhat likely' to move in the future because of it. Comparatively, only 3% of owners indicated they had moved in the past due to drifting ETS exposure, and one in ten said they were 'very likely' or 'somewhat likely' to move in the future as a result of their exposure. Researchers suggest these results indicated that in the rental population in B.C. 50,000 to 100,000 tenants may move each year because of

drifting ETS (Context Research Inc., 2008). Although a proportion of both tenants and owners consider moving due to their exposure to ETS, few respondents indicated they had spoken with their landlord or building manager about this issue. In the renting population, 77% of respondents said they rarely talked about the problem and 84% of owners said they rarely talked about the problem. When asked if they would support a move to make more of BC's MUDs smoke-free, 69% said they would (Context Research Inc., 2008).

ThinkWell Research completed a study on behalf of Smoke-Free Nova Scotia. A random telephone survey of 401 adults from Nova Scotia who live in MUDs or lived in a MUD within the last two years was conducted in May of 2008. Eighty-four per cent of the sample currently lived in a MUD (ThinkWell Research, 2008). Non-smokers and smokers who smoked only on their balconies or patios were asked, 'During the last 12 months, how often did tobacco smoke odour enter your living space?'. Twenty-nine per cent of respondents indicated they had noticed drifting ETS at least 'once every couple of weeks' and 13% noticed it on a daily basis. Of those who were exposed, 78% were at least 'somewhat' bothered and 10% were bothered to the point they were considering moving (ThinkWell Research, 2008). When respondents were asked which building they would prefer to live in, 35% said they would like to live in a building with no smoking indoors or on balconies/patios and 29% would rather live in a building where smoking was not permitted indoors, but was permitted on balconies and patios (ThinkWell Research, 2008).

Ipsos Reid conducted a survey on behalf of the Ontario Tobacco Free Network in November 2006. The survey sample included 1832 tenants and was representative of the population of Ontario multi-unit dwelling adult population (Ipsos Reid, 2007). The results of this survey suggested just under half of those living in MUDs had tobacco smoke odour enter their unit from somewhere else in the last year (46%) and 64% of individuals would be likely to select a no-smoking building over a smoking building. Of those

who had noticed drifting ETS, 27% indicated they had spoken with landlords or another outside agency about the smoke (Ipsos Reid, 2007).

The Ontario Tobacco Survey, a cross-sectional telephone survey of Ontario adult non-smokers and a longitudinal study of smokers, included a set of questions related to exposure to ETS in the home during the wave which ran from July 2007 to June 2008 (OTRU, 2009a, OTRU, 2009b). The survey included 2,546 smokers and non-smokers from Ontario. The survey sample is representative of all Ontarians, not just those individuals living in MUDs. Respondents were asked, “in the past six months, how often have you noticed any tobacco smoke entering your home from a neighbour, neighbouring unit or from outside the building?” Eighteen per cent of respondents indicated they had noticed drifting ETS in their unit daily or occasionally (OTRU, 2009a). Individuals living in MUDs (townhouses, apartments and semi-detached buildings) were more likely to notice drifting ETS than those living in single family dwellings. Never smokers, young adults and those with no-smoking policies in place in their home were more likely to notice drifting ETS in their homes than smokers, older adults and those who permitted smoking in their home (OTRU, 2009a).

Two studies have been conducted by Ontario Public Health Departments, one in Hamilton and one in the Region of Waterloo, on the issue of drifting ETS. The City of Hamilton’s Public Health Services department conducted focus groups with tenants of CityHousing Hamilton, the organization which operates municipally owned housing most of which is rented on a rent geared to income basis, to determine what the attitudes and opinions of residents were on second-hand smoke and smoking in the units. Focus groups occurred in March 2009. Five focus groups were completed with 33 smokers and 39 non-smokers and an additional five smokers and twelve non-smokers provided written feedback on the issue (City of Hamilton, 2009). The results of the focus groups indicated tenants agreed with the idea that any new properties acquired by CityHousing Hamilton should be smoke-free. Both smokers and non-smokers felt this would be a fair policy as individuals would know of the regulation before they moved in.

Some of the smokers and most of the non-smokers also supported a policy where smoke-free regulations would be put into place in existing buildings but previous tenants would be grandfathered and therefore not affected by the regulation. Another option that received support was having smoking and non-smoking buildings, though participants showed concern over the cost of moving to a building where the policy would fit their lifestyle. Few individuals supported the idea of having smoking and non-smoking floors. All non-smokers who participated in the groups were interested in living in a smoke-free building, and felt if some buildings in the CityHousing Hamilton portfolio became smoke-free, current residents should have first choice in moving into those buildings. Some smokers indicated they would move to a smoke-free building, and two indicated if their building was made smoke-free they would move out (City of Hamilton, 2009).

The Region of Waterloo Public Health (ROWPH) department completed research on exposure to ETS in their social housing properties owned and operated by Waterloo Region Housing (WRH) and Region of Waterloo Community Housing Inc. (ROWCHI) in the fall of 2008 and winter of 2009. Surveys were sent to all tenants living in these properties and 967 households returned a completed survey. Following the initial study, tenants were sent feedback on the results and were invited to participate in an online survey as a follow-up. Subsets of residents were also invited to participate in a community forum, six of which were held (ROWPH, 2009a).

Over half of all tenants surveyed indicated they had been exposed to second-hand smoke in their home, which could include second-hand smoke which came from a source outside of their unit. Specifically, 57% of respondents indicated they were exposed at least 'sometimes' and 10% said they were always exposed. Just over half (54%) of the tenants said they were bothered by second-hand smoke (ROWPH, 2009a). Tenants did show an interest in smoke-free housing. Fifty-seven per cent said they would want part of the housing complex or building to be smoke-free, such as a smoke-free wing or floor. When asked if they would be interested in the building being 100% smoke-free, including patio and balconies,

50% were interested and 13% weren't sure (ROWPH, 2009a). The results of this study were used to support a new smoke-free policy for Waterloo Region Housing properties which will come into effect on April 1, 2010 (Region of Waterloo, 2009).

The various tenant surveys completed in Ontario and across the country suggest individuals living in both MUDs and single family dwellings are exposed to drifting ETS, however those living in MUDs are most likely to be exposed. While the perceived rate of exposure varied based on the survey, overall the results suggest many tenants are exposed to drifting ETS, and in most cases those who are exposed are bothered by the exposure. The surveys which asked about an interest in smoke-free housing found high rates of interest, and the Region of Waterloo has utilized these results to move forward on a smoke-free policy in the MUDs they operate. Although these surveys provide an overview of the issue, additional research is needed focusing specifically on tenants of MUDs and gaining more in depth knowledge of tenant's perceptions and experiences.

2.5.2 Landlord surveys

Hewett et al. (2007) also included telephone interviews of landlords in their study. The focus was on two groups, landlords who had made their buildings smoke-free, and those who had not. Over a quarter of the individuals in both groups felt ETS was the most common source of objectionable air moving into their tenants' units, but the majority did not think that their building experienced ETS transfer on a regular basis. Landlords did however seem interested in learning how to reduce ETS transfer in their building with 25% being very interested and 41% being somewhat interested. They identified potential benefits of reducing ETS transfer such as creating better environments for tenants, lower maintenance costs and the ability to attract "better" tenants. The major concern with modifying the building was the potential cost. Sixty-nine per cent of landlords were willing to spend \$250 or less per unit to make the modifications.

Major differences were seen between the two groups of landlords in the ways they perceived the issue of drifting ETS in MUDs. Landlords with smoke-free buildings were more likely to perceive drifting ETS as a major health concern than those landlords who had not implemented smoke-free policies. Fifty-five per cent of smoke-free landlords perceived drifting ETS as a major health concern compared to 17% of non smoke-free landlords. Landlords who had implemented smoke-free policies in their properties reported neutral or positive effects on vacancy and turnover rates, rent charged and staff time required managing the building. Contrasting this, those landlords who did not have experience with smoke-free policies were concerned there would be an increase in vacancy rates, a decrease in the size of their rental market and issues with legalities and enforcement of policies leading to an increase in the staff time required to manage the building (Hewett et al., 2007). There appear to be major differences between the perceptions of what the consequences of implementing and supporting a no-smoking policy would be, and the reality of actually implementing the policies. The landlords who had made their buildings smoke-free were happy with their decision and 95% stated they were very likely to continue to offer smoke-free buildings (Hewett et al., 2007).

King et al. (2009b) completed a telephone and paper survey of landlords in two counties in New York State regarding their views and experiences with smoke-free rental housing. Nine per cent of respondents indicated smoking was banned in all units within at least one of their buildings and seventy-five per cent of respondents who did not have a smoking ban in place were interested in implementing a policy (King et al., 2009b). Those who did not have a policy in place identified concerns over vacancy rates and market size, and legal considerations as the barriers to implementation and identified tenant demand for smoke-free units, and reduction in insurance rates and turnover rates as motivating factors. King et al. (2009b) suggest that there is an opportunity to intervene to promote smoke-free policies as many landlords display an interest in implementing policies, but few have do so to date.

The BC Non-Profit Housing Association collected information on non-profit housing providers' views of smoke-free housing options and their presence in the non-profit sector in British Columbia. The research was completed for the Heart and Stroke Foundation of BC & Yukon. Data was collected from 192 respondents who represent 533 buildings across the province of British Columbia using online, electronic and paper surveys (B.C. Non-Profit Housing Association, 2008). This research suggests that landlords received complaints about drifting ETS from tenants fairly infrequently. Thirty-nine per cent of landlords indicated they never received complaints and 58.8% received complaints monthly or less. Although complaints did not occur frequently, the landlords surveyed were open to considering smoke-free policies in their buildings. At the time of the survey, 25.6% of landlords who ran 128 buildings indicated their entire building had a smoke-free policy in place, although in some cases previous tenants had been grandfathered and therefore were permitted to smoke indoors if they choose to do so. An additional 42.4% of landlords who operate 212 buildings indicated they were considering implementing a smoke-free policy in some or all of their units in the near future (B.C. Non-Profit Housing Association, 2008).

2.5.3 Legalities of smoke-free MUDs policies

The legalities of smoke-free regulations in MUDs are a concern for landlords and tenants. A survey conducted in Minnesota asked owners what their concerns were related to the legalities of smoking and smoking restrictions in MUDs. Building owners seemed most concerned about how restrictions could be enforced, and if having a non-smoking clause in the lease was sufficient for implementation or if they had other responsibilities. Other issues included questions regarding if a smoking ban would be discriminatory, if owners would be liable if people did smoke and, if owners could be held liable if tenants suffered a negative health outcome due to ETS exposure (Minnesota Centre for Energy and Environment (MNCEE), 2001b). Interestingly, a more recent study of non-profit housing landlords in British Columbia found approximately half of all landlords knew they could legally designate specific

units or the entire building smoke-free (B.C. Non-Profit Housing Association, 2008). Reviews of Canadian and American laws have been conducted to address the questions regarding the legalities of implementing no-smoking buildings. It is clear from these reviews that in both countries there is no legal reason why landlords cannot implement smoke-free policies in their building (NSRA, 2007; Schoenmarklin, 2004).

Both in Canada and the United States smokers have attempted to claim that there is a constitutional right to smoke and in both countries this has been shown to be false (Hill 2008; NSRA, 2007; Schoenmarklin, 2004). In the review of American laws by Schoenmarklin (2004) it was found that there is nothing preventing landlords from making buildings smoke-free. In fact, if landlords choose not to make their buildings smoke-free and a tenant's health is negatively affected by the drifting ETS the landlord may be held liable (Schoenmarklin, 2004). In 1992, the Michigan Attorney General stated an opinion that "neither state nor federal law prohibits a privately-owned apartment complex from renting only to non-smokers" (Schoenmarklin, 2004). In a 2008 legal opinion commissioned by the Ontario Tobacco-Free Network, indicated that the Canadian Charter of Rights and Freedoms (the Charter), does not provide any protection for smokers in terms of discrimination. The Charter also does not recognize smoking as a disability (Hill, 2008). Hill (2008) indicates that neither the Charter nor the Ontario Human Rights Code prevents governments or individuals from imposing restrictions on smoking in their buildings.

In Ontario, landlords can legally include a no-smoking clause in their lease, however enforcement may be complex. Landlords can implement the no-smoking policy only with new tenants, and must grandfather existing tenants for the duration of their tenancy, therefore exempting them from the regulation unless the tenant agrees in writing to the policy (Hill, 2008). Issues related to rental housing are dealt with at a Landlord and Tenant Board. The boards are quasi-judicial and work to resolve disputes through the use of appointed adjudicators. The adjudicators are not bound by precedent when making

their decisions and instead use a “balance of probabilities” standard to determine which side is more likely to be truthful (Hill, 2008; NSRA, 2007). As the adjudicators are not forced to follow precedent there is no clear way of determining if a complaint regarding drifting ETS will be successful or not.

In Ontario, to terminate a lease, a landlord must rely on the regulations set by the Residential Tenancies Act, 2006. The Act does not specifically indicate that landlords can terminate a lease based on tenants breaching the landlords policy on smoking, or breaching a specific clause in the lease on smoking (Hill, 2008). As such, landlords must argue the smoking causes damage or has interfered with the reasonable enjoyment of another tenant or the landlord, two reasons which are accepted as reasons for termination in the Act. Landlords must give tenants seven days to change their behaviour, and if there is no change the landlord can take the tenant to the Landlord and Tenant Board and ask they be evicted (Hill, 2008). As the Board is not bound by precedent, it is impossible to determine if they would evict based on smoking every time a similar case appeared before the board. After reviewing various case examples, Hill (2008) states termination of a tenant for breaching a smoke-free provision in the lease is possible. Having complaints from other tenants is useful, but may not be necessary (Hill, 2008).

The Non-Smokers’ Rights Association (NSRA) examined a variety of decisions from landlord and tenant boards from across Canada and identified key issues that consistently came into play with these cases. The main issue the NSRA (2007) identified is the right to smoke. While there is no explicit or implicit right to smoke in Canadian law, arbitrators often assume tenants do have this right unless otherwise stated in a lease. In one case, individuals signed a lease saying the unit was smoke-free, and it was also advertised as smoke-free, however others in the building were smoking. The adjudicator found that although their individual unit was designated as smoke-free, the building as a whole was not and others had the right to smoke in their units, unless their individual leases stated otherwise, which they did not (NSRA, 2007).

Another main argument made at landlord and tenant boards is that smoking and drifting ETS is a breach of the covenant of quiet, peaceful or reasonable enjoyment. This covenant is laid out in landlord tenant acts and it is broken when an action makes the premises uninhabitable as a residence and is more than just a temporary inconvenience (NSRA, 2007). When this argument was used in cases the results varied with approximately a 50/50 split between adjudicators accepting and rejecting this argument. Where the argument was rejected the main problem seemed to be individuals being unable to prove to the adjudicator's satisfaction that the drifting ETS was not just a slight inconvenience but that the harm was greater than they ought to be exposed to (NSRA, 2007).

Other key issues arising in tenant and landlord decisions included issues of individuals being either too sensitive or not sensitive enough to ETS, a lack of recognition of the health risks associated with exposure to ETS and, the need for objective evidence on ETS. Many adjudicators indicated they could not make a decision based on individuals saying they smell smoke, even if they have witnesses, but need concrete evidence the ETS is drifting and could cause harm to the individual (NSRA, 2007).

Kline (2000), in his review of the legal recourses available to Americans bothered by drifting ETS in MUDs, suggests the most appropriate point of entry into the legal system with a complaint may be through health and safety codes. Each state has some form of code which is in place to protect the health of those living in multi-unit dwellings be it through housing codes, sanitary codes or landlord and tenant regulations. Within the code a specific list of issues which could affect the health of those living within MUDs is given, and Kline (2000) suggests that although ETS exposure is likely not listed here, the regulations could still apply. The tenant could place a complaint with the board against their landlord for allowing exposure to ETS, which detrimentally affects their health. The tenant would need scientific evidence (i.e. scientific literature) to show their symptoms are caused by or exacerbated by ETS. If the board agreed the health concern was caused by exposure to ETS in the dwelling, they could then force the landlord attempt to fix the building to minimize ETS transfer, to enforce non-smoking policies if present,

charge a fine or other such actions. Kline (2000) suggests this is an effective course of action as the boards are already in place, the focus is on the health of the tenant not the smoking rights of other tenants and the landlord would be forced to take on any economic burden rather than other tenants in the building.

Kline (2000) also suggests specific legal actions which could be taken through the courts to address drifting ETS in MUDs. Tenants could claim the ETS was a nuisance which occurs when an individual's use and enjoyment of their residence is affected by a non-trespassory invasion of their property. The other individual must be doing so intentionally, being aware of the consequences of their actions. For example, if they smoke in their unit they must know the smoke can drift into the other units and bother other tenants. The tenant would then need to prove that it was unreasonable by showing the effects were not minimal (i.e. not just watery eyes), that the harm was serious and that the amount of harm to the non-smoking tenant outweighs the rights of the other tenant to smoke (Kline, 2000). Other possible avenues Kline (2000) suggests are addressing the covenant of quiet enjoyment which indicates the tenant should be able to enjoy their unit without anything intruding on that enjoyment or the warranty of habitability which suggests that the unit must be fit for individuals to safely live there.

It is clear from the legal reviews that have been completed to date that it is legal to include a no-smoking clause in a lease both in Canada and the United States. Enforcement of the regulation may be difficult in some jurisdictions, and future research should be completed to determine the best avenues for enforcement and possible legislative options to make enforcement easier. It is important that both landlords and tenants be made aware that no-smoking policies are legal.

2.5.4 Overview of current smoke-free regulations in MUDs

While smoke-free rental housing is not yet the norm in Canada, there are an increasing number of landlords who are addressing the issue, and implementing no-smoking regulations in their buildings both

in Canada and the United States. It is not only private landlords who are electing to make their buildings smoke-free, municipalities are also considering and implementing smoke-free policies for their social housing portfolios, and in some cases, mandating specific smoking regulations which must be implemented in all MUDs, both public and private. The following sections provide examples of this work in the United States and Canada.

United States of America. California has been a leader in the smoke-free MUDs movement. Two municipalities, Belmont and Temecula have passed ordinances addressing ETS in MUDs. Belmont, California passed an ordinance on September 11, 2007 which strengthens restrictions against smoking in MUDs in the municipality. The ordinance, which took full effect on January 9, 2009, prohibits smoking in any unit that shares a floor and/or ceiling with another unit. Smoking is prohibited both inside the unit and on balconies and patios, and landlords are required to put non-smoking clauses into their leases, both new and renewed. They are able to implement an outdoor smoking area but it must be at least twenty feet away from the nearest door (Belmont, 2007). In the spring of 2007, Temecula, California passed an ordinance requiring all rental apartment buildings to designate at least 25% of their units as smoke-free. The units must all be in the same area of the building in order to form a non-smoking section or wing. The ordinance was applicable immediately for all new builds of 10 units or more. Pre-existing buildings have eight years to comply unless they are designated as seniors buildings in which case they will have five years to implement the new regulations (City of Temecula, 2007). Other municipalities in California with smoking restrictions in place for MUDs include Loma Linda, Glendale, Albany, Novato, Calabasas, Oakland, Emeryville and Plumas County (City of Hamilton, 2009).

The City Council in Portland, Maine has put forward a resolution to show their support for the efforts being made to increase the number of smoke-free rental units available in the city. While Portland City Council is not mandating that landlords implement smoke-free policies in their buildings, they are working with organizations to advocate for smoke-free housing (City of Portland, 2006). The resolution

will likely increase publicity of the issue, and the likelihood landlords will consider smoking regulations in their buildings as they will feel they have the support of their city behind them. While this is not as strong of a stance as municipalities in California have taken, this may be a model for other municipalities to follow if they are uncomfortable mandating non-smoking regulations in private dwellings but want to take some action on the issue. As there appears to be a fair amount of confusion among landlords on their rights regarding the implementation of smoke-free regulations, having a resolution from their municipality stating they can, and are supported in making their buildings smoke-free may lead to an increased momentum towards smoke-free MUDs.

Utah has taken the concept of a resolution to the next level and has explicitly stated that landlords are permitted to ban smoking in apartments and that ETS is in fact a nuisance (Hewett et al., 2007). While it is legal in all states for landlords to make their buildings smoke-free, it is only in Utah that it is explicit. This helps to alleviate some of the confusion and need for interpretation surrounding the implementation of smoke-free policies.

Canada. Various buildings in Canada have gone smoke-free, though the number is much smaller than in the United States. In Toronto, the Newtonbrook United Church – Taiwanese United Church Toronto (NUC-TUCT) Non-Profit Homes Inc. made their 53 unit building smoke-free in 2006 (NSRA, 2008). Artscape Non-Profit Homes Inc., also based out of Toronto, developed a new live-work property for artists, Artscape Wychwood Barns, and implemented no-smoking regulations during development. The Wychwood Barns includes units for artists and their families in addition to work space for non-profit environmental and arts organizations. Artscape indicates they have had no complaints regarding the no-smoking policy, and have a waiting list for units in the complex (Smoke-Free Housing Ontario, 2009). Other smoke-free MUDs in Ontario include 70 units in the Lonsdale in the Village Condos in Toronto, 156 units at Collier Place in Barrie, two buildings in Finlandia Village in Sudbury and all ten of the seniors properties operated by Schlegel Seniors Villages which are located across Ontario (Smoke-Free

Housing Ontario, 2009). There are various other properties across Canada which have also gone smoke-free with success.

In Canada there have also been developments towards smoke-free housing at the municipal and regional level in regards to smoking in social housing. St. John's, Newfoundland and the Region of Waterloo in Ontario have implemented smoke-free housing regulations in municipally owned social housing properties. In St. John's, Newfoundland, City Council designated all of their community housing properties as smoke-free in the summer of 2008. The regulation came to fruition following a petition from residents of Riverhead Towers, a municipally owned building, asking for the building and main entrance to be made smoke-free (St. John's, Newfoundland City Council, 2008). The regulation will be grandfathered in, meaning all residents currently living in the building and their guests may continue to smoke inside, but all new residents and their guests must abide by the smoke-free rule. Over time as current residents move out and new residents move in the entire building will become smoke-free.

In the Region of Waterloo smoking will be banned in all social housing units operated by Waterloo Region Housing as of April 1, 2010. As in St. John's, current tenants will be grandfathered and as such, it may take up to a decade for the properties to become 100% smoke-free (Region of Waterloo, 2009). The decision to go smoke-free was made following consultations with tenants including a survey sent to all current tenants and community meetings (ROWPH, 2009a). Other regions in Ontario including the city of Hamilton are also considering no-smoking policies for their municipal housing portfolios (City of Hamilton, 2009).

The Peel Regional Council asked their Public Health Department to investigate the feasibility of introducing no-smoking policies in multi-unit dwellings in Peel Region, in this case to cover both municipally owned and operated properties and privately owned and operated properties. The Region investigated the possibility of enacting regulations pursuant to the Municipal Act, 2001 as they have the

authority to enact by-laws which protect the “health, safety and well-being of persons”, however the Region suggested in their report to council that no other municipalities had enacted a by-law related to smoking in MUDs, and if they did so it would likely be challenged in court and may not be upheld (Region of Peel, 2009). As there is uncertainty in determining if municipalities and regions could enact a regulation, the Region of Peel has determined the best course of action is to advocate the province of Ontario to consider legislation regulating smoking in MUDs (Region of Peel, 2009). Further research should be completed to determine what role the various levels of government could play in enacting regulations related to smoking in privately owned MUDs, and to determine if there is support for the legislative route.

2.6 Summary and Implications

It is clear from the literature that ETS exposure is detrimental to the health of non-smokers and that even low levels of exposure can cause harm. There is also a clear connection between smoke-free places and homes and the health outcomes of non-smokers and smoking behaviours of those who do smoke. It is known that ETS can easily drift from one unit to another in MUDs and that this can be harmful to individual’s health. There are no legal reasons why a landlord cannot make their building smoke-free if they choose to do so and the support for smoke-free housing is growing. Surveys conducted to date both in the U.S.A. and Canada show a consistent pattern of demand for and, interest in smoke-free housing. What is needed is the scientific literature to support the advocacy groups and tenants in their claims that drifting ETS is a real problem, and support the fact that landlords may want to consider implementing smoke-free policies where possible. The current research project begins to fill the gaps in the research related to tenant perceptions and attitudes towards drifting ETS in MUDs.

Chapter 3

Study Rationale and Research Questions

3.1 Study Rationale

It is clear that ETS exposure can cause negative health outcomes, and that individuals living in multi-unit dwellings may be at risk for involuntary exposure to ETS in their own homes. There is strong evidence available to support smoke-free spaces generally, and it is clear smoke-free spaces can benefit both the smoker and non-smoker. The rationale for the current project was to extend the scope of the smoke-free spaces literature by providing insight into another potential site of intervention to reduce ETS exposure, multi-unit dwellings. The study was among the first studies on tenant perceptions of ETS in MUDs in the Canadian context, and will set the stage for future programs of research in the field.

3.2 Study Purpose

The purpose of the study was to gain insight into tenant's perceptions of the extent and severity of drifting ETS in MUDs and to determine if there is a potential market for smoke-free housing.

3.3 Research Questions

The study addressed the following research questions:

1. How do tenants living in multi-unit dwellings perceive the extent and severity of drifting ETS?
2. What actions, if any, do tenants take in response to drifting ETS?
3. Are perceived smoking restrictions in multi-unit dwellings prevalent in the Kitchener area?
4. Is there a market for smoke-free rental housing? If so, what characteristics predict membership in this market?

Chapter 4

Methods

4.1 Overview

The purpose of this study was to identify tenant's perceptions of the extent and severity of drifting ETS in MUDs and to explore the potential market for smoke-free housing. Survey data was collected from tenants living in multi-unit dwellings in Kitchener, Ontario. The details of the study sample, data collection process, measures and analysis are provided in the following sections.

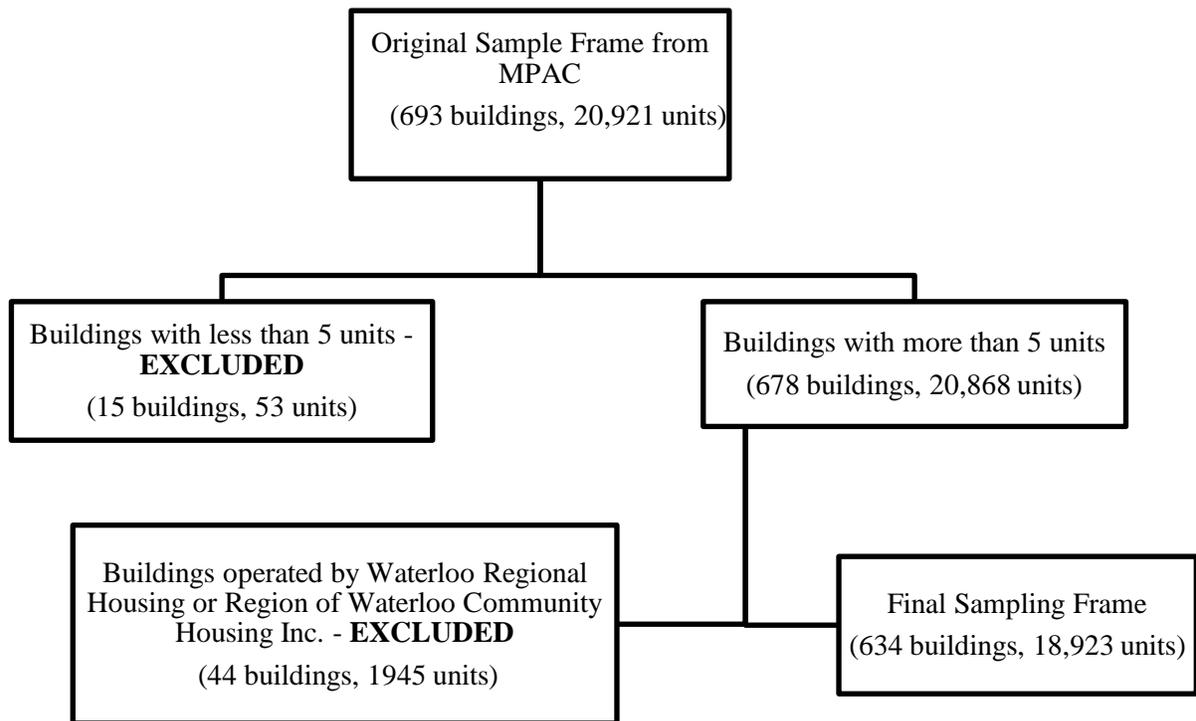
4.2 Sample Population and Recruitment

The target population for this survey was tenants 18 years of age or older, who live in rented multi-unit dwellings (townhouses or apartments) with five or more units in the city of Kitchener, Ontario. Excluded from the target population were tenants living in buildings or complexes with less than five units, individuals living in owner occupied units (i.e. condominiums or co-ops) and tenants living in buildings owned and operated by Waterloo Region Housing (WRH) and Region of Waterloo Community Housing Incorporated (ROWCHI). The Region of Waterloo surveyed tenants of WRH and ROWCHI in October 2008 on the issue of smoking in MUDs (ROWPH, 2009a). In order to avoid duplication of effort and any potential biases due to the completion of two similar surveys within a short time frame, the decision was made to exclude these properties from the final sampling frame.

The sample frame for the survey was drawn from a list of rental townhouse complexes and apartment buildings obtained from the Municipal Property Assessment Corporation (MPAC). MPAC, the organization in Ontario responsible for property assessments for tax purposes, maintains up to date information on all buildings, both commercial and residential, in the province (MPAC, 2009). MPAC was able to supply, at a cost, a list of all multi-unit dwellings in the city of Kitchener with five or more units. The data provided included the building's mailing address, the number of units within the

building/complex, the owners name (where available), and the property code assigned to the building. MPAC utilizes property codes to organize and label each property. The codes are assigned based on the property's use, ownership and size. Six property codes were identified as relevant for the purposes of this study. They included: (1) property code 335: residential properties with five units, (2) property code 336: residential properties with six units, (3) property code 340: residential properties with seven or more units, not row housing, (4) property code 341: residential properties with seven or more units and commercial unit(s), (5) property code 350: row housing with three to six units under one owner and, (6) property code 352: row housing with seven or more units under one owner. Figure 1 illustrates the final sampling frame.

Figure 1. Sampling frame



For the purposes of sampling, three strata were developed based on building/complex size and type, (1) apartment buildings with forty units or less, (2) apartment buildings with more than forty units and, (3) townhouse complexes. Random selection occurred at the building level. If a building or complex was randomly selected, every unit within that building/complex was included in the final sample.

Power calculations to determine the final sample size can be found in Appendix A. The calculations suggested a final sample size of approximately 3,705 was needed to have a significant final sample. The calculations assumed a 20% response rate. The number of units selected from each stratum was determined based on two factors: the size of the stratum in the population (proportional allocation) and the number of units needed to allow enough statistical power to conduct calculations at the strata level. Based on the sample sizes suggested by proportional allocation there would not have been enough power within the townhouse stratum. As such, the townhouse stratum was over-sampled, and the apartment strata were slightly under-sampled based on proportional allocation to ensure there would be a large enough sample in the townhouse strata to analyze.

Addresses of the properties in each stratum were placed in a random order in a list and a random number generator was used to randomly select properties to be included in the final sample. Buildings/complexes were selected until the desired number of units was reached for each stratum. The final sample is shown in Table 1.

Table 1. Sampling grid

Strata	Total in Kitchener		Total meeting inclusion criteria		Number in final sample	
	Buildings n (%)	Units n (%)	Buildings n (%)	Units n (%)	Buildings n (%)	Units n (%)
Strata 1. Apartments with 5 to 40 self-contained units	501 (72.3%)	6488 (31.1%)	482 (76.0%)	6156 (32.5%)	89 (70.6%)	1169 (31.4%)
Strata 2. Apartments with 41 or more self-contained units	109 (15.7%)	11,389 (54.4%)	100 (15.8%)	10,729 (56.7%)	18 (14.3%)	1800 (48.3%)
Strata 3. Row housing, with five or more units	83 (12%)	3044 (14.5%)	52 (8.2%)	2038 (10.8%)	19 (15.1%)	755 (20.3%)
TOTALS	693 (100%)	20,921 (100%)	634 (100%)	18,923 (100%)	126 (100%)	3724 (100%)

4.3 Data Collection

Data collection took place between March and August 2009. Survey packages were hand delivered to each of the selected units and, where possible, placed in mailboxes. Where the mailboxes were not accessible (e.g. locked, did not have a mail slot), surveys were left at the door of each unit. Eighty-six per cent (n=3219) of surveys were delivered in this manner. The remaining 14% (n=505) of surveys were mailed. At least three attempts were made to gain entry into the building or complex for the purposes of delivering the surveys before they were mailed.

The tailored design method for surveys, as suggested by Dillman (2000), formed the basis of the data collection plan though it was adapted to fit the needs of the study. A total of three packages were received by each unit selected as part of the survey sample. The first package included a copy of the survey, an introduction letter, a consent to be re-contacted for future studies form, a business reply envelope and a one dollar coin (Appendix B). Two to three weeks later, a postcard reminder was delivered/mailed to the unit. The postcard reminded respondents about the survey, and emphasized the importance of their response (Appendix C). The final package was sent or delivered two to three weeks after the second (four to six weeks after the first). This package contained all the same elements as the first (information letter,

business reply envelope, survey, and consent to re-contact form) except for the one dollar coin. The information letter was altered to place an emphasis on the importance of the tenant's response, and to thank those who had already responded (Appendix D).

The one dollar coin was included in the initial survey package as an incentive for individuals to complete the survey. As the dollar was included with the initial survey package, individuals received the honorarium regardless of their participation in the research project. While this meant some individuals received the honorarium but did not complete the survey, past research suggested the improvement of the response rate is much more significant if compensation is provided with the survey, rather than as a consequence of completion. Specifically, providing compensation at this stage has been shown to more than double the rate of response (Edwards et al., 2002).

The survey was a self-administered, anonymous survey with thirty-one questions. It was expected it would take participants fifteen to twenty minutes to complete the survey in its entirety. Respondents were asked questions regarding their personal background, their experiences with ETS, their experiences with smoking restrictions in MUDs, their views on smoking and their opinions on smoke-free housing.

4.3.1 Survey Response

The response rate for the survey without adjusting for non-deliveries was 8.2%. Of the 3724 surveys mailed or delivered, 305 were returned by tenants. Not all surveys reached the potential respondents. Of those surveys which were mailed, 27 (5.3%) were returned as undeliverable as the unit was vacant at the time of delivery. While none of the hand delivered surveys were returned due to units being vacant, it should not be assumed that all surveys were delivered to occupied units. As the hand delivered surveys did not have postage on them, it would not be possible for the surveys to be returned to the sender without paying postage, or opening the envelope and utilizing the business reply envelope provided, which is unlikely to occur. The overall vacancy rate for Kitchener in April 2009 according to the Canadian

Mortgage and Housing Corporation (CMHC) was 2.9% (CMHC, 2009). If we assume this rate applied to the buildings where the surveys were hand delivered, approximately 94 surveys were delivered to vacant units. This suggests surveys were delivered to 3603 occupied units, and 121 unoccupied units. The response rate, considering only occupied units, was then 8.5%. Figure 2 illustrates the overall survey distribution and response rates.

Figure 2. Survey distribution and response rates

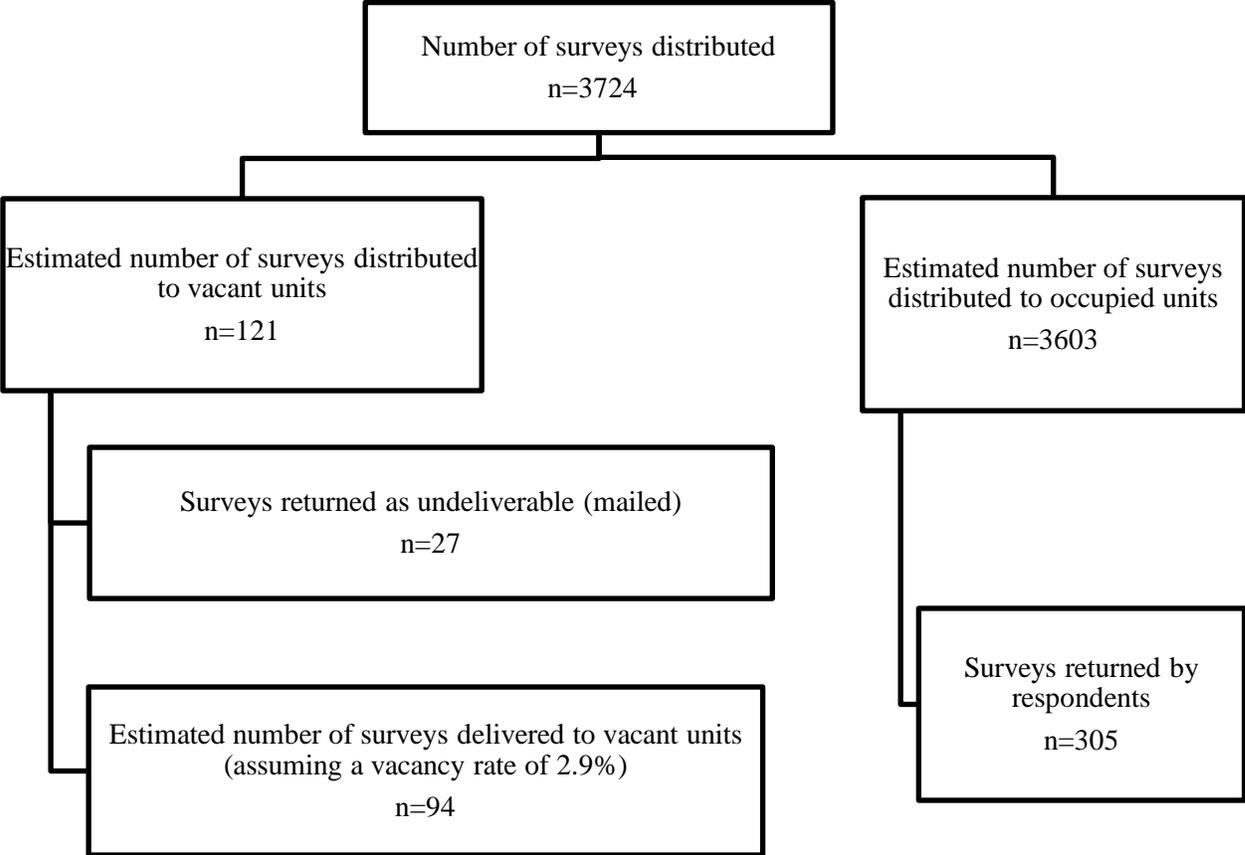


Table 2 illustrates the final response rate overall and by building type, response rates varied by building type with townhouse complexes having the highest response rate overall.

Table 2. Final sample and response rate by building type

Strata	Number in sample		Number returned		Response rate unit (building)
	Buildings	Units	Buildings	Units	
Strata 1. Residential property with 5 to 40 self-contained units	89	1169	44	113	9.7% (49.4%)
Strata 2. Multi-residential, with 41 or more self-contained units (excludes row-housing)	18	1800	14	109	6.1% (77.8%)
Strata 3. Row housing, with five or more units under single ownership	19	755	15	83	11.0% (78.9%)
TOTALS	126	3724	73	305	8.2% (57.9%)

Surveys returned by tenants were excluded from the final sample under two conditions. The first criteria for exclusion was if the respondent had missed or skipped more than 75% of the survey questions (23 questions or more) they were eligible to complete including questions related to smoking behaviours (Questions 9 and 10) and, if they were eligible to complete them, questions related to exposure to ETS in the home (Questions 14 and 15). Fourteen surveys met these criteria and were excluded from the analysis.

The second criterion for exclusion from the sample for analysis applied only to a portion of the survey. Respondents who lived with someone who smoked in the unit on a daily basis or did so themselves were asked to skip the set of questions related to their experiences with drifting ETS in their unit (Questions 14 – 20). This skip was included as those individuals who are exposed to ETS in their home which originates from within the unit may have had a difficult time responding to questions regarding drifting ETS as it could be hard to tell which smoke came from outside the unit and which smoke came from inside the unit. Twenty respondents did not follow this skip pattern and answered the questions related to drifting ETS in the home. The responses to this set of questions from those respondents were not included in the final analysis. The remainder of their responses to other survey questions were kept in the final sample.

4.4 Survey Measures

The survey was modelled after previously conducted surveys on the same topic including, a tenant survey conducted by the Minnesota Centre for Energy and Environment (MCEE et al., 2001) and a tenant survey conducted by the Region of Waterloo (Region of Waterloo, 2009a). Questions were added, removed and adapted from the surveys to fit the purpose of the current research. The full survey can be found in Appendix E. The key measures and variables of interest addressed in the study are explored below.

4.4.1 Demographic measures

Information was collected on basic demographic characteristics of respondents. Demographic measures included the number of tenants in the unit, presence and number of youth in the home, gender, age, tenancy length, income and education. Tenancy length and age were collected as continuous variables, while the rest of the measures were categorical or ordinal.

Low income status. Statistics Canada's low income cut offs (LICOs), were used as proxy measures to classify individuals as 'low income'. While LICOs do not define a poverty line, they do allow for a determination of individuals who are "substantially worse off than average" (Statistics Canada, 2009b). LICOs are based on the number of individuals within a family unit, geographic location and total family income. The LICOs are set at a point where households below that level of income are likely spend 20% more than average of their income on food, shelter and clothing (Statistics Canada, 2009b).

4.4.2 Smoking related measures

Current smoking status. Current smoking status was defined based on a combination of responses to the following two questions, (1) "Over the course of your lifetime have you smoked 100 or more cigarettes?" (Question 9) and, (2) "Have you smoked, even a single puff, in the last 30 days?" (Question 10). Based on the responses to these questions, the following four categories of current smoking status were defined,

(1) current smokers, (2) occasional smokers, (3) former smokers and, (4) never smokers. Table 3 illustrates the categories and the coding scheme.

Table 3. Smoking status variable – definitions and coding scheme

Smoking status	Definition	Over the course of your lifetime, have you smoked 100 or more cigarettes?	Have you smoked, even a single puff, in the last 30 days?
Current smokers	Has smoked 100 cigarettes or more in their lifetime, and has smoked in the last thirty days	Yes	Yes
Occasional smokers	Has not smoked 100 cigarettes in their lifetime but has smoked in the last thirty days	No	Yes
Former smokers	Has smoked 100 cigarettes in their lifetime, but has not smoked in the last thirty days	Yes	No
Never smokers	Has not smoked 100 cigarettes in their lifetime, and has not smoked in the last thirty days	No	No

Personal policies on smoking in the home. To determine who, if anyone, smoked in the home, respondents were asked two questions, (1) ‘Do you allow guests to smoke in your unit? (Question 12) and, (2) ‘Including yourself, of the people you live with how many smoke inside your unit?’ (Question 13). For each question, if the respondent indicated the group did smoke indoors (‘yes’ or ‘one or more’ response), the frequency of the behaviour was measured by asking respondents how often the behaviour occurred on a four point scale ranging from ‘daily’ to ‘a few times a year’.

The two measures, tenant smoking in the home and guests smoking in the home, were combined to create a measure of personal policies on smoking in the home. Four types of personal policies were defined, as shown in Table 4. For the purposes of analysis, the measures were collapsed into two

categories, smoke-free homes (completely smoke-free) and smoking permitted homes (smoking permitted and both smoking restricted smoking categories).

Table 4. Personal policies on smoking in the home – definitions and coding scheme

Personal smoking policy	Definition	Response to “Do you allow guests to smoke in your unit?” (Q12)	Response to “Including yourself, of the people you live with how many smoke inside your unit?” (Q13)
Smoking permitted	Both guests and tenants are permitted to smoke in the home	Yes	One or more
Restricted smoking (guests only)	Guests are permitted to smoke in the home, tenants are not	Yes	None I don’t know
Restricted smoking (tenants only)	Tenants are permitted to smoke in the home, guests are not	No	One or more
Completely smoke-free	No guests or tenants smoke in the home	No	None I don’t know

4.4.3 Measures related to experiences with drifting ETS

Respondents who indicated they lived in a unit where one or more tenants smoked indoors on a daily basis were asked to skip the questions related to experiences with drifting ETS.

Perceived exposure. Two questions were asked in regards to the respondent’s exposure to drifting ETS, (1) ‘How often are you exposed to second-hand smoke in your home? This may include smoke coming in from the outside’ (Question 14) and, (2) ‘How often have you noticed tobacco smoke odours entering your unit from a source outside of your unit?’ (Question 15). Both questions were intended to measure perceived exposure to drifting ETS. The first question was included to allow for direct comparisons between the results of this study, and the results of the Region of Waterloo’s survey on smoking in MUDs. The second question has commonly been used in previous surveys on drifting ETS in MUDs and was included to allow comparisons between the current study and previous work in other jurisdictions.

Respondents who indicated they were ‘never or almost never’ exposed to drifting ETS in question 15 were asked to skip the remaining questions related to their experiences with drifting ETS (Questions 16 –

21). As they indicated they had not been exposed, it was expected that asking them about their experiences would not produce any relevant information.

Perceptions of drifting ETS. To determine respondent's perceptions of drifting ETS they were asked, "When tobacco smoke odour does enter your unit, how much does it bother you or others in your home?" (Question 16). Respondents could select a response from a four point scale ranging from 'not at all' to 'so much I'm considering moving'.

Mode of entry for drifting ETS. A question was asked to determine how respondents perceived the ETS entered their unit causing exposure. Respondents were asked "What is the most common way tobacco smoke odours enter your unit from outside of your unit?" (Question 17) and were given a list of five possible modes of entry, an 'other' option and an 'I don't know' option.

Actions taken in response to drifting ETS. To determine what actions, if any, tenants had taken in response to their exposure to drifting ETS, three questions were asked. The questions addressed two possible types of actions, actions the individual may take to mitigate their exposure, and actions related to speaking with others about their exposure.

The first question asked if tenants had taken any of a list of eight possible actions in response to their exposure. These actions ranged from turning off fans or masking the smell with air freshener, to moving to a new building or a new unit. If respondents indicated they had taken one of the actions, they were prompted to answer the second half of the question, 'how much did this help?' and to rate the effectiveness of the action on a three point scale from 'not at all' to 'a lot'.

The second and third question on this issue related to speaking with others about their exposure. The first of these questions asked respondents if they had spoken to their landlord/building representative about the issue. Two follow-up questions were included. If tenants indicated they had spoken to their landlord, they were asked what their landlord's reaction was to the conversation and were given a list of

five options, including an 'other', to choose from. If tenants indicated they had not spoken to their landlord, they were asked 'why not' and were again given a list of five options including an 'other' to choose from.

Finally, respondents were asked if they had spoken to anyone else (other than the smoker or their landlord) about the issue of drifting ETS. If they indicated they had, they were asked to indicate who they had spoken with from a list of six options, including an 'other' option.

4.4.4 Measures of current smoking restrictions

To gain insight into the current size of the smoke-free rental housing market, respondents were asked to identify whether smoking was permitted in various areas within their building/complex including units, outdoor spaces and common areas. In cases where respondents indicated smoking was not permitted, the effectiveness of the policy in creating a smoke-free area was evaluated by asking how often, in the last three months, they had noticed individuals smoking in those areas (never, sometimes or often).

The list of areas included in the question addressed both areas covered by the Smoke-Free Ontario (SFO) Act and areas which were not covered by the SFO Act. The SFO Act prohibits smoking in common areas of residential building including hallways, party rooms, lobbies, elevators and underground parking lots (Smoke-Free Ontario Act, 2008). By including the areas covered by the SFO Act, the question acted as a measure of perceived compliance and awareness of the Act among tenants.

It is expected that tenants within the same building or complex may not agree on overall smoking policies in place, as past work has found the level of agreement among tenants in the same building on smoking regulations to be very low (Henrikus et al., 2003; Hewett et al., 2006).

4.4.5 Perceptions of risk

Respondents' perceptions of risk associated with smoking and ETS were measured based on four key issues, risk associated with indoor smoking, risk of ETS generally, risk of drifting ETS and the personal health risks of ETS for the respondent and their families/roommates.

A four point ordinal scale was used to measure the perceived risk of fires associated with indoor smoking ranging from (1) 'does not increase' to (4) 'increases a lot', plus a fifth 'not sure' option. Risk associated with second-hand smoke was measured by asking how harmful second-hand smoke was to people's health and how harmful second-hand smoke that drifts into individual units from somewhere else in the building or from outside of the building is to people's health. For both questions respondents were asked to select from five responses, a 'not sure' response or one of a four point ordinal scale ranging from (1) 'not at all harmful' to (4) 'very harmful'.

The perceived risk of ETS on the specific respondent and other members of the household's health was measured with two questions. The first measure simply asked 'Do you or any of the others in your home have health problems that get worse when you breathe in second-hand smoke?' (Question 23) with 'yes', 'no' and 'I don't know' response options. The second measure was more specific, specifically asking if the tenant and if others in the home suffered from a list of six health conditions related to ETS exposure.

4.4.6 Smoke-free housing

Questions were asked of respondents to determine the likelihood there is a market for smoke-free MUDs. The following issues were addressed: preferred smoking regulations, desire for smoke-free buildings, sacrifices they are willing to make for smoke-free buildings and the perceived enforceability of smoke-free regulations.

Enforceability of smoke-free regulations was measured by asking respondents how easy it would be to enforce a smoke-free regulation. Two questions were asked, one based on how easy it would be for the

landlord to enforce and one on how easy it would be for themselves as tenants to enforce. Respondents were asked to answer based on a four point scale ranging from ‘not easy at all’ to ‘very easy’.

Overall interest in smoke-free housing was measured in two ways. The first measure asked how interested individuals would be in living in a building where smoking was not allowed anywhere on a four point scale from (1) ‘not interested’ to (4) ‘extremely interested’. The second question was more specific, asking respondents which building they would prefer to live in when given a list of five buildings with increasingly strong levels of smoking restrictions in place, starting with the first building where there were no smoking restrictions at all to the fifth building where smoking was banned in the entire building and on all green space.

Finally, respondent’s willingness to make sacrifices to live in smoke-free housing was measured. Respondents were asked, “If you were planning to move, would you be willing to do the following to live in a building that was designated as smoke-free? (Assume the apartments are the same in every other way)” (Question 31). Respondents were then given a list of twelve possible sacrifices which fit into three categories, sacrifices related to distances traveled, sacrifices related to safety and, sacrifices related to building amenities. A dichotomous measure of willingness to make sacrifices was created from this question for analysis purposes. If respondents answered ‘yes’ to at least one of the listed sacrifices, they were classified as ‘willing to make sacrifices for smoke-free housing’ and if they did not answer ‘yes’ to any of the options they were placed in the ‘unwilling to make sacrifices for smoke-free housing’ category.

4.5 Analysis

Analyses were conducted using SAS 9.1 for Windows. Each survey was marked with a six digit identification code. A range of identification codes were assigned to each building or complex in the sample. The surveys were then randomly distributed to units within the building/complex, which allowed the building to be identified but not the specific unit.

Surveys were printed in a Scantron format, and respondents were asked to complete the survey by filling in a bubble next to their response in pencil, allowing the surveys to be scanned by a computer system when returned. When surveys were returned they were scanned, coded using a preset coding scheme and data was entered into a .csv database. Following the first scan of data into the system, a second scan was completed. Using SAS, the two resulting data sets were compared, and any discrepancies between the two sets were noted. For those cases where the two scans did not agree on the value for a specific response, the paper copy of the survey was consulted to determine the appropriate value. Following scanning, each survey was manually checked and any additional written comments, which would not have been picked up by the computer scanning process, were added to the data set.

Prior to analysis, the data was checked for any unexpected responses. Missing data was noted, and dealt with using deductive imputation and mean value imputation.

4.5.1 Demographics

The demographic characteristics of respondents were explored using the FREQ and UNIVARIATE procedures within SAS. Basic frequencies were calculated for a variety of demographic variables in order to develop a profile of the sample. The variables of interest are listed in Table 5. In some cases responses were combined in order to deal with small sample sizes, when this occurred it is noted in the table.

Table 5. Demographic variables of interest

Variable	Survey question	Response options	Response type
Number of Tenants	“How many people, including yourself, live in your unit? (Question 1)”	One, two, three, four, five, six, seven, eight or more	Categorical
Number of Youth	“How many of the people living with you are under the age of 18?” (Question 2)”	None, One, Two, Three, Four, Five or more	Categorical
Gender	“Are you: (Male or Female)” (Question 3)”	Male, female	Categorical
Age	“How old are you?” (Question 4)”	--	Continuous
Hours spent at home	“Thinking of a typical weekday (Monday to Friday), how many hours a day do you spend at home on average over the course of the whole day?” (Question 5) “Thinking of a typical weekend day (Saturday to Sunday), how many hours a day do you spend at home on average over the course of the whole day? (Question 6)”	0 – 4 hours 5 – 10 hours 11 – 15 hours 16 – 20 hours 21 to 24 hours	Ordinal
Education Level	“What is the highest level of education you have completed?” (Question 7)”	High School or equivalent (Forms ‘no postsecondary education’ category) Registered apprenticeship, other trades certificate/diploma (Combined to form ‘trades’ category) College certificate/diploma, other non-university certificate/diploma (Combined to form ‘college’ category) University certificate or diploma below the bachelor’s level, university certificate, diploma, or degree at the bachelor’s level, university certificate, diploma, or degree above the bachelor’s level (Master’s, PhD., professional degree) (Combined to form ‘university’ category)	Categorical

Variable	Survey question	Response options	Response type
Income	“What is your total household income, including all earners in your household?” (Question 8)	Less than \$10,000 \$10,000 to \$19,999 \$20,000 to \$29,999 \$30,000 to \$39,999 \$40,000 to \$49,999 \$50,000 to \$59,999 \$60,000 to \$69,999 \$70,000 to \$79,999 \$80,000 to \$89,999 \$90,000 to \$99,999 \$100,000 and above	Ordinal
Tenancy Length	How long have you lived in this building? I have lived here for _____ years and _____ months (Question 11)	--	Continuous

Smoking status. FREQ procedures were used to determine the number of current, former, occasional and never smokers in the sample.

Personal smoking policies. The FREQ procedure was used to determine the proportion of respondents in the sample with each of the four potential personal smoking policies in place. This measure was further investigated by smoking status to determine if there was a relationship between the personal smoking policy in place, and the smoking status of the respondent.

The LOGISTIC procedure was used to investigate any potential relationships between having a smoke-free home, and the demographic variables explored in the survey. Univariate analyses were conducted first to determine if there were any relationships present when the variables were considered separately. Those variables identified as significant at the 0.05 level were included in additional analyses to develop a final multivariate logistic regression model to predict personal smoke-free policies in the home.

Perceptions of risk associated with ETS. The frequencies of respondents' answers to the questions related to the risk associated with ETS were calculated using the FREQ procedure. This included questions related to the risk of fire associated with smoking indoors, the perceived impact of ETS on respondents' health outcomes and, the perceived harm of ETS and drifting ETS.

4.5.2 Research question one: How do tenants living in multi-unit dwellings perceive the extent and severity of drifting ETS?

The FREQ procedure was used to generate a set of frequencies for the respondents' responses to the questions: "How often are you exposed to second-hand smoke in your home? This may include smoke coming in from the outside" (Question 14), "How often have you noticed tobacco smoke odours entering your unit from a source outside of your unit?" (Question 15), and "When tobacco smoke odour does enter your unit, how much does it bother you or others in your home?" (Question 16).

The LOGISTIC procedure was then used to further investigate question 16. A dichotomous variable of bothered or not bothered was created, and various univariate logistic regression models were developed to

determine if those respondents who were bothered by drifting ETS differed in any significant way (p value of less than 0.05) from those respondents who were not bothered by drifting ETS. Variables which were identified as significant in the univariate analysis at the 0.05 level were considered for inclusion in a multivariate logistic regression model which was developed to predict which tenants would be more likely to be bothered by drifting ETS.

4.5.3 Research question two: What actions, if any, do tenants take in response to drifting ETS?

To determine what actions were taken in response to drifting ETS by respondents, the FREQ procedure was utilized to determine the proportion of respondents who took each of the potential actions listed in question 18 ('When you experienced tobacco smoke odours entering your unit from somewhere else, what did you do about it? Did you...') and to determine the perceived success of each action taken ('how much did this help').

A dichotomous variable was developed to separate those respondents who took at least one action in response to the drifting ETS (one or more 'yes' responses to question 18) and those who took no actions. Univariate logistic regression models were developed to determine if any potential explanatory variables predicted an individual would take at least one action. Using these results, a multivariate logistic regression model was developed. All variables which were identified as significant at the 0.05 level in the univariate analysis were considered for inclusion in the final model.

FREQ procedures were also utilized to determine the proportion of respondents who had spoken with their landlord or building representative about the drifting ETS (question 19) and the proportion of respondents who had spoken with someone else about their exposure (question 20).

4.5.4 Research question three: Are perceived smoking restrictions in multi-unit dwellings prevalent in the Kitchener area?

Frequencies were determined for respondents' responses to the question, "Is smoking allowed in any of the following areas of your building?" (Question 21) using the FREQ procedure. Frequencies were also calculated for this question for each building and building type to determine two key issues, first if individuals living within the same building agreed on the overall regulations on smoking in the building, and second to determine if building type played any role in the likelihood that restrictions existed. Frequencies (FREQ procedure) were also calculated for the question, "Thinking of the last three months, how often have you noticed individuals smoking in each of the areas where it was not allowed?" (Question 21b), for those individuals who responded "no" to the question determining if smoking was allowed in that area of the building.

Responses to question 21 and 21b in regards to hallways, laundry rooms, lobbies, party rooms, and gyms or indoor pool areas were calculated separately. These areas have non-smoking regulations in all buildings due to the Smoke-Free Ontario Act. As such, the responses to these questions were calculated to gain insight into the awareness (Question 21) and enforcement (Question 21b) of the SFO Act in the sample.

4.5.5 Research question four: Is there a market for smoke-free rental housing? If so, what characteristics predict membership in this market?

Respondent's opinions on smoke-free housing were determined in order to find if there is a potential market for smoke-free housing. Measures of interest included: ease of enforcement, interest in smoke-free housing, preferred level of restrictions and willingness to make sacrifices for smoke-free housing.

Perceptions of the potential enforceability of smoke-free regulations was measured with two questions, (1) "If smoking was not allowed anywhere in your building, how easy would it be for you to ensure no one, including your guests, smoked in your apartment?" (Question 27) and, (2) "If smoking was not

allowed anywhere in the building, including all the individual units, how easy do you think it would be for your landlord to enforce the rule? (Question 28). Frequencies were calculated for each question utilizing the FREQ procedure.

The FREQ procedure was used to determine the proportion of respondents' who selected each response option for the questions related to the respondent's interest in smoke-free housing (question 29) and their preferred building based on smoking restrictions in place (question 30).

Logistic regression was used to predict the likelihood that an individual would be interested in living in a smoke free multi-unit dwelling. The model was based on respondents' answers to the question "Which of the following statements do you agree with the most? I would ____ be interested in living in a building where smoking is not allowed anywhere" (Q29), with individuals answering "not be interested" forming the group who would not be part of the smoke-free rental housing market, and individuals answering "somewhat interested", "very interested" or "extremely interested" forming the group of respondents who would be members of the smoke-free rental housing market.

The LOGISTIC procedure was first used to develop a set of univariate models to determine if there were differences between those individuals who would be part of a potential smoke-free rental housing market, and those individuals who would not be part of a potential smoke-free rental housing market based on various demographic variables, and responses to previous questions. Using the results from these models, any variables which were significant at the 0.05 level were considered for inclusion in a single multivariate logistic regression model to predict who would be most likely to be a member of the potential smoke-free rental housing market.

In addition to who was interested in smoke-free rental housing, it was determined who would be most likely to make a sacrifice for smoke-free housing. The FREQ procedure was used to calculate the proportion of respondents who were willing to make each of the sacrifices listed in question 31 ('if you

were planning to move, would you be willing to do the following to live in a building that was designated as smoke-free?). A dichotomous variable of willing to make a sacrifice (at least one 'yes' response to question 31) and those who were not willing to make a sacrifice was developed. Using this dichotomous variable, the LOGISTIC procedure was used to develop a series of univariate logistic regression models to determine if there were differences between those individuals who would make a sacrifice and those who would not in terms of demographics and responses to previous survey measures. Those variables which were found to be significant at the 0.05 level in the univariate analysis were considered for inclusion in the final multivariate model to predict a willingness to make sacrifices for smoke-free housing.

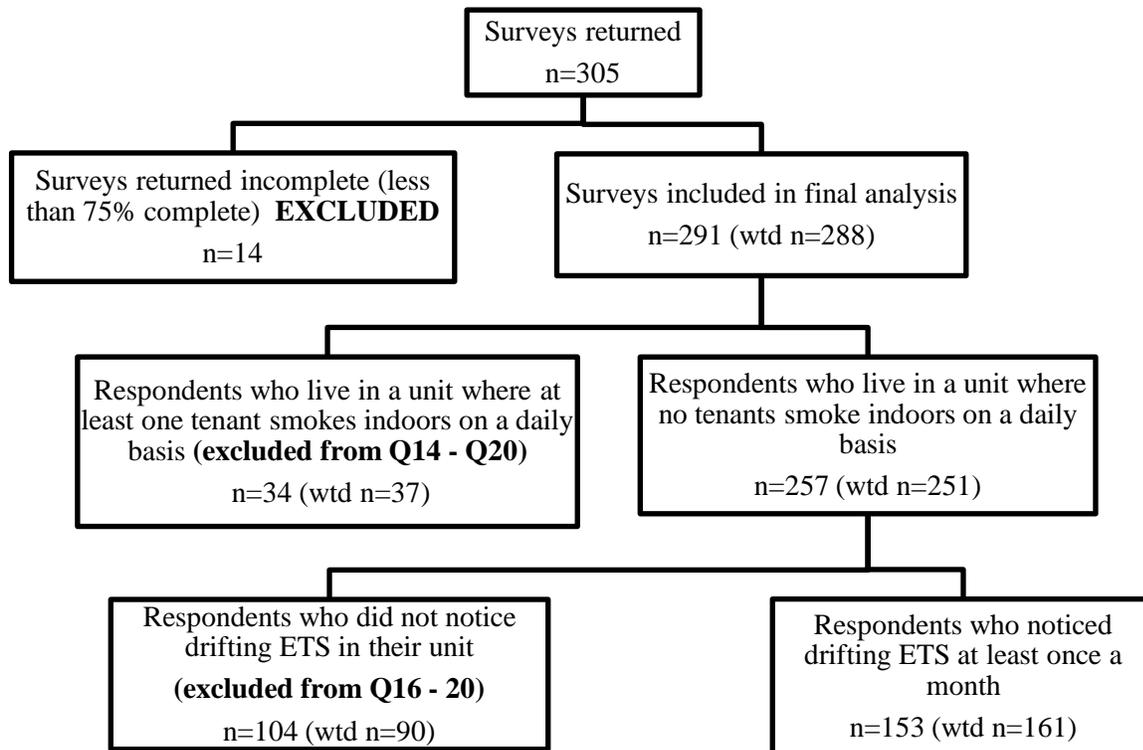
Chapter 5

Results

Three hundred and five tenants responded to the survey. Of these, fourteen surveys were returned with less than seventy-five per cent of the questions completed and, as per the inclusion criteria, were eliminated from the final data set for analysis purposes. The remaining 291 surveys were included in the analyses.

Respondents who indicated they live in a unit where a tenant smokes indoors on a daily basis and those who indicated they do not notice drifting ETS in their homes at least once a month were asked to skip the section of the survey related to their experiences with drifting ETS. As such, the sample size varies based on the section of the survey being considered. Figure 3 presents both the weighted and unweighted sample sizes for each of the groups.

Figure 3. Final sample sizes available for analysis



5.1 Weighting

The final sample was randomly selected in an attempt to make the sample representative of all tenants living in rental MUDs in Kitchener, Ontario. The response rate for the survey however was low at 8.5%, suggesting non-response bias may have an impact on the results, and on the overall representativeness of the sample. In order to help mitigate this problem, survey weights were developed and utilized.

Survey weights were developed based on education level and age of the respondent. Both of these variables have been found to be significant predictors of key outcomes in previous studies (MCEE, 2001a). The data suggested there maybe differences in the distributions of these variables between the sample population and the overall population of interest. Ideally, information on age and education level distributions within the population of interest, tenants living in MUDs in Kitchener, Ontario, would have been used to create the final survey weights however these data were not readily available, and as such, Census level data for renters at the national level and for Kitchener as a whole were utilized.

Statistics Canada has published the proportion of individuals in specific age brackets (ten year intervals ranging from 18 years to 75 years and up) who rent their accommodations, based on national level data (Statistics Canada, 2009a). While renting was not defined as individuals renting MUDs specifically, it was assumed that the majority of individuals who do rent, rent in a multi-unit setting, rather than a single detached home. The national proportions of individuals who rent in each age bracket were applied to the age distribution within the city of Kitchener as reported in the 2006 Census (Statistics Canada, 2008). This provided information on the proportion of individuals in the rental market in Kitchener who fell in each age bracket.

The 2006 Census data also included information on the educational attainment of the residents of the city of Kitchener (Statistics Canada, 2008). These data were used to calculate the education level variable for the survey weights. Information was available on the proportion of individuals with each level of

education within three age brackets, (1) less than 24 years, (2) 25 – 34 years and, (3) 35 years and up. It was assumed the proportion of individuals within each level of education in the city generally would be similar to the renting population, and as such no adjustments were made to this data.

Table 6 illustrates the final weights for the survey. Survey weights were developed by determining the weight for each combination of age group and education level. Unless otherwise stated, the weighted dataset was used for all results presented in this paper.

Table 6. Final survey weights

Education Level Age Group	High School Weight (% in population, % in sample)	Trades Weight (% in population, % in sample)	College Weight (% in population, % in sample)	University Weight (% in population, % in sample)
Under 25 years	5.51 (22.87%, 4.15%)	1.00 (1.44%, 0.00%)	1.7 (5.87%, 3.46%)	0.8 (4.15%, 5.19%)
25 – 34 years	2.59 (7.17%, 2.77%)	4.51 (1.58%, 0.35%)	1.12 (7.00%, 5.88%)	0.55 (7.41%, 13.49%)
35 – 44 years	0.71 (4.93%, 6.92%)	2.77 (1.91%, 0.69%)	0.64 (3.99%, 6.23%)	0.7 (4.10%, 5.88%)
45 – 54 years	1.05 (3.63%, 3.46%)	0.68 (1.40%, 2.08%)	0.47 (2.93%, 6.23%)	0.67 (3.01%, 4.50%)
55 – 64 years	0.36 (2.26%, 6.23%)	0.32 (0.88%, 2.77%)	0.38 (1.83%, 4.84%)	0.54 (1.88%, 3.46%)
65 – 74 years	0.43 (1.48%, 3.46%)	1.63 (0.57%, 0.35%)	1.15 (1.19%, 1.04%)	1.18 (1.23%, 1.04%)
75 years and over	0.90 (1.88%, 2.08%)	0.42 (0.73%, 1.73%)	1.10 (1.52%, 1.38%)	4.46 (1.56%, 0.35%)

Note: $Weight = \frac{\% \text{ in population}}{\% \text{ in sample}}$

5.2 Demographic Characteristics of the Sample

Table 7 presents the demographic characteristics of the respondents, based on weighted and unweighted data. Approximately 60% (n=173) of the sample were female. The sample ranged in age from 18 to 95 years with a mean age of 36.6 years (SD=17.6) in the weighted sample. There was no significant

difference in the mean age between the genders. On average, there were 2.1 (SD=1.2) tenants living in each unit and just over a fifth of all households included a youth under the age of 18 years. Tenancy lengths varied from a low of one month to a high of 488 months with the mean tenancy length in the weighted sample being 48.1 months (SD=71.9).

Table 7. Selected demographic characteristics of the sample based on weighted and unweighted data

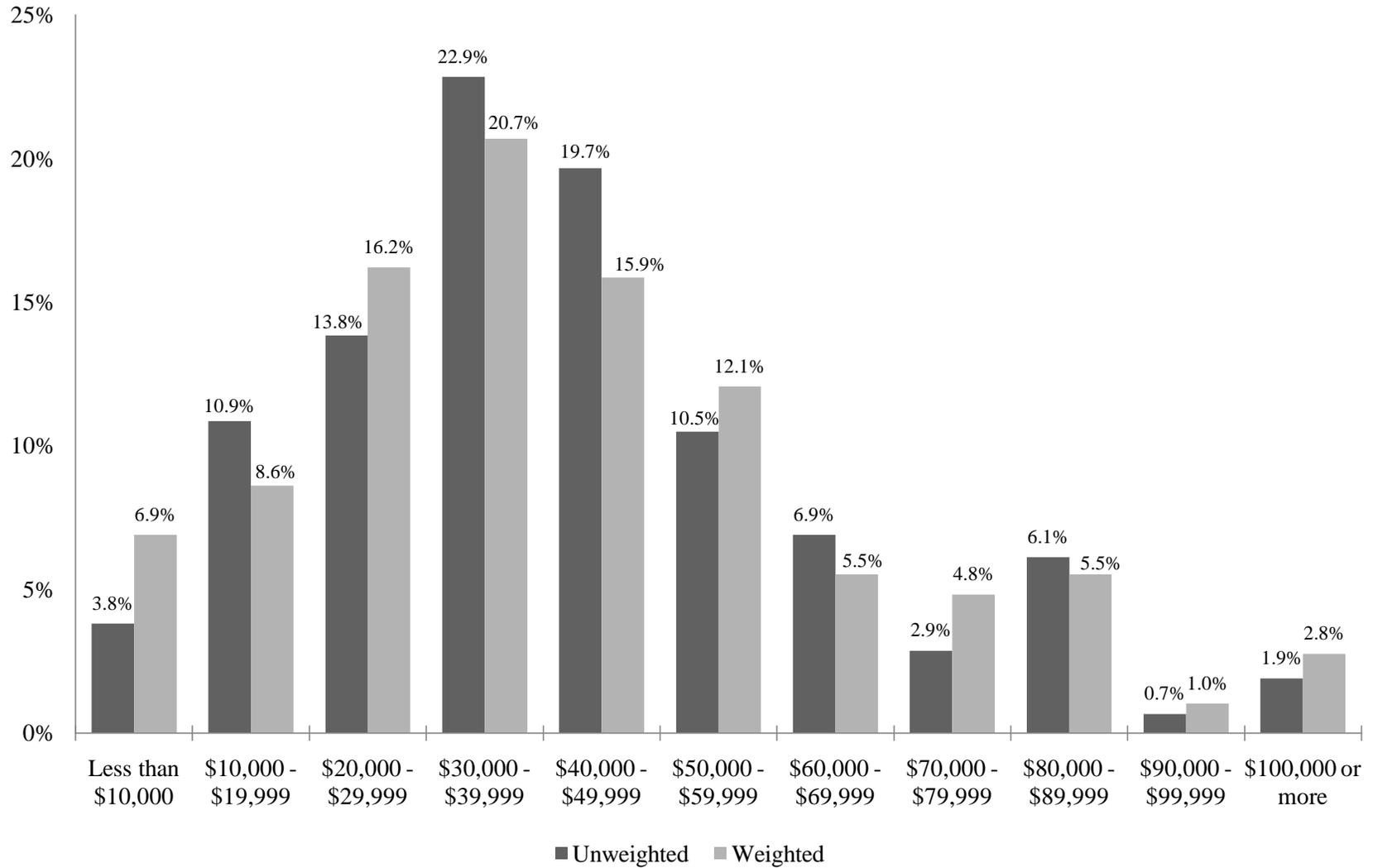
Variable	Response Option	Unweighted Data (n=291)	Weighted Data (n=288)
Mean number of tenants per unit	Mean (SD)	2.0 (1.3)	2.1 (1.2)
Gender	Male	38.5% (n=112)	40% (n=115)
	Female	61.5% (n=179)	60% (n=173)
Youth in home	Yes	78.4% (n=228)	79.4% (n=229)
	No	21.7% (n=63)	20.6% (n=59)
Mean number of youth (excluding respondents with no youth in the home)	Mean (SD)	1.7 (0.9)	1.7 (0.9)
Education	High School	28.9% (n=84)	44.8% (n=129)
	Trades	7.9% (n=23)	7.2% (n=21)
	College	29.2% (n=85)	24.4% (n=70)
	University	34.0% (n=99)	23.6% (n=68)
Age	Mean (SD)	43.5 (16.7)	36.6 (17.6)
Tenancy length (months)	Mean (SD)	62.0 (84.2)	48.1 (71.9)
Average number of hours spent at home on a typical weekday day	0 – 4 hours	3.8% (n=11)	2.7% (n=9)
	5 – 10 hours	20.3% (n=59)	23.4% (n=67)
	11 – 15 hours	51.2% (n=149)	49.6% (n=143)
	16 – 20 hours	14.4% (n=42)	14.6% (n=42)
	21 – 24 hours	10.3% (n=30)	9.5% (n=27)
Average number of hours spent at home on a typical weekend day	0 – 4 hours	7.6% (n=22)	7.1% (n=21)
	5 – 10 hours	18.2% (n=53)	24.7% (n=71)
	11 – 15 hours	25.1% (n=73)	24.1% (n=69)
	16 – 20 hours	38.1% (n=111)	34.5% (n=99)
	21 – 24 hours	11.0% (n=32)	9.6% (n=28)

5.2.1 Income and low income status

The proportion of respondents within each income bracket in the weighted and unweighted data sets are presented in Figure 4. There was little difference in overall income distribution between the weighted and unweighted data. Just over 70% (n=204) of the sample had an income \$49,999 or less in both the weighted and unweighted sample.

The proportion of individuals in the sample who were low income, as defined as falling below the LICOs as set by Statistics Canada, in the weighted sample was 16.8% (n=48). In 2007, 8.8% of Ontarians living in all types of residences fell below the LICOs (Statistics Canada, 2009b). No demographic variables (age, gender, presence of youth in the home or education level) were significantly associated with low income status in the sample.

Figure 4. Proportion of respondents in each income category, using weighted and unweighted datasets



5.2.2 Smoking

Table 8 presents the current smoking status of respondents based on weighted and unweighted data. There was little difference in the overall smoking status distribution between the weighted and unweighted samples. Just over half of all respondents were never smokers, and current smokers accounted for approximately a fifth of the sample. For the purposes of the following analyses, current smoking status was collapsed into a dichotomous variable, current smoker (current and occasional smoker) and current non-smoker (former and never smokers). Current smokers accounted for 21.8% (n=62) of the weighted sample and current non-smokers accounted for 78.2% (n=225).

Table 8. Smoking status of respondents based on weighted and unweighted data

Current Smoking Status	Weighted Data Set % (n)	Unweighted data set % (n)
Current Smoker	20.2% (n=58)	17.6% (n=51)
Occasional Smoker	1.6% (n=5)	2.1% (n=6)
Former Smoker	22.2% (n=64)	27.2% (n=79)
Never Smoker	56.0% (n=161)	53.1% (n=154)

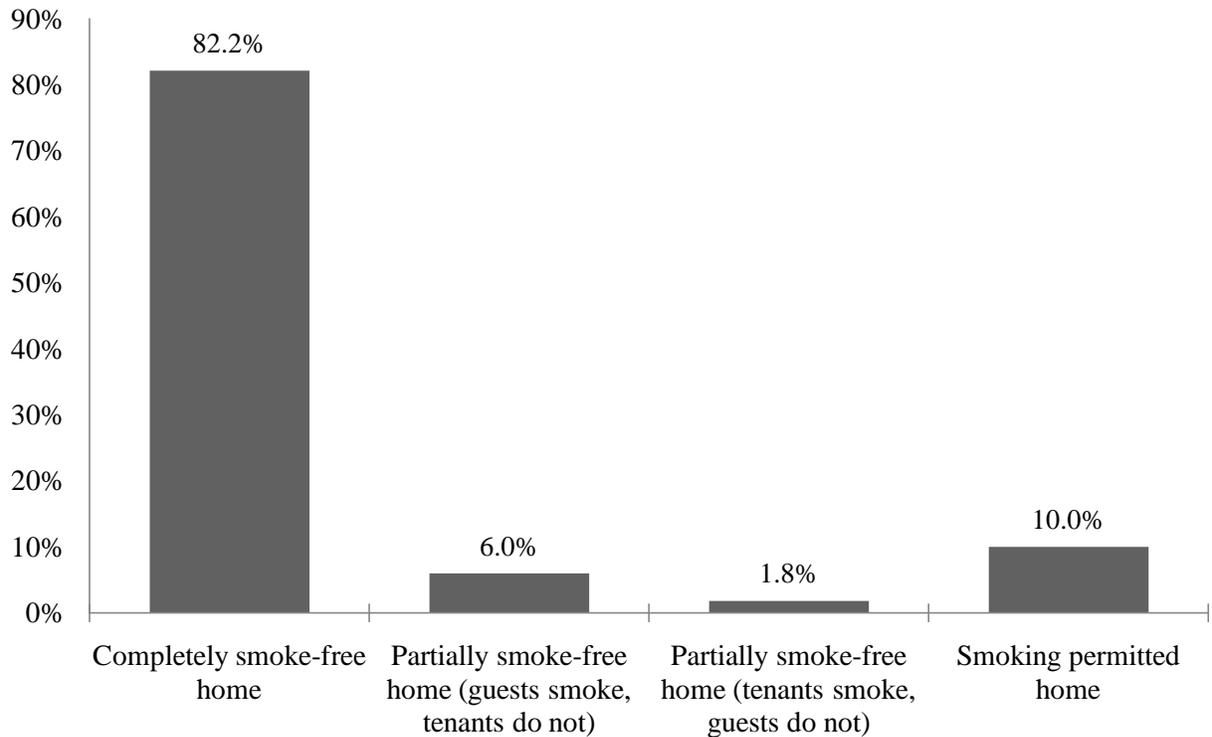
5.3 Personal Policies Regarding Smoking in the Home

Smoking in the unit was examined based on three issues: guest smoking, tenant smoking and overall personal smoking policies in place. Respondents were asked if they permitted guests to smoke in their unit, and if they or anyone they lived with smoked inside their unit. In the majority of households (84.0% n=241) guests were not permitted to smoke indoors. Sixteen per cent of respondents did allow guests to smoke in their home.

Respondents were also asked if they, or anyone else they live with, smoked inside the unit. The majority of respondents indicated that either no one smokes inside their unit (83.5%, n=239) or they were not sure if anyone smoked in the unit (4.64%, n=13). In the households where at least one of the tenants smoked in the unit, 88.2% (n=37) indicated it occurred on a daily basis.

To determine the proportion of respondents who have personal smoke-free policies in place in their units, a measure of personal smoking policies was developed using the questions on guest and tenant smoking. Four possible personal policies were identified, (1) completely smoke-free home, (2) partially smoke-free home (guest permitted to smoke but tenants are not), (3) partially smoke-free home (tenants permitted to smoke but guests are not) and, (4) smoking permitted home. The proportions of respondents with each personal smoking policy in place in their homes are presented in Figure 5.

Figure 5. Proportion of respondents with each personal smoking policy in place in their home

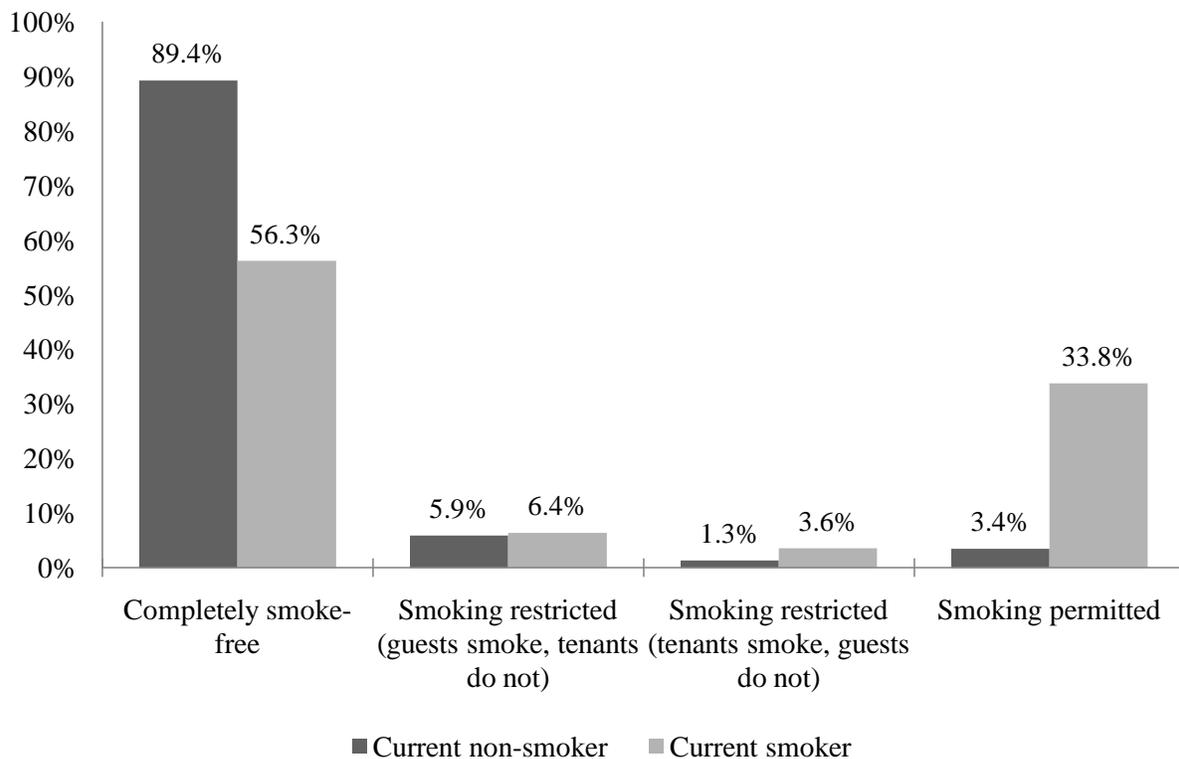


The majority of tenants (82.2%, n=235) live in units where they have personal smoking policies in place which make their unit completely smoke-free. The remaining 17.8% (n=51) of respondents have personal smoking policies in place which either restrict who can smoke in the unit, or which place no restrictions on who can smoke in the unit. For the purposes of the following analyses, these measures

were combined to form a dichotomous variable of completely smoke-free and not smoke-free (partially smoke-free and smoking permitted homes).

Personal smoking policies did vary based on the smoking habits of the respondent. Just over forty per cent (43.7%, n=27) of smokers allowed at least one group (guests or tenants) to smoke in the unit compared to 10.6% (n=24) of non-smokers. It is important to note, however, that over half (56.3%, n=35) of smokers lived in completely smoke-free units suggesting that smokers are willing to live in smoke-free environments, even when this is not a requirement. Figure 6 presents personal smoking policies in place in the home based on the current smoking status of the respondent.

Figure 6. Proportion of respondents with each personal smoking policy in place in their home, by current smoking status



For the most part, the presence of a complete ban on smoking in the home (no tenants or guests permitted to smoke), was not associated with the presence of youth in the home, age or income level.

University level education, increased number of hours spent at home on an average weekend day, and smoking status were all significantly associated with the presence of a complete smoking ban in the home. Table 9 presents the odds ratios predicting an individual will have a completely smoke-free home which were developed by allowing each variable to be the sole predictor of smoke-free homes in a univariate logistic regression model.

Table 9. Odds ratios for univariate logistic regression models predicting the presence of a completely smoke-free personal policy (compared to a restricted or smoking permitted policy)

Variable		Sample	% with a smoke-free policy	OR	95% CI	p value
Youth in the home	No (C)	228	80.6%	1.00	--	--
	Yes	59	86.7%	1.56	0.69 – 3.54	0.285
Gender	Male (C)	115	81.0%	1.00	--	--
	Female	173	82.5%	1.11	0.60 – 2.04	0.739
Age	Continuous	288	--	0.99	0.98 – 1.01	0.488
Income level	Continuous	288	--	0.96	0.84 – 1.10	0.540
	Above LICOs (C)	239	80.0%	1.00	--	--
	Below LICOs	48	91.4%	2.65	0.93 – 7.59	0.069
Education	Post-secondary education (C)	159	84.9%	1.00	--	--
	No post-secondary education	129	78.1%	0.63	0.35 – 1.16	0.138
	No Trades (C)	267	82.0%	1.00	--	--
	Trades	21	80.2%	0.89	0.29 – 2.73	0.832
	No College (C)	217	82.5%	1.00	--	--
	College level education	70	79.9%	0.84	0.43 – 1.66	0.621
	No university (C)	220	78.9%	1.00	--	--
	University education	68	91.6%	2.91	1.17 – 7.28	0.022
	Ordinal	288	--	1.16	1.01 – 1.32	0.031
Hours spent at home on an average weekday	Ordinal	288	--	0.81	0.59 – 1.11	0.180
Hours spent at home on an average weekend day	Ordinal	288	--	1.32	1.01 – 1.73	0.043
Smoking status	Current non-Smoker (C)	225	89.0%	1.00	--	--
	Current Smoker	62	56.3%	0.16	0.08 – 0.31	<0.001
Number of tenants	Continuous	288	--	0.82	0.62 – 1.07	0.138
Tenancy length	Continuous	288	--	1.00	0.99 – 1.00	0.465

The odds of having a smoke-free home increased by 1.16 times for each additional level of education reached from high school to postgraduate work (95% CI: 1.01- 1.32), specifically those with a university level education were more likely to have a smoke-free home than those without a university level education (OR= 2.9; 95% CI: 1.17-7.28). Those who spent more time at home, on average, per typical weekend day also had increased odds of having a smoke-free home than those who spent fewer hours at home, for each increased level of time spent at home, the odds in favour of having a smoke-free home increased by a factor of 1.32 (95% CI: 1.01-1.73).

5.4 Perceptions of Risk Associated with Environmental Tobacco Smoke

Respondents were asked to answer a series of five questions designed to measure their perceptions of the risk associated with various aspects of smoking and exposure to ETS. The results of those questions are explored in the following sections.

5.4.1 Perceived risk of fire

Respondents were asked to consider how smoking indoors affects the risk of a fire. Seventy-nine per cent of respondents felt smoking indoors would 'increase' or 'increase a lot' the risk of fire and 11.6% (n=33) thought it would slightly increase the risk of fire. Only one per cent (n=3) felt smoking indoors would not increase the risk of fire, and 9.0% (n=26) were unsure of the impact smoking indoors would have on fire risk.

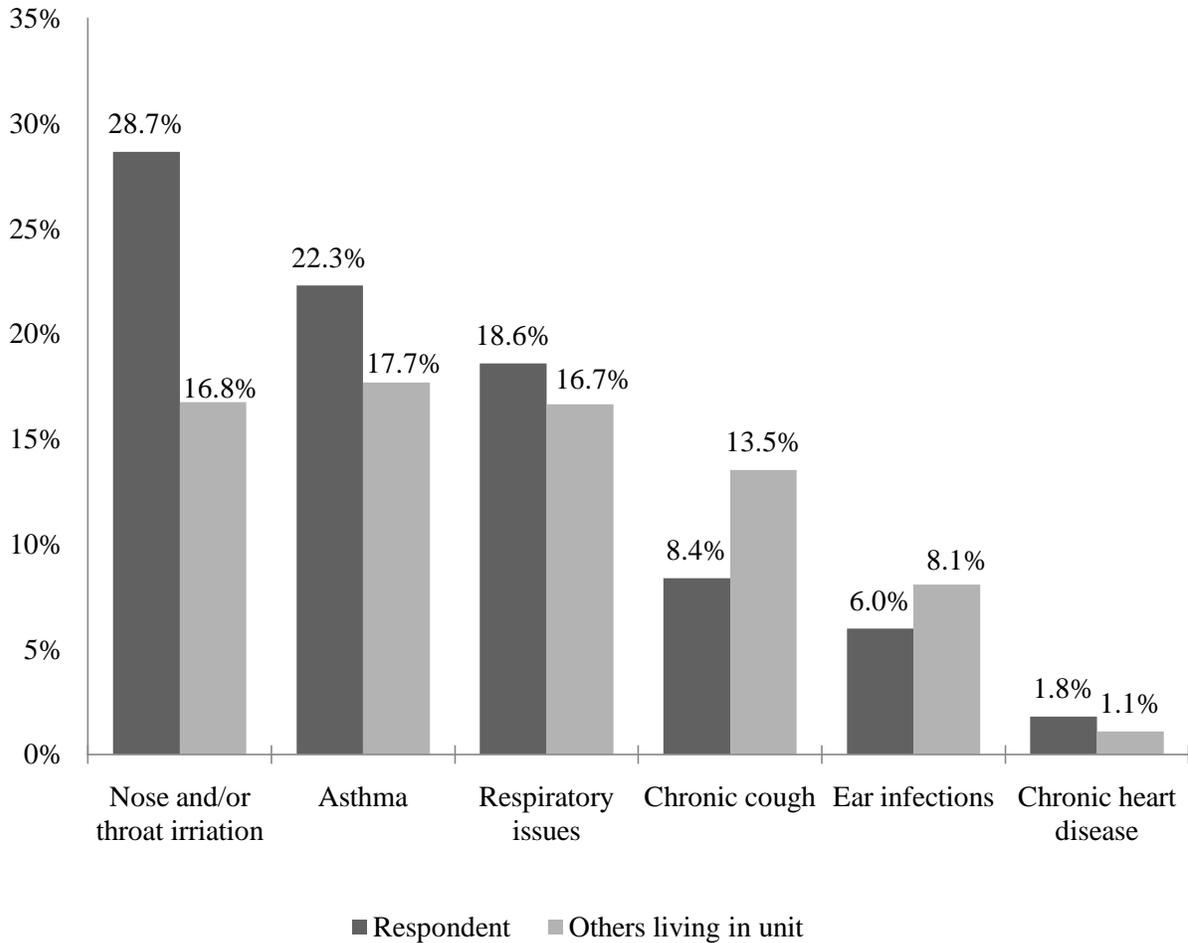
5.4.2 Personal health risks

Respondents were asked to consider how their personal health was affected by ETS exposure.

Approximately a third of respondents (33.4%, n=95) reported they or someone they lived with suffered from health issues that got worse after exposure to ETS. Twenty per cent of respondents were not sure if they or someone they lived with had a health issue that got worse after exposure (n=58) and 46.3% (n=132) of respondents indicated neither they, nor someone they lived with, had health issues that got worse after exposure to ETS.

Respondents were also asked to indicate if they, or someone they lived with, had any health conditions from a list of six conditions associated with ETS and smoking. The results of this question are presented in Figure 7.

Figure 7. Proportion of respondents with each health condition that worsened after exposure to ETS, by respondent and other members of the household

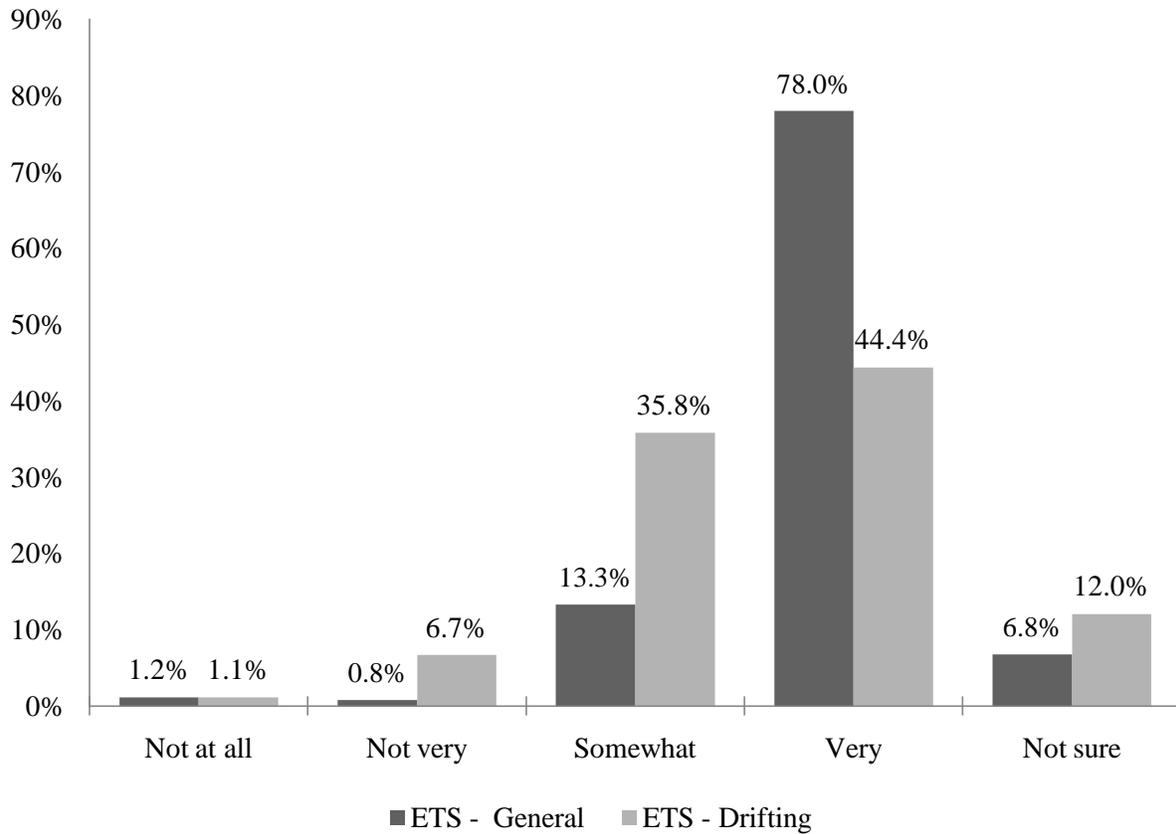


The most commonly reported health condition among respondents was nose and/or throat irritation (28.7%, n=82) and the most commonly reported condition among those the respondents lived with was asthma (17.7%, n=35).

5.4.3 Perceived harm of ETS and drifting ETS

Respondent's perceptions of the harm to people's health associated with ETS and drifting ETS are presented in Figure 8.

Figure 8. Perceptions of harm to a person's health due to exposure to ETS, by general ETS and drifting ETS



Few respondents perceived ETS and drifting ETS as not being harmful, one per cent (n=3) said drifting ETS was not harmful at all and one per cent (n=4) said ETS was not harmful at all. While overall respondents perceived both forms of ETS as being harmful, there was greater variation in the responses related to drifting ETS as respondents were split between drifting ETS being 'somewhat' harmful and 'very' harmful, compared to ETS generally, where the majority of respondents felt it was 'very' harmful.

A larger proportion of individuals were also not sure if drifting ETS was harmful (12.0%, n=34) compared to the proportion of individuals who were not sure if general ETS was harmful (6.8%, n=19).

5.5 Experiences with Drifting Environmental Tobacco Smoke

Two hundred and fifty one respondents were eligible to complete the questions regarding experiences with drifting environmental tobacco smoke. Respondents who lived in a unit where they or someone they lived with smoked indoors on a daily basis (n=37) were prompted to skip these questions, as it would be difficult to discern the differences between drifting ETS and ETS generated within the unit.

5.5.1 Perceived level of exposure to drifting ETS

Respondents answered two questions related to their perceived level of exposure to drifting ETS. Both questions have been used on previous studies, and as such both were included in this study to allow for comparisons between questions and between this study and previously conducted studies. The responses to the questions are presented in Figures 9 and 10.

Figure 9. Responses to question 14, “How often are you exposed to second-hand smoke in your home? This may include smoke coming in from the outside.”

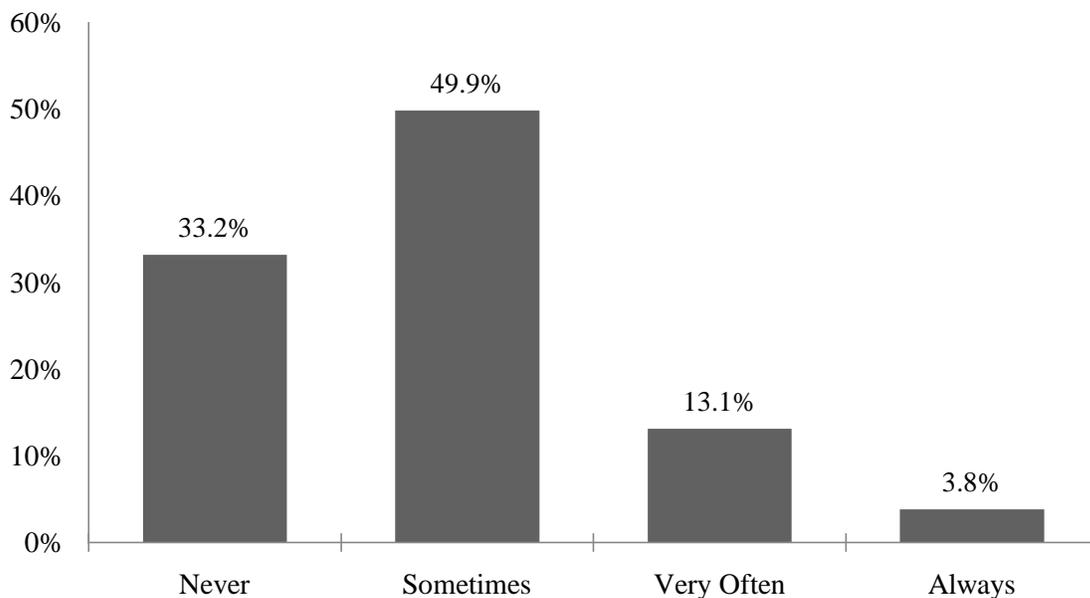
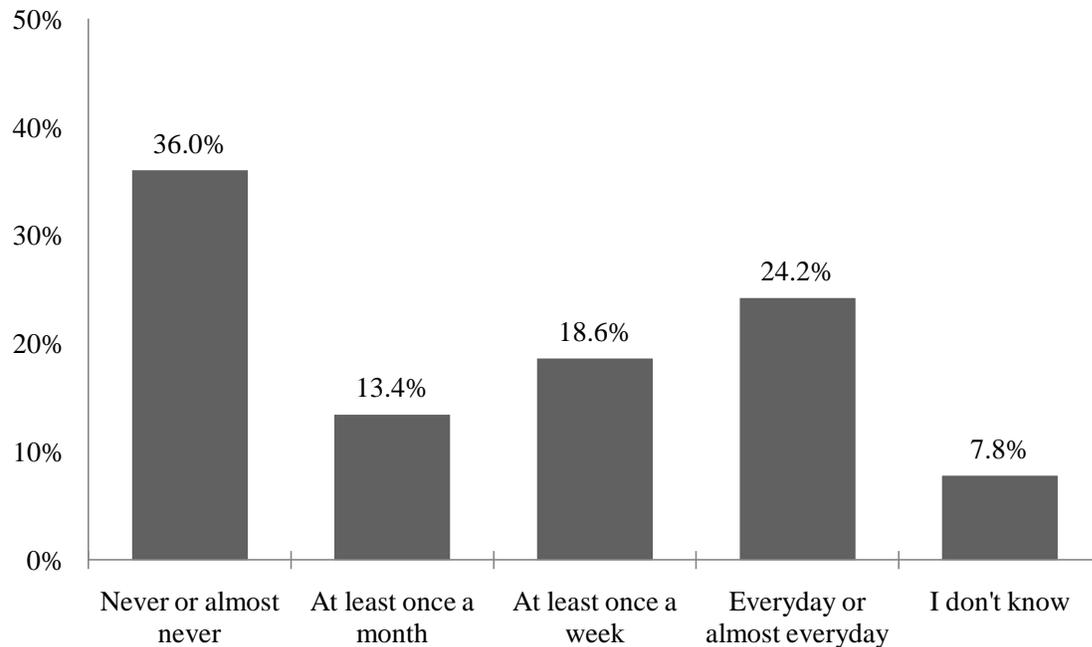


Figure 10. Responses to question 15, “How often have you noticed tobacco smoke odours entering your unit from a source outside of your unit?”



Responses to both questions suggest approximately two thirds of respondents were exposed to drifting ETS in their home. In response to question 14, 33.2% (n=83) indicated they were never exposed to drifting ETS in their unit, and in response to question 15, 36.0% (n=90) indicated they were ‘never or almost never’ exposed to drifting ETS in their unit. The two questions were correlated ($r=0.37$, $p < 0.001$).

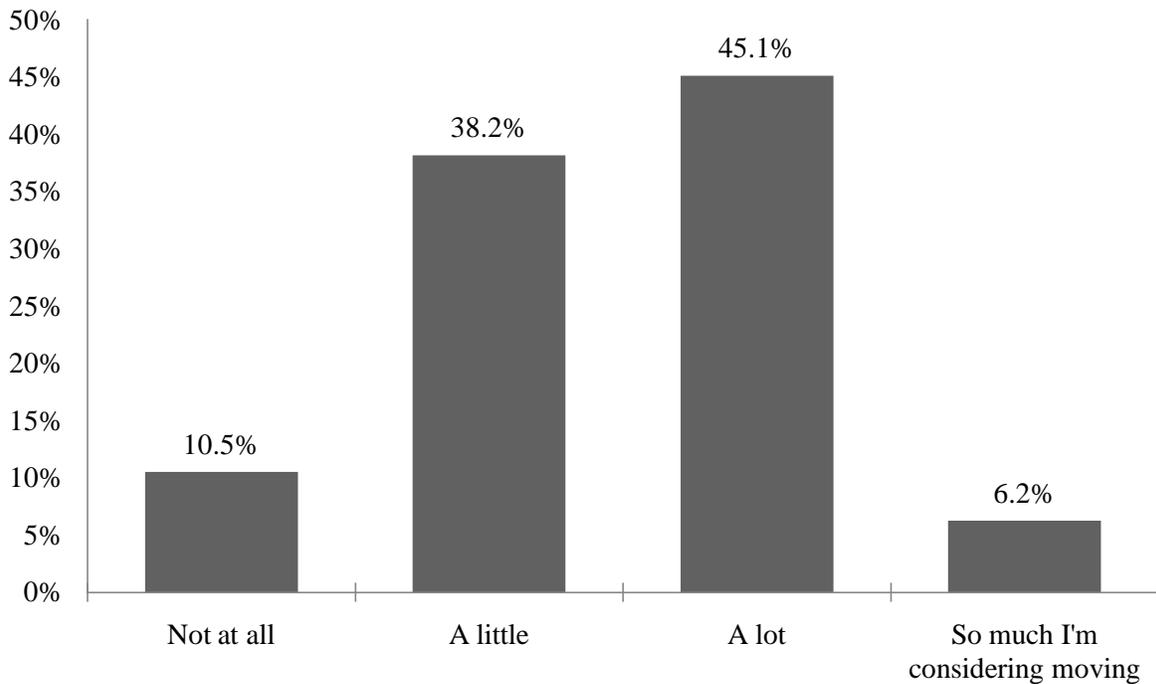
Respondents who indicated they noticed drifting ETS in their home at least once a month were asked to complete the rest of the questions related to their experiences with drifting ETS. Those respondents who said they ‘never or almost never’ noticed drifting ETS in their home (n=90) were asked to skip the remaining questions related to their experiences with drifting ETS.

5.5.2 Bothered by drifting ETS

One hundred and fifty-three respondents indicated they were exposed to drifting ETS in their home at least once a month, and thus were eligible to complete the remaining questions on their experiences with drifting ETS.

Respondents were asked how much the drifting ETS bothered them and those they lived with. The results of this question are presented in Figure 11.

Figure 11. Responses to question 16, “When tobacco smoke odour does enter your unit, how much does it bother you or others in your home?”



Nearly ninety per cent of respondents were bothered at least a little by the drifting ETS that entered their home (89.5%, n=167). Just under half were bothered a lot (45.1%, n=84), and 6.2% (n=12) were bothered so much that they were considering moving.

Univariate logistic regression modelling was utilized to determine which characteristics, if any, predicted an individual would be bothered by drifting ETS, if they were exposed. The results of these analyses can be found in Table 10.

Table 10. Odds ratios for univariate logistic regression models predicting whether individuals are bothered by drifting ETS (compared to individuals who are not bothered)

Variable		Sample (n)	% who are bothered	OR	95% CI	p Value
Youth	No (C)	119	87.4%	1.00	--	--
	Yes	40	96.5%	6.73	0.35 -129.49	0.206
Gender	Male (C)	46	79.3%	1.00	--	--
	Female	113	94.8%	6.79	1.57 – 29.36	0.010
Age	Continuous	159	--	1.01	0.96 – 1.05	0.834
Education	Post secondary education (C)	88	90.4%	1.00	--	--
	No post secondary education	72	88.5%	0.36	0.09 – 1.50	0.160
	No College education (C)	119	88.5%	1.00	--	--
	College education	40	92.9%	1.17	0.23 – 5.85	0.849
	Trades training (C)	151	91.0%	1.00	--	--
	No trades training	8	67.2%	0.51	0.04 - 55.18	0.824
	No university education (C)	120	88.1%	1.00	--	--
	University education	39	93.9%	5.64	0.35 – 90.34	0.222
Income	Above the LICOs (C)	123	93.0%	1.00	--	--
	Under the LICOs	36	77.8%	0.11	0.03 -0.48	0.003
	Ordinal	159	--	2.00	1.87 – 3.39	0.009
Hours home (weekend)	Ordinal	159	--	0.21	0.08 – 0.56	0.002
Hours home (weekday)	Ordinal	159	--	0.82	0.41 – 1.67	0.587
Smoking status	Non-Smoker (C)	141	89.9%	1.00	--	--
	Current Smoker	18	86.7%	1.53	0.13 – 17.90	0.587
Frequency of exposure to drifting ETS	Ordinal	140	--	1.59	0.67 – 3.79	0.293

The results of the univariate analyses suggest gender, income level, low income status and the number of hours spent at home on an average weekend day are significantly associated, at the 0.01 level or below, with being bothered by drifting ETS. The odds an individual would be bothered by drifting ETS increased by a factor of 6.79 if the respondent was female versus if they were male (95% CI: 1.57- 29.36). Those with higher household incomes were also more likely to be bothered by drifting ETS. For each change in income bracket (\$10,000 intervals to \$100,000) the odds the respondent would be bothered by drifting ETS increased by a factor of 2.00 (95% CI: 1.87 - 3.39). If an individual fell below the LICOs as set by Statistics Canada, they were less likely to be bothered by drifting ETS (OR=0.11; 95% CI: 0.03 -0.48) than those who were over the LICOs.

Individuals who spent more time at home on an average weekend day were also less likely to be bothered by drifting ETS. For each move from a lower range of hours spent at home on a weekend day to the next highest range of hours, the odds in favour of being bothered by drifting ETS decreased by a factor of approximately a fifth (OR=0.21; 95% CI: 0.08 – 0.56).

To better understand who is most bothered by drifting ETS, a multivariate logistic regression model was developed. All variables which were significant in the univariate analysis were considered for inclusion in the final model. All variables were retained for the final model, except for low income status. The final model is presented in Table 11. In the final model, females and those with higher incomes continued to be more likely to be bothered by drifting ETS and as an individual increases the amount of time they spent at home on a weekend, they are less likely to be bothered.

Table 11. Final multivariate logistic regression model predicting being bothered by drifting ETS

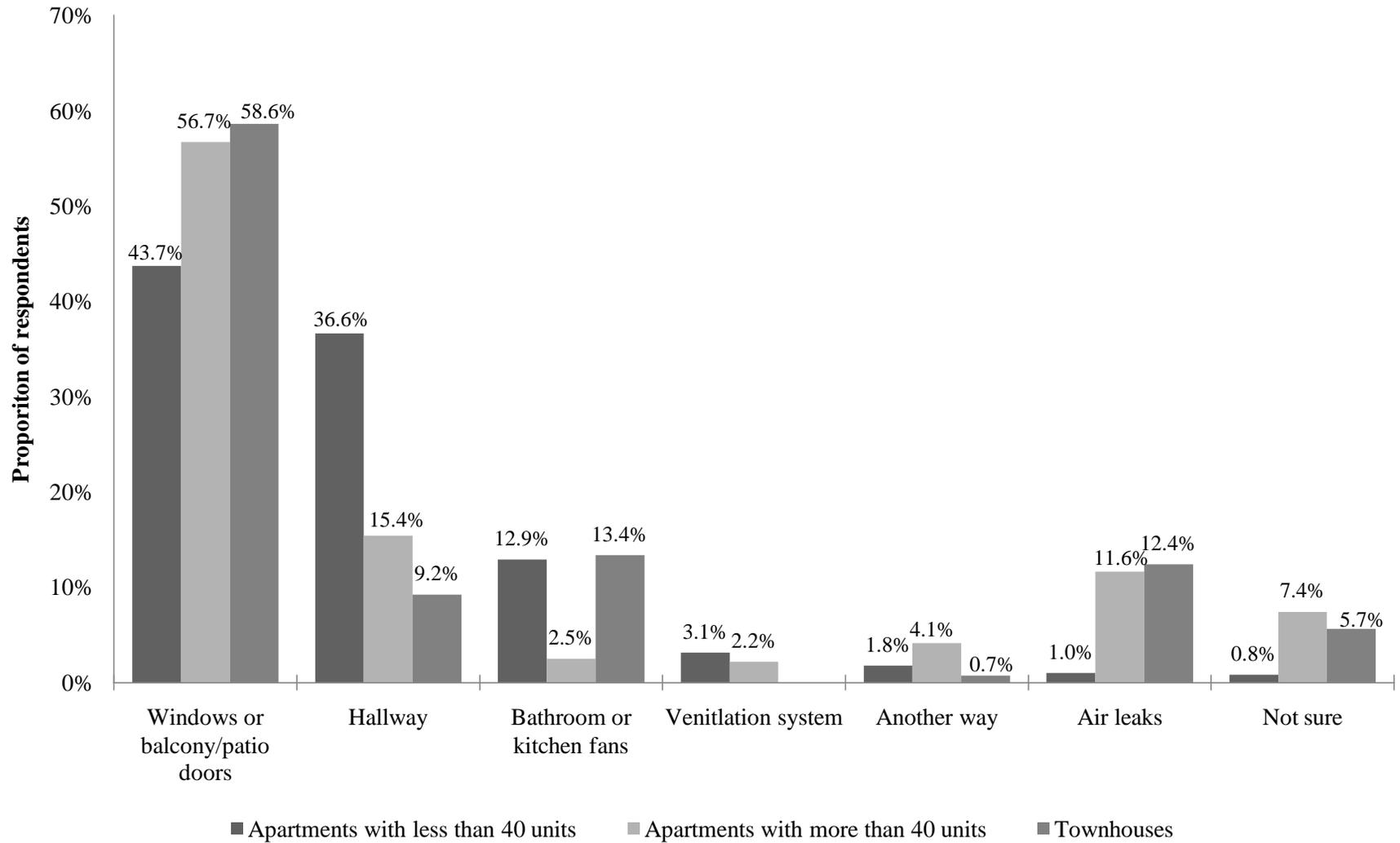
Final model	Model variables					<i>c</i>
			OR	95% CI	<i>p</i>	
Bothered by drifting ETS = <i>f</i>(Smoking in home + Gender + Income + Hours at home on a weekend day)	Gender	Male (C)	1.00	--	--	0.71
		Female	4.48	1.55 – 12.90	0.006	
	Income	Ordinal	1.46	1.07 – 1.999	0.016	
	Hours spent at home on a weekend day	Ordinal	0.55	0.33 -0.93	0.026	

5.5.3 Mode of entry for drifting ETS

Respondents were asked to identify from a list of seven options, including an ‘other’ and a ‘not sure’ option, the most common way they believed ETS entered their unit. Figure 12 illustrates the responses to this question by the respondent’s building type of residence.

Overall, the most commonly identified mode of entry was through the windows or balcony/patio doors when they were open (52.9%, n=103). This was the most common mode of entry identified by residents of all three building categories. Nine respondents (4.6%) suggested other ways the ETS entered their unit. These included from the front porch (a townhouse tenant), in the carpets from previous tenants, and from the staircase.

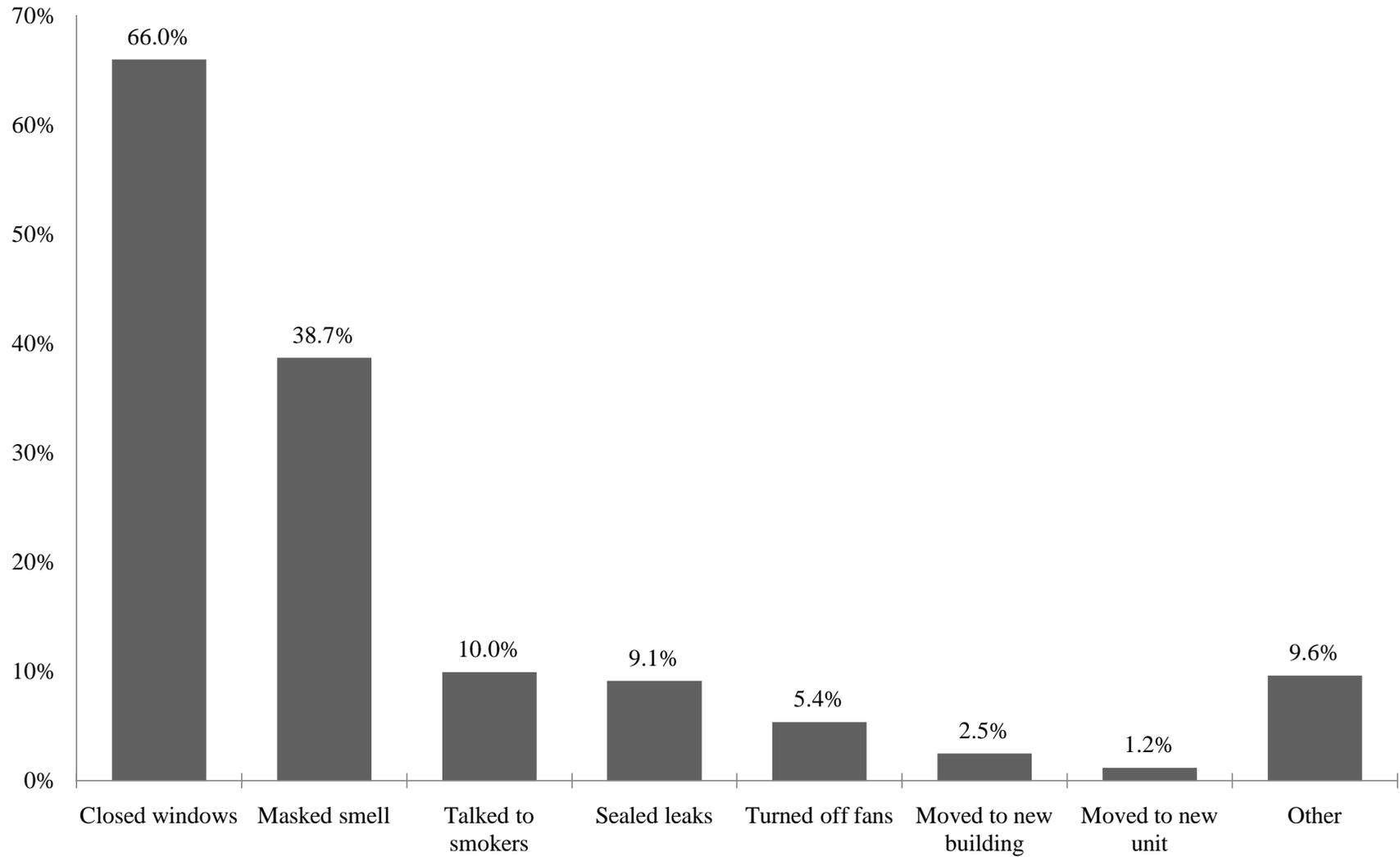
Figure 12. Proportion of respondents who identified each area as the most common point of entry for drifting ETS, by building type and size



5.6 Actions Taken in Response to Drifting ETS Exposure

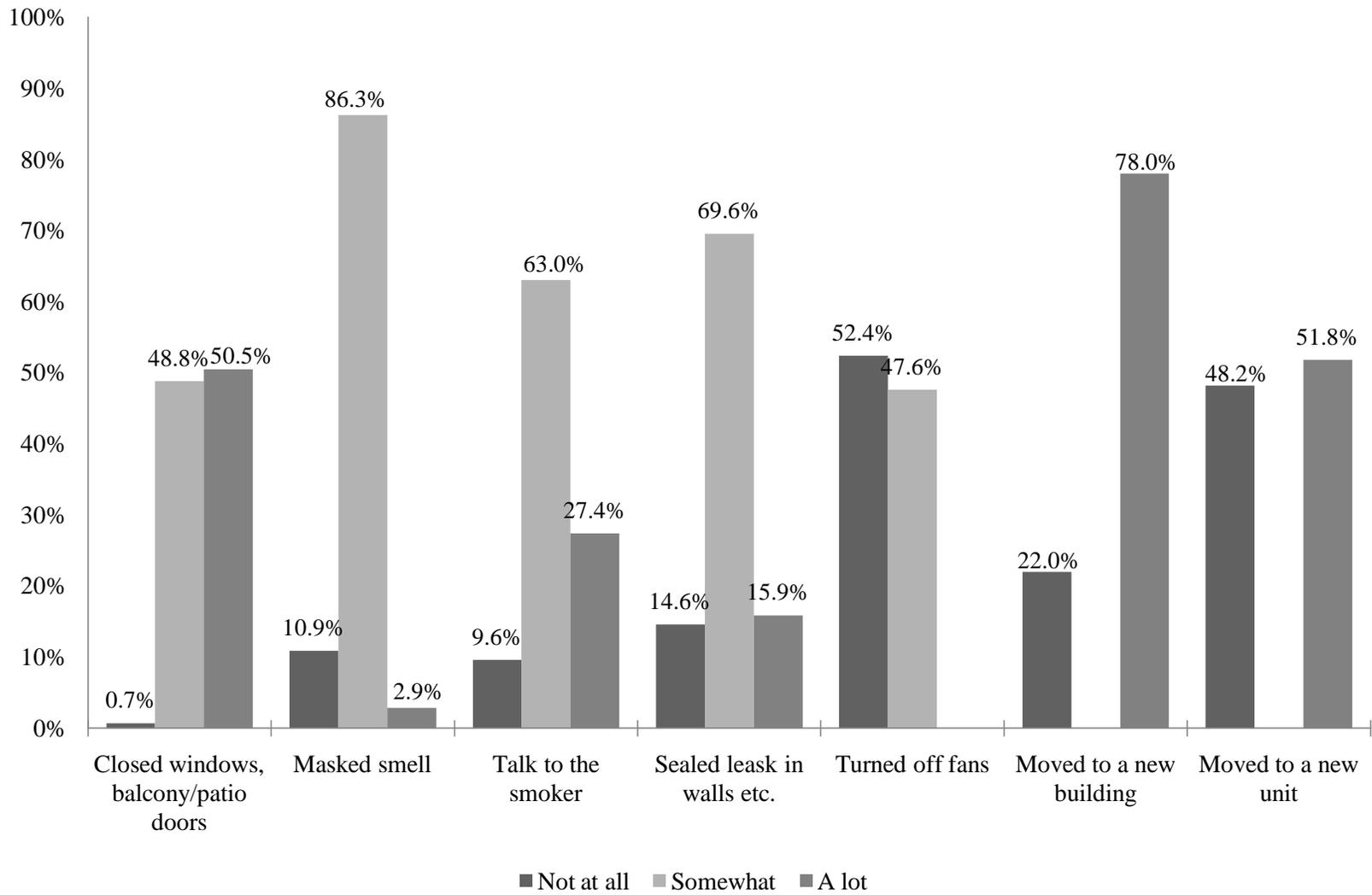
To determine if respondents had taken any action in response their exposure to drifting ETS respondents were asked if they had taken each of eight possible actions. Overall, 88.9% (n=141) of respondents indicated they had taken at least one of the actions in response to the drifting ETS. The most common actions taken were, closing windows and/or balcony/patio doors (65.95%, n=119), trying to mask the smell with air freshener (38.63%, n=69) and talking to the smokers (9.96%, n=18). Figure 13 illustrates the proportion of respondents who took each action.

Figure 13. Proportion of respondents indicating ‘yes’ they had taken the potential action in response to drifting ETS in their unit



Respondents who indicated they had taken a specific action in response to the drifting ETS were asked to rate the success of that particular action in terms of how much it helped on a three point scale (not at all, somewhat, a lot). Figure 14 presents the responses to this question. The actions that were perceived by respondents as being most successful (somewhat or a lot helpful) were, closing the windows and/or balcony/patio doors (98.1%, n=104), talking to the smokers (90.4%, n=15) and, masking the smell with air freshener (89.1%, n=54). The least successful action was turning off the fans (52.4%, n=4).

Figure 14. The perceived success of actions taken by respondents in response to their exposure to drifting ETS



A dichotomous variable was created to separate those who took at least one action in response to drifting ETS (at least one ‘yes’ response to the eight actions listed in question 18), and those who took no actions. Univariate logistic regression models were developed to investigate if any of the other descriptive variables of individuals predicted taking action. The results of these analyses are found in Table 12.

Table 12. Odds ratios for univariate logistic regression models predicting an individual will take at least one action in response to drifting ETS (compared to those who did not take any actions)

Variable		Sample (n)	% who took an action in response to the drifting ETS	OR	95% CI	p value
Youth	None (C)	118	89.5%	1.00	--	--
	One or more	40	87.4%	0.82	0.27 – 2.46	0.716
Gender	Male (C)	46	78.0%	1.00	--	--
	Female	113	93.4%	4.02	1.45 – 11.19	0.008
Age	Continuous	158	--	1.00	0.97 – 1.03	0.863
Hours home (weekend)	Ordinal	158	--	0.61	0.37 – 1.00	0.051
Hours home (weekday)	Ordinal	158	--	0.94	0.55 – 1.61	0.832
Education level	Ordinal	158	--	1.11	0.89 – 1.37	0.361
	Post-secondary education (C)	87	92.2%	1.00	--	--
	No post-secondary education	72	85.1%	0.48	0.17 – 1.33	0.159
	Not college (C)	118	88.0%	1.00	--	--
	College	40	92.0%	1.56	0.44 – 5.53	0.490
	Not University (C)	119	88.3%	1.00	--	--
	University	39	91.0%	1.33	0.39 – 4.54	0.653
Income	Above LICOs (C)	122	83.3%	1.00	--	--
	Under LICOs	26	74.1%	0.21	0.07 -0.58	0.003
	Continuous	158	--	1.07	0.84 – 1.37	0.572
Smoking	Non-Smoker (C)	140	89.0%	1.00	--	--
	Smoker	18	89.0%	0.99	0.21 -4.80	0.999

Gender and low income status were the only variables which were significantly associated with taking actions in response to drifting ETS at the 0.05 level. The odds an individual would take at least one action in response to drifting ETS increased by a factor of 4.02 if the respondent was a female ($p=0.008$). Those who were under the LICOs as set by Statistics Canada and were considered low income were less likely to take any actions in response to drifting ETS compared to those who were not in the low income category ($OR=0.21$; $p=0.003$).

When both significant variables were entered into a multivariate logistic regression model, both remained significant. The final model is presented in Table 13.

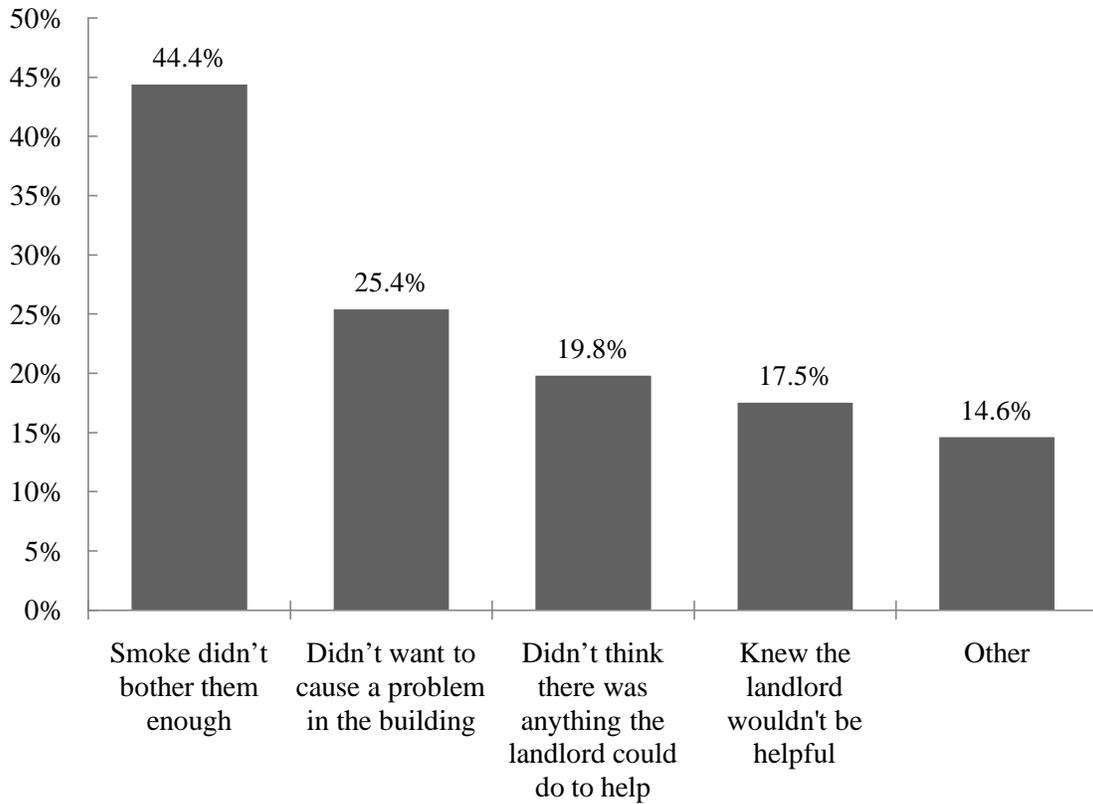
Table 13. Multivariate logistic regression model predicting taking at least one action in response to drifting ETS

Final model	Model variables				<i>c</i>	
			OR	95% CI		<i>p</i>
Actions in response to ETS = $f(\text{Gender} + \text{Low income status})$	Gender	Male (C)	--	--	0.006	0.58
		Female	4.54	1.54 – 13.4		
	Low income status	Over LICOs (C)	1.00	--	--	
		Under LICOs	0.18	0.06 – 0.54	0.002	

5.6.1 Spoke with landlord

Respondents who indicated they had noticed drifting ETS in their unit at least once a month were asked if they had spoken to their landlord or building representative about the issue. Eighty-six per cent of respondents ($n=158$) said they had not spoken with their landlord. Respondents who indicated they had not spoken to their landlord about the issue of drifting ETS were asked to select from a list of five reasons, including an ‘other’ option, why they had not. The proportion of respondents who identified each reason can be found in Figure 15.

Figure 15. Responses to why respondents did not speak with their landlord or building representative about the issue of drifting ETS in their unit



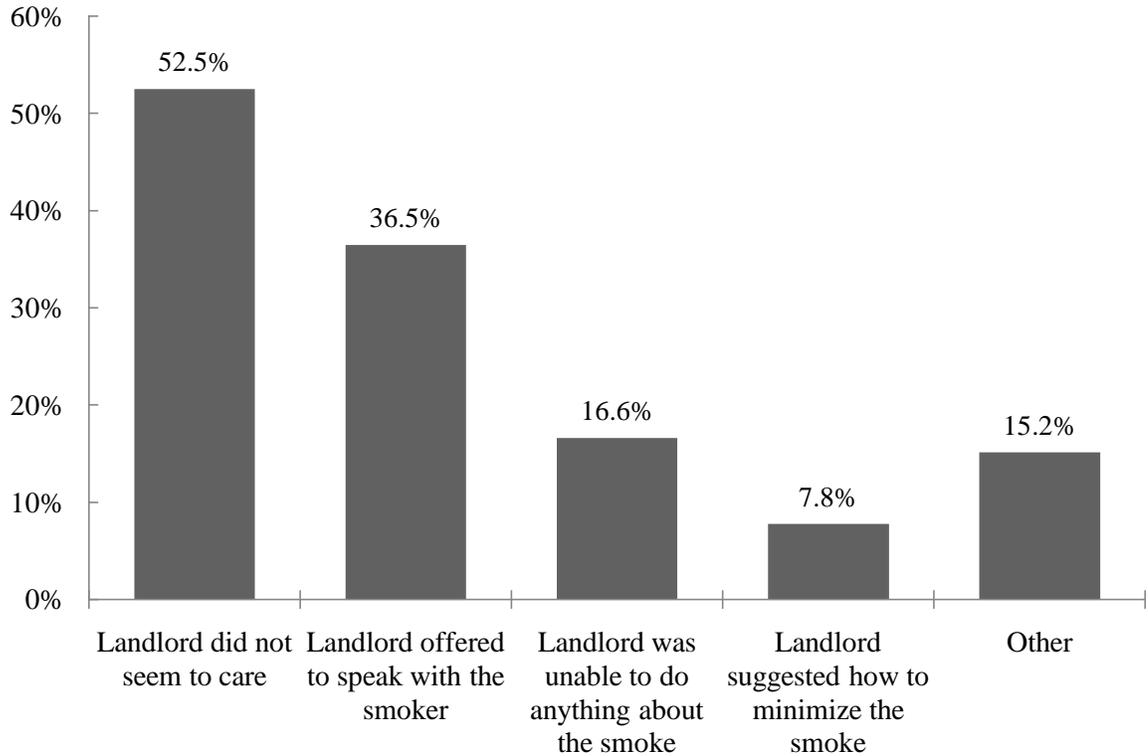
Note: Respondents could select multiple responses to this question and therefore the percentages total more than 100%

Most commonly, respondents indicated the smoke did not bother them enough to do anything about it (44.4%, n=70). Other responses provided by respondents as reasons why they did not speak with their landlord included: (1) they were not sure who was responsible for the smoke, (2) individuals should be allowed to smoke in their home or it was their right to smoke, (3) the building wasn't managed well and therefore speaking with a landlord would have no impact, (4) they were moving soon and, (5) they couldn't ask others not to smoke inside if they were a smoker themselves.

Fourteen per cent of respondents did report speaking with their landlord about the issue of drifting ETS (n=25). Those respondents were asked how their landlord reacted to their conversation. Four

options were given, plus an 'other' response option. The results of this question are presented in Figure 16.

Figure 16. Tenant's perceptions of their landlord's response to their complaints about drifting ETS



Note: Respondents were permitted to select more than one response option and therefore the percentages total more than 100%

The most common reaction from landlords was that they did not seem to care, or they did not think it was a very big issue (52.5%, n=13). Respondents also indicated their landlords commonly said that they could not or would not tell individuals they couldn't smoke in their own apartment. One respondent indicated their landlord did place a seal under the door in an attempt to stop the smoke from entering the unit.

5.6.2 Spoke with others

Respondents were more likely to speak with others regarding the drifting ETS than they were to speak with their landlords. Forty-one per cent (n=76) of respondents indicated they had spoken with at least one other individual regarding the issue of drifting ETS in their unit. The most common individuals respondents said they spoke with were those around them, 77.2% (n=58) spoke with family and friends and 35.7% (n=27) spoke with other tenants. Very few people spoke with the public health department (1.7%, n=1) or with government officials (1.8%, n=2) and no one said they spoke with advocacy groups.

5.7 Experiences with Smoking Restrictions

In order to explore the number of smoke-free rentals available currently in Kitchener, respondents were asked to consider the current smoking restrictions in their building/complex. All respondents (n= 288) were asked to respond to these questions. Included in the list of areas the respondents were asked about were both those that fall under the Smoke-Free Ontario (SFO) Act and those areas where there are no provincial or municipal regulations in place regarding smoking. The results of this question are presented in Table 14.

Table 14. Perceived smoking restrictions in place in the tenant’s building/complex by building area

Location	Regulated under the Smoke-free Ontario Act?	Smoking is not allowed % (n)	Smoking is allowed % (n)
All residential units	No	15.8% (44)	84.2% (235)
Balconies or Patios	No	4.6% (11)	95.4% (227)
Ground level parking lot	No	5.8% (11)	94.2% (178)
Outside the building entrance	No	4.9% (11)	95.1% (215)
On the building grounds	No	4.3% (11)	95.7% (245)
Hallways	Yes	85.9% (158)	14.1% (26)
Laundry room	Yes	92.4% (158)	7.6% (13)
Lobby	Yes	91.6% (131)	8.4% (12)
Party rooms	Yes	100% (49)	0% (0)
Gyms or indoor pool areas	Yes	84.6% (33)	15.4% (6)
Underground parking lot	Yes	42.6% (26)	57.4% (35)

Note: Not applicable responses are not included in the data presented here, this accounts for the differences in sample sizes

Perceived smoking restrictions, other than those imposed by the Smoke-free Ontario Act, were not overly prevalent in the Kitchener area. Forty-four of the 279 respondents (15.8%) indicated smoking was banned in all units within their building/complex. These respondents live in thirty-two unique properties. This does not suggest, however, that these thirty-two properties are in fact smoke-free. There was little agreement amongst those living in the buildings regarding the smoking restrictions in place. Within the buildings where at least one respondent suggested the units were smoke-free, only one building had complete agreement on this regulation (two individuals both indicating it was smoke-free in all units). All other buildings either only had one respondent, and therefore it is unknown if other tenants would perceive the regulations in the same way (n=5), or there was disagreement between respondents within the building on the regulation (n=26). In buildings where tenants disagreed, in all but one building, the majority of respondents felt smoking was permitted in all units. In one building five respondents indicated smoking was not permitted and only one

suggested smoking was permitted in units. Overall, it is clear there is confusion among tenants on the regulations in place in their building.

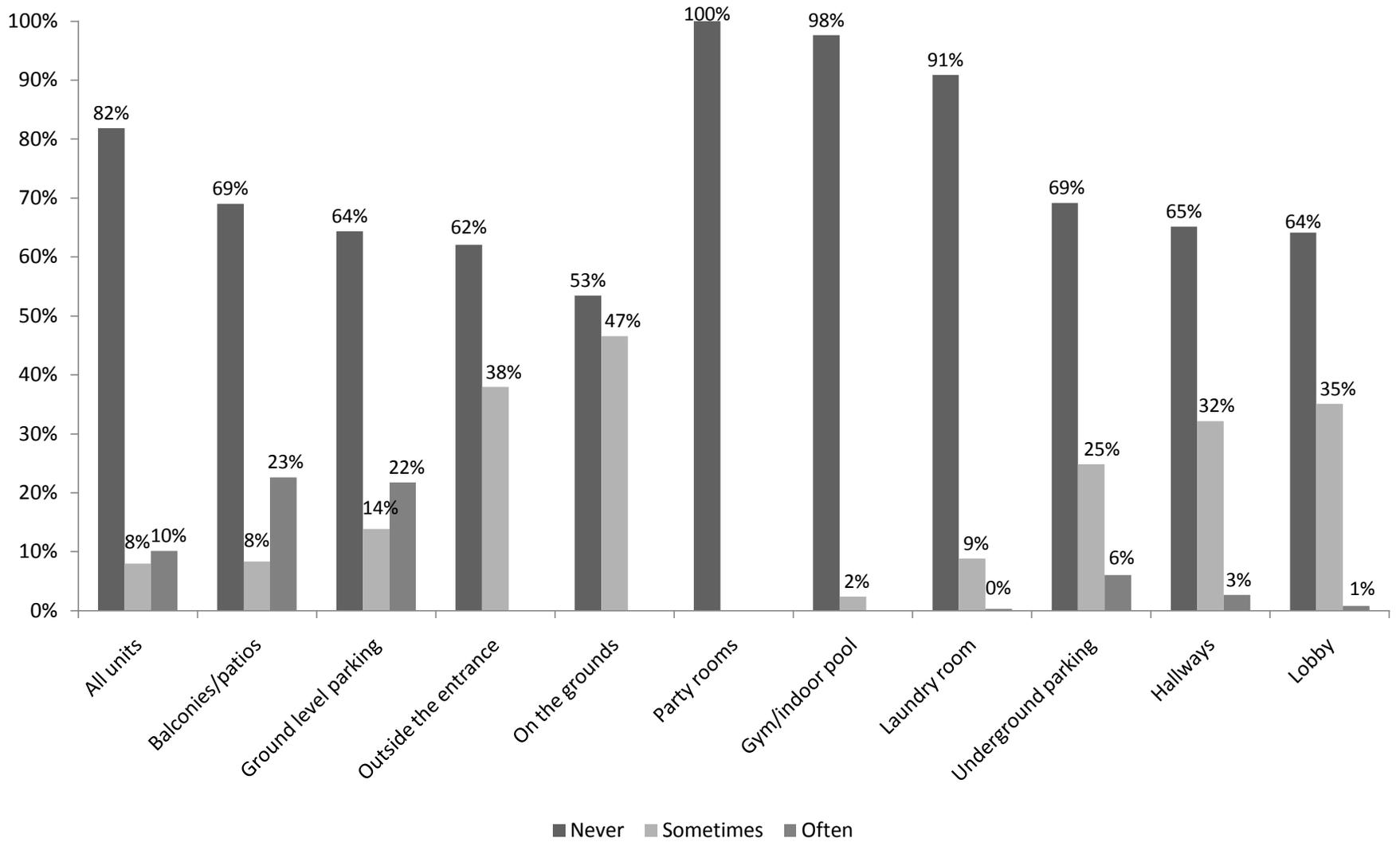
5.7.1 Awareness of the Smoke-free Ontario Act

The overall knowledge of the Smoke-Free Ontario Act was high in this population. Over ninety per cent of respondents knew smoking was banned in laundry rooms, lobbies and party rooms. Slightly fewer respondents knew of the ban on smoking in hallways, with 85.9% (n=158) of respondents indicating smoking was not permitted in that area of the building and of the ban in gyms and indoor pool areas where 84.6% (n=33) knew smoking was not permitted in that area of the building. The lowest level of knowledge was in regards to underground parking lots where only 42.6% (n=26) of individual respondents knew smoking was not permitted in that area.

5.7.2 Perceived enforcement of smoke-free areas

It is understood that even though smoking may be banned in some areas, this ban will likely not be enforced in the same way, or with the same strength, within each building. Respondents who indicated smoking was banned in one of the areas discussed were then asked how often, over the last three months, they had noticed individuals smoking in that area with three response options, 'never', 'sometimes' and 'often'. The results of this question can be seen in Figure 17.

Figure 17. Perceived frequency of smoking in areas of the building where smoking is not permitted



In the areas associated with the Smoke-free Ontario Act, individuals who correctly identified that smoking was not permitted in these areas perceived high compliance in party rooms, gym and indoor pool areas and the laundry room. Perceived compliance was lower in underground parking lots, hallways and lobbies with between 31% and 36% of respondents noting individuals smoking in those areas sometimes or often.

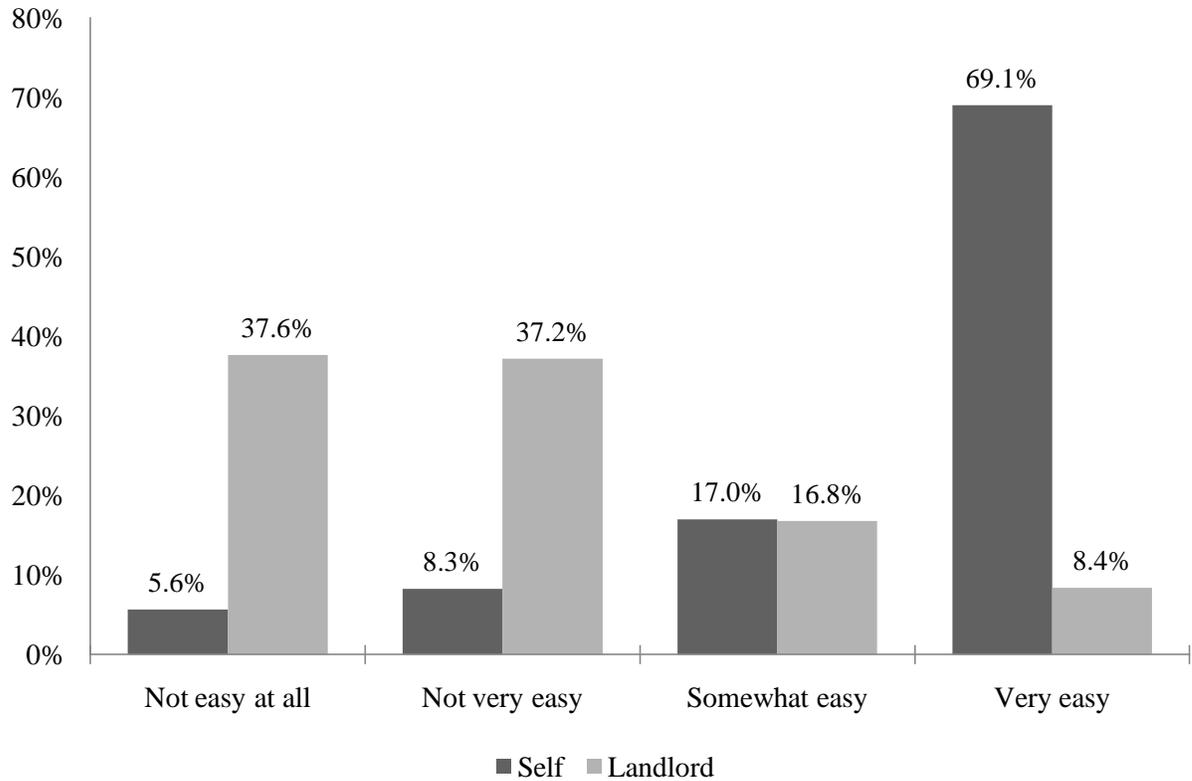
Of the respondents who indicated smoking was banned in the units in their building, 18.16% (n=6) noticed individuals smoking at least sometimes over the past three months. Outdoor locations also seemed to have higher levels of smoking where it was not permitted. Smoking was seen at least sometimes where it should not have been occurring on balconies/patios (30.96%, n=3), in parking lots (35.63%, n=5) outside the building entrance (37.93%, n=4), and on the grounds of the building (46.57%, n=3).

5.8 Opinions on Smoke-Free Housing

All respondents were asked their opinions on various issues related to smoke-free housing including their perceptions of the enforceability of a smoke-free regulation, their desire for smoke-free housing and what, if anything, they would be willing to do or sacrifice to live in a smoke-free unit.

Respondents were asked to consider how easily they felt a regulation could be enforced if smoking was not allowed anywhere in the building. When respondents were asked how easy it would be for them to enforce the regulation within their own unit, the majority felt it would be manageable with 86.1% (n=282) indicating it would be 'easy' or 'very easy' to enforce the regulation. They felt differently however when thinking about their landlord's role in enforcement. When they were asked how easy it would be for their landlord to enforce the rule, 74.8% (n=209) of respondents felt it would be 'not easy at all' or 'not very easy' for the landlord to enforce. Figure 18 presents the responses to both questions.

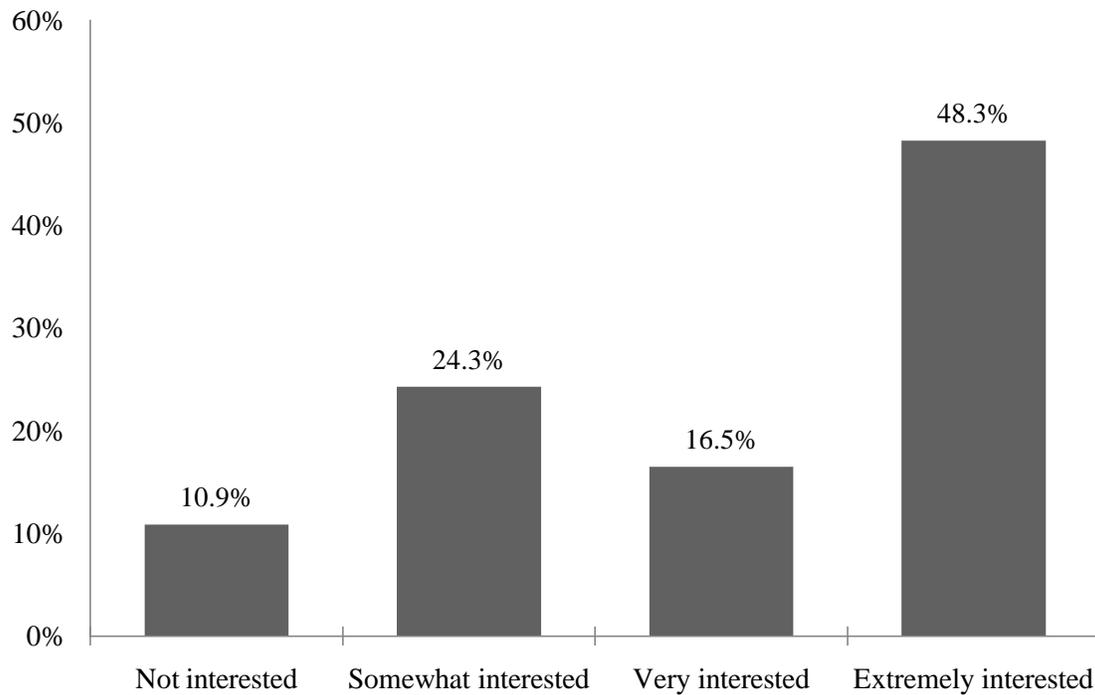
Figure 18. Perceived ease of enforcement of a smoke-free regulation, by landlord and tenant if smoking was not allowed anywhere in the building



5.8.1 Market for smoke-free housing

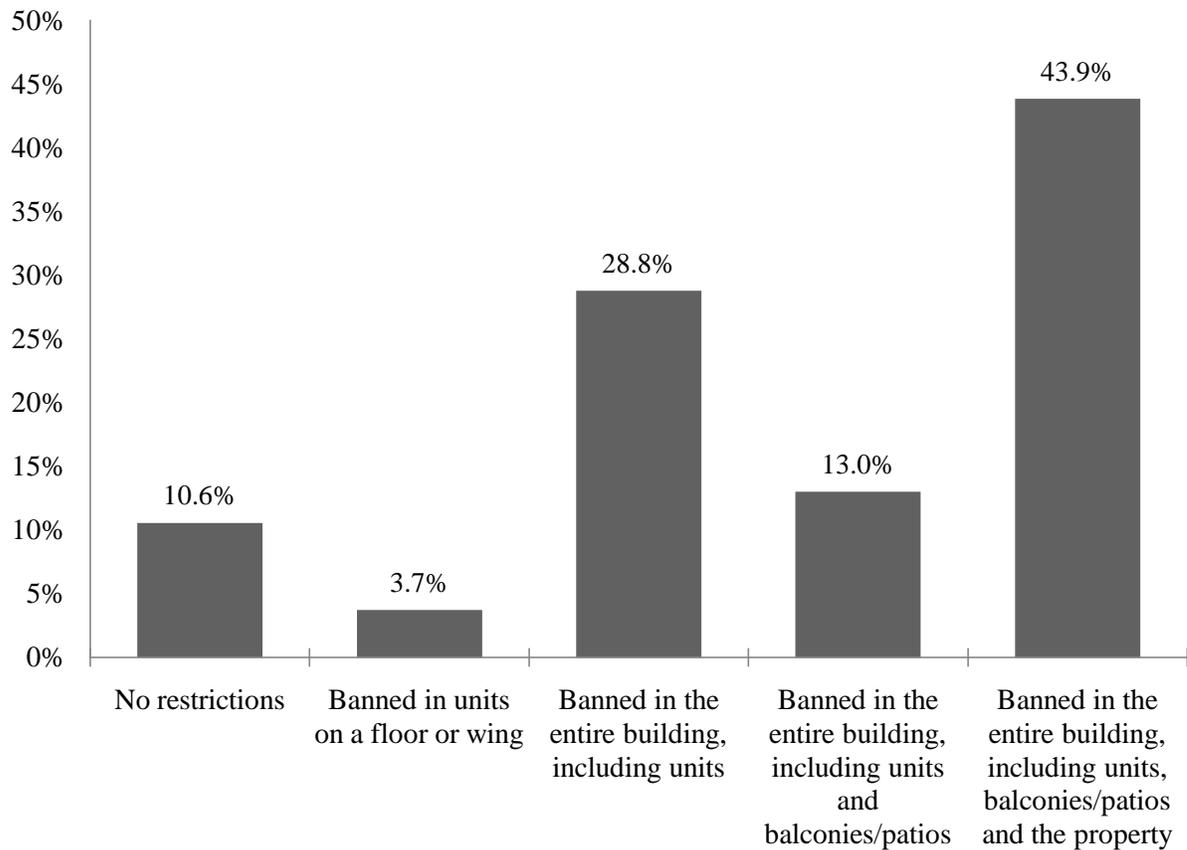
The potential market for smoke-free housing in Kitchener was measured in two ways, respondents' interest in smoke-free housing, and their preferred building to live in, based on varying smoking restrictions. The level of interest respondents had in living in a building where smoking was not permitted anywhere is presented in Figure 19. The majority of tenants, 89.1% (n=255), were at least somewhat interested in living in a building where smoking was not permitted and 48.3% (n=137) were extremely interested.

Figure 19. Respondents' level of interest in living in a smoke-free building



Respondents were also asked which building they would prefer to live in, when provided with a list of five buildings with varying levels of smoking restrictions ranging from no restrictions at all, to severe restrictions banning smoking everywhere within the building and on the grounds. Figure 20 illustrates respondent's preferences. Forty-four per cent (n=122) were most interested in living in the building with the most severe smoking restrictions, a building where smoking was banned everywhere inside the building and on the entire grounds. Only 10.6% of respondents preferred to live in a building with no smoking restrictions at all.

Figure 20. Preferred building of residence based on level of smoking restrictions in place



Based on the level of interest in smoke-free housing, and the respondents preferred buildings, there is likely a strong market for smoke-free housing in the Kitchener area. To gain insight into the characteristics which predicted membership in this market, a series of univariate logistic regression models were developed. Potential membership in the market for smoke-free housing was defined as answering ‘somewhat’, ‘very’ or ‘extremely’ interested when asked how interested they would be in living in a building where smoking is not allowed anywhere. Those who said they would ‘not be interested’ formed the comparison group, those who would not be members of a smoke-free rental housing market. The results of these analyses are presented in Table 15.

Table 15. Odds ratios for univariate logistic regression models predicting potential membership in a smoke-free rental housing market (compared to those who would not be members of a smoke-free rental housing market)

Variable		Sample (n)	% interested in smoke-free rental housing	OR	95% CI	p value
Gender	Male (C)	115	90.1%	1.00	--	--
	Female	173	88.4%	0.84	0.39 – 1.82	0.657
Youth	None in the home	228	89.3%	1.00	--	--
	One or more in the home	59	88.4%	0.91	0.37 – 2.25	0.837
Age Group	Continuous	288	--	0.99	0.97 – 1.01	0.181
	Over 30 years (C)	141	84.9%	1.00	--	--
	Under 30 years	147	93.1%	2.39	1.09 – 5.27	0.031
Hours at home (weekend)	Ordinal	288	--	0.66	0.46 - 0.95	0.026
Hours home (weekday)	Ordinal	288	--	0.61	0.42 – 0.90	0.013
Education	Ordinal	288	--	1.13	0.96 – 1.33	0.160
	Post-secondary (C)	159	88.0%	1.00	--	--
	No post-secondary	129	90.5%	1.30	0.61 – 2.79	0.501
	No trades education (C)	267	90.2%	1.00	--	--
	Trades education	21	75.0%	0.33	0.11 – 0.99	0.048
	No College (C)	217	91.3%	1.00	--	--
	College	70	82.4%	0.45	0.21 – 0.98	0.044
	No University (C)	220	86.5%	1.00	--	--
	University	68	97.4%	5.76	1.24 – 26.72	0.025
Income	Not Low Income (C)	239	87.5%	1.00	--	--
	Low Income	49	97.5%	5.62	0.83 – 38.08	0.077
	Continuous	288	--	1.10	0.91 – 1.32	0.330
Smoking status	Smoker (C)	62	59.1%	1.00	--	--
	Non-Smoker	225	97.6%	27.82	10.31-75.11	<0.001
Bothered by drifting ETS	Not bothered (C)	20	74.2%	1.00	--	--
	Bothered	167	96.5%	9.56	2.52 -36.27	0.001

Variable		Sample (n)	% interested in smoke-free rental housing	OR	95% CI	<i>p</i> value
Took actions in response to drifting ETS	No (C)	17	93.7%	1.00	--	--
	Yes	141	98.1%	3.47	0.35 – 34.00	0.286
Risk of fire due to smoking indoors	No or little risk (C)	36	63.8%	1.00	--	--
	Increased risk	224	94.3%	9.41	3.88 – 22.81	<0.001
Health issues related to ETS	No (C)	190	87.5%	1.00	--	--
	Yes	95	95.0%	2.70	0.98 – 7.48	0.056

Age group, time spent at home, education, smoking status, being bothered by drifting ETS and perceived risk of fire associated with indoor smoking were significant predictors of an interest in smoke-free housing at the 0.05 level. Individuals under 30 years of age were more likely to be interested in living in smoke-free rental housing than individuals over the age of 30 years (OR=2.39; 95% CI: 1.09 – 5.27). Time spent at home, both on weekend days and weekdays, was negatively associated with an interest in smoke-free housing. Specifically, for each increase in category of time spent at home on a weekend, the odds in favour of being interested in smoke-free housing decreased by a factor of 0.66 ($p=0.026$), and for each increase in category of time spent at home on a weekday, the odds in favour of being interested in smoke-free housing decreased by a factor of 0.61 ($p=0.013$).

Education level also played a role in predicting interest in smoke-free rental housing. Individuals with a college level education or trades level education were less likely to be interested in smoke-free rental housing. Those with trades level education had 0.33 ($p=0.048$) times the odds of being interested than those without trades level education, and those with a college education had 0.45 times the odds ($p=0.044$) of being interested than those without a college education. Alternatively, those with university level education were more likely to be interested in smoke-free rental housing. The odds of being interested in smoke-free housing increased by a factor of 5.76 ($p=0.025$) for those with a university level education, compared to those without. Not surprisingly, those who were bothered by drifting ETS were 9.56 ($p: 0.001$) times more likely to be interested in smoke-free rental housing than those who were not bothered and those who believed smoking indoors increased the risk of fire were 9.41 times more likely to be interested than those who did not think smoking indoors increased the risk of fire ($p < 0.001$). Non-smokers had much higher odds of being interested in smoke-free rental housing than smokers. The odds an individual would be interested in smoke-free housing increased by a factor of 27.82 ($p < 0.001$) for non-smokers compared to smokers.

A multivariate logistic regression model was developed to predict the likelihood that an individual would be interested in living in a smoke-free building. The variables that were significant as listed in Table 15 were considered for potential inclusion in the final model. The final model is presented in Table 16.

In the final model, age, the average number of hours spent at home on a weekend day, smoking status and perceived risk of fire due to smoking remained significant. Individuals under the age of thirty, non-smokers and those who perceived smoking indoors as a fire risk had increased odds of being interested in smoke-free housing, while for each additional level of hours spent at home on a weekend day the odds an individual would be interested in smoke-free housing decreased

Table 16. Final multivariate logistic model predicting an interest in smoke-free rental housing

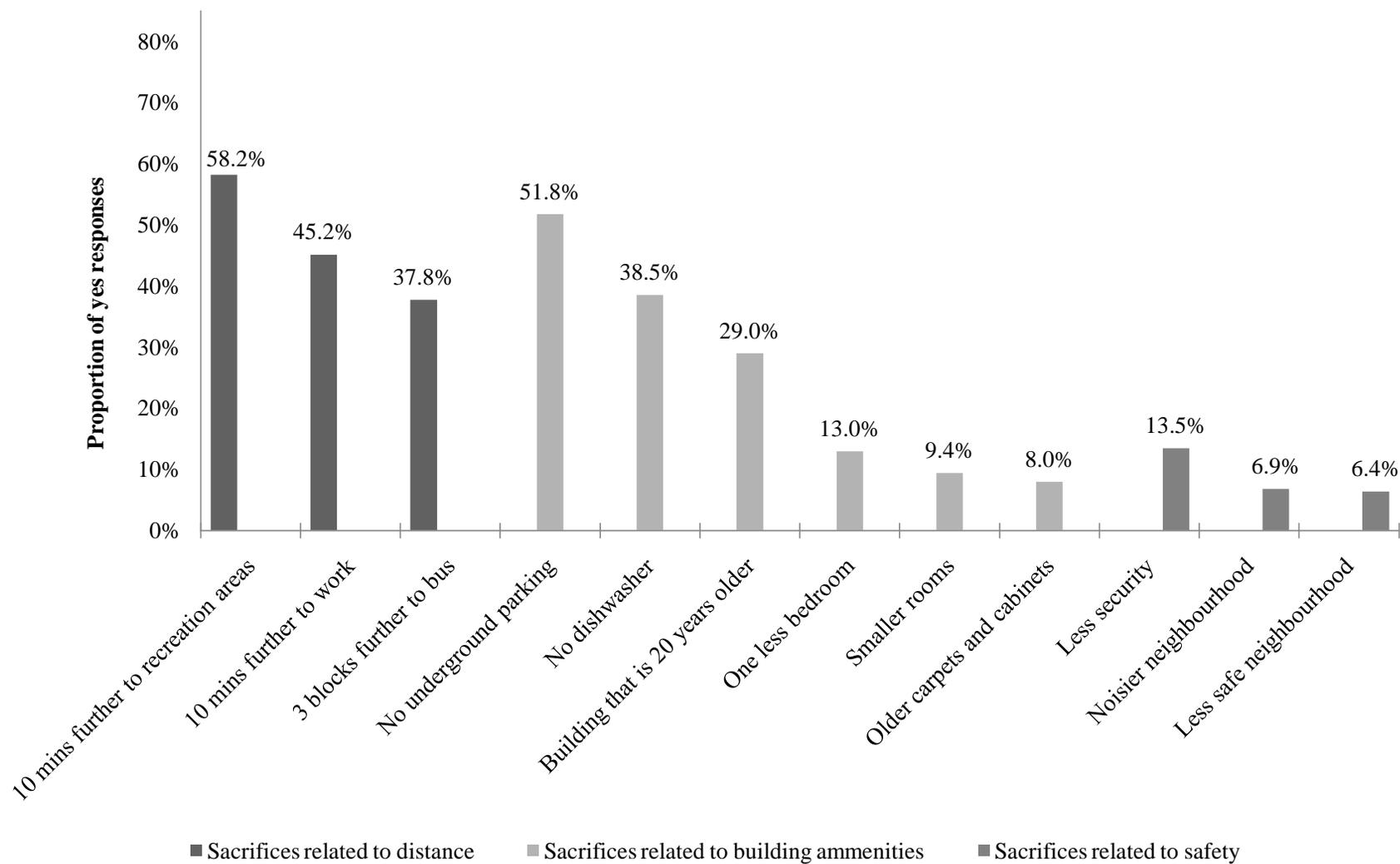
Final model	Model variables					<i>c</i>	
			OR	95% CI	<i>p</i>		
Interest in Smoke-Free Housing = $f(\text{Age} + \text{Hours home on an average weekend day} + \text{Smoking Status} + \text{Perceived risk of fire due to smoking indoors})$	Age	Over 30 years (C)	1.00	--	0.036	0.92	
		30 years or younger	4.28	1.10 – 16.70			
	Hours home on an average weekend day	Ordinal	0.36	0.19 – 0.69	0.002		
	Smoking Status	Smoking	Smoker (C)	1.00	--	--	
		Status	Non-Smoker	67.62	16.35 – 279.60	<0.001	
Perceived risk of fire due to smoking indoors)	Perceived risk of fire due to smoking indoors	No or little Risk(C)	1.00	--	--		
		Risk	19.20	4.78 – 77.08	<0.001		

5.8.2 Sacrifices for smoke-free housing

To determine if respondents were willing to give up anything or do anything differently to live in a smoke-free building, they were asked, “If you were planning to move, would you be willing to do the following to live in a building that was designated as smoke-free? (Assume the apartments are the same in every other way; select one answer for each)” (Question 31). A list of twelve possible sacrifices were given, and they were asked to select a response from four options, (1) no, (2) maybe,

(3) yes or, (4) not applicable. Figure 21 presents the proportion of respondents who indicated 'yes' to the potential sacrifice.

Figure 21. Proportion of respondents who indicated ‘yes’ they would be willing to make the sacrifice to live in a smoke-free building



Overall, 83.5% (n=240) of respondents were willing to make at least one of the listed sacrifices to live in a smoke-free building. Sixty-nine per cent (n=200) of respondents were willing to make at least one of the sacrifices related to distance and 69.4% (n=201) were willing to make at least one sacrifice related to building amenities. Fewer respondents were willing to make sacrifices related to safety (17.4%, n=50).

Most commonly individuals were willing to drive further to recreation areas (58.2%) and live in a building without underground parking (51.8%).

To determine if some individuals were more likely to make a sacrifice than others, univariate logistic regression models were created to determine whether there were any significant relationships between a willingness to make a sacrifice for smoke-free housing and any other variables.

Willingness to make a sacrifice was defined as answering 'yes' to at least one of the sacrifices listed in question 31. The results of these analyses are found in Table 17.

Table 17. Odds ratios for univariate logistic regression models predicting an individual is willing to make at least one sacrifice for smoke-free rental housing (compared to individuals who are not willing to make sacrifices for smoke-free rental housing)

Variable		Sample	% willing to make a sacrifice	OR	95% CI	p value
Hours home (weekday)	Ordinal	288	--	1.04	0.74 – 1.45	0.836
Hours home (weekend)	Ordinal	288	--	1.14	0.87 – 1.51	0.342
Education	No university education (C)	220	81.7%	1.00	--	--
	University education	68	89.4%	1.90	0.81 – 4.41	0.138
	Post-secondary education (C)	159	76.5%	1.00	--	--
	No post-secondary education	129	92.1%	3.60	1.72 – 7.54	0.001
	No college (C)	216	87.5%	1.00	--	--
	College	70	71.2%	0.35	0.18 – 0.68	0.002
	No trades training (C)	267	85.9%	1.00	--	--
	Trades training	21	51.8%	0.18	0.07 - 0.45	<0.001
Smoking status	University or high school (C)	197	91.2%	1.00	--	--
	College or trades training	91	66.8%	0.19	0.10 – 0.38	<0.001
Smoking status	Non-smoker (C)	225	88.2%	1.00	--	--
	Smoker	62	66.6%	0.27	0.14 – 0.52	<0.001
Interest in smoke-free housing	Not interested (C)	31	47.9%	1.00	--	--
	Interested	253	88.0%	2.09	1.55 – 2.84	<0.001
Personal smoking policies in the home	Smoking permitted or partially smoke-free (C)	52	72.2%	1.00	--	--
	Completely smoke-free	236	86.0%	2.35	1.16 – 4.78	0.018
Youth	No youth in the home (C)	229	83.5%	1.00	--	--
	Youth in the home	59	83.5%	1.01	0.47 – 2.17	0.990
Gender	Male (C)	115	81.1%	1.00	--	--
	Female	173	85.0%	1.32	0.71 – 2.48	0.382
Income	Above the LICOs (C)	239	82.2%	1.00	--	--
	Under the LICOs	49	89.5%	1.83	0.69 – 4.86	0.224
	Continuous	288	--	1.04	0.90 – 1.20	0.635
Age	Continuous	288	--	0.97	0.95 – 0.99	< 0.001

Variable		Sample	% willing to make a sacrifice	OR	95% CI	<i>p</i> value
Health issues	No health issues related to ETS (C)	190	80.9%	1.00	--	--
	Health issues related to ETS	95	91.0%	2.37	1.08 – 5.22	0.032
Perceived harm of drifting ETS	Not harmful (C)	22	81.7%	1.00	--	--
	Harmful	260	84.9%	1.26	0.41 – 3.92	0.689
Exposed to drifting ETS in current unit	No (C)	90	75.7%	1.00	--	--
	Yes	159	81.4%	1.47	0.73 – 2.95	0.286
Bothered by drifting ETS	No (C)	20	79.2%	1.00	--	--
	Yes	167	85.5%	1.55	0.48 – 5.01	0.465
Perceived risk of fire from smoking indoors	No risk (C)	36	79.9%	1.00	--	--
	Risk	224	83.2%	1.24	0.51 – 3.02	0.635

Education level, age, someone in the household having health issues related to ETS, personal smoking policies in the home, interest in smoke-free housing and smoking status were all significant predictors of a willingness to make at least one sacrifice for smoke-free housing at the 0.05 level. Those respondents who indicated they or someone in the household had a health issue that got worse when they were exposed to ETS were 2.37 times more likely to make a sacrifice for smoke-free housing than those without anyone with a health issue related to ETS in the household ($p=0.032$). Not surprisingly, those respondents who lived in a unit with personal smoking policy which made the unit completely smoke-free were 2.35 ($p=0.018$) times more likely to make at least one sacrifice for smoke-free housing than those individuals who lived in a unit where at least one group of individuals were permitted to smoke indoors. Also, those who said they were interested in living in smoke-free housing were more likely to be willing to make a sacrifice for smoke-free housing than those who were not interested ($OR=2.09$; 95% $CI=1.55 - 2.84$). Older individuals, smokers and those with college or trades level training were less likely to make a sacrifice for smoke-free housing. For each additional year of age, the likelihood a respondent would make a sacrifice for smoke-free housing decreased by a factor of 0.97 ($p < 0.001$). Smokers were 0.27 ($p < 0.001$) times as likely to make a sacrifice for smoke-free housing than non-smokers, and those with college or trades level training were 0.19 ($p < 0.001$) times as likely to make a sacrifice than those with only high school level education or a university level education.

A multivariate logistic regression model was developed to determine overall, what characteristics predicted increased odds that an individual would be willing to make at least one sacrifice for smoke-free housing. All variables which were significant at the 0.05 level in the univariate analysis were considered for inclusion in the final model. The final model was presented in Table 18. Smoking status, interest in smoke-free housing, age and education level remained significant in the final model. Older respondents and those with training in the trades or at the college level have decreased odds of

being willing to make a sacrifice, and those who are interested in smoke-free rental housing and non-smokers have higher odds of being willing to make a sacrifice for smoke-free rental housing.

Table 18. Final multivariate logistic model predicting the odds an individual will be willing to make at least one sacrifice to live in smoke-free housing

Final model	Model variables		OR	95% CI	<i>p</i>	<i>c</i>
Interest in Smoke-Free Housing = <i>f</i>(Smoking status + interest in smoke-free housing + age + education)	Age	Continuous	0.97	0.95 – 0.99	<0.001	0.75
	Interested in Smoke-free Housing	No (C)	1.00	--	--	
		Yes	3.55	1.29 – 9.83	0.015	
	Smoking Status	Smoker (C)	1.00	--	--	
		Non-Smoker	2.75	1.07 – 6.64	0.035	
	Education	High School or University (C)	1.00	--	--	
College or Trades		0.26	0.13 – 0.52	<0.001		

Chapter 6

Discussion

As smoke-free public spaces have become the norm, the home has become an even more critical point of intervention to prevent exposure to environmental tobacco smoke. Many households are electing to make their own home smoke-free through personal smoking bans. Tenants living in multi-unit dwellings can do the same, but cannot control the smoking behaviours of others in the building/complex and it is known that smoke can drift from a smokers unit throughout the building. This suggests that individuals living in MUDs may be exposed to ETS in their home, even if they do not permit anyone to smoke in their unit. The objective of this research was to investigate tenant's perceptions of drifting ETS, including their perceived exposure, and to determine if there was a potential market for smoke-free rental housing. This study is among the first to look at tenant's perceptions, understandings and views of this problem in Ontario. The results of this work suggest many tenants are exposed to drifting ETS in their unit, they are bothered by this exposure and there is a strong potential market for smoke-free housing. The following sections present a summary and interpretation of the key findings of this work in relation to the research questions asked, explore the limitations of the work and discuss implications and future directions for the field.

6.1 Summary and Interpretation of Key Findings

6.1.1 How do tenants living in multi-unit dwellings perceive the extent and severity of drifting ETS?

The findings of this research indicate that many tenants living in MUDs in Kitchener are exposed to drifting ETS and of those who are exposed, most are bothered by the exposure. Sixty-eight per cent of tenants indicated they were exposed to ETS in their home at least 'sometimes' and nearly a quarter of the tenants said they were exposed to drifting ETS in their home everyday or almost everyday. These

results are consistent with previous research focused on tenants of MUDs. The Region of Waterloo study found 57% of respondents indicated they were exposed at least ‘sometimes’ (ROWPH, 2009a) and 46% of those surveyed in a poll by Ipsos Reid with a representative sample of Ontario’s MUD rental population indicated they had noticed tobacco smoke odour in their unit at least once in the last year (Ipsos Reid, 2007).

Previous research in Ontario asking individual respondents about the issue of drifting ETS exposure as part of a larger study and where the sample was not restricted to individuals living in MUDs found lower rates of exposure. The Ontario Tobacco Survey (OTS), a broad tobacco survey with a sample representative of all Ontario residents, found 18% of Ontarians noticed ETS entering their home from a source outside of their home. This study included both individuals living in detached dwellings and MUDs. Respondents living in MUDs were more likely to report being exposed to drifting ETS than those living in single family homes (OTRU, 2009a). The Waterloo Region Area Study (WRAS) conducted by the Survey Research Centre at the University of Waterloo included a subset of questions from the Region of Waterloo survey on the issue of drifting ETS. The survey included a representative sample of individuals from the Region of Waterloo, including individuals living in all forms of housing, not just those living in rental MUDs. This survey found that, within the general population of Waterloo Region, 30.7% of respondents indicated they were exposed to second-hand smoke in their homes (ROWPH, 2009a). This is a higher percentage than was seen in the OTS, but is still significantly lower than the results found by the Region of Waterloo and the current study.

The differences between the more general tobacco and social surveys (WRAS and OTS) and the current study, in regards to exposure rate, may be explained by a few key issues. First, the sample frame for the current study was specifically focused on tenants living in rented MUDs, rather than a representative sample of the city as a whole. As tenants in MUDs are more likely to be exposed than

individuals in detached, single family homes, this may lead to the higher exposure rate seen in this sample. Response bias may also play a role. The current study focused solely on the issue of drifting ETS, whereas the OTS and WRAS studies focused on a variety of issues. Individuals may have been more likely to respond to the current study if they had experience with drifting ETS, whereas this bias may not have been seen in the more general surveys.

The vast majority of tenants who noticed ETS in their unit at least once a month were bothered by the drifting ETS. Ninety per cent of tenants indicated they were bothered by the drifting ETS at least 'a little' and 45.1% of tenants were bothered 'a lot'. In fact, a small proportion of individuals (6.2%) were bothered by the drifting ETS to the point they were considering moving. Females and those with higher household incomes had higher odds of being bothered by drifting ETS than males and those with lower incomes. Interestingly, the more time an individual spent at home on an average weekend day, the lower the odds they would be bothered by drifting ETS. This should be investigated further to gain a deeper insight into why this would be the case. One possible explanation for this finding may be that those individuals who are exposed to drifting ETS more frequently, for example spending more time in a unit exposed to drifting ETS, may experience habituation where they become less aware of the stimulus due to repeated exposures over an extended period of time. This suggests that while individuals who spend longer periods of time at home on an average weekend day may not be as bothered by the drifting ETS, that may not be due to the fact they are less exposed, but perhaps due to the fact they have grown used to the drifting ETS therefore noticing it less and being less bothered by it. Further research is needed to determine if this finding is true for other populations, and to gain a deeper understanding of the possible underlying assumptions of why this may be the case.

The fact that individuals who are exposed are, for the most part, bothered by drifting ETS suggests the issue of drifting ETS in MUDs is a problem in the Kitchener area. Exposure is more than just a mere inconvenience for tenants, it is something that is bothering them and likely affecting their

enjoyment of their home. The problem is so severe for a small portion of the population that they are considering moving to escape the drifting ETS. This suggests that a smoke-free building could, perhaps, be in the best interest of the landlord. If many individuals are bothered by drifting ETS, and some are considering moving due to their exposure, having a smoke-free building could be a way of reducing turnover of units and attracting new tenants.

Landlords should not only focus on the fact individuals are bothered by drifting ETS to justify a no-smoking policy in their building, but should also consider the health impacts of exposure to drifting ETS. A third (33.4%) of respondents indicated they or someone they lived with suffered from health issues which got worse after exposure to ETS. For these individuals, living in a smoke-free building could lead to improved health outcomes, as their personal health issue would not be aggravated. The vast majority of respondents also felt drifting ETS was at least somewhat or very harmful to their health. Focusing on the health benefits of smoke-free buildings could provide landlords with an additional reason to go smoke-free, and another way to market a smoke-free building to potential tenants.

6.1.2 What actions, if any, do tenants take in response to drifting ETS?

The results of this research suggest that while tenants are willing to take simple, independent actions in response to the drifting ETS they are exposed to, they are less likely to be willing to take actions which would be more labour intensive, and are not likely to speak to their landlord about their exposure.

The majority of tenants (88.9%) who were exposed to drifting ETS indicated they took at least one action in response to their exposure. The actions taken ranged from the simple (i.e. closing windows) to the more complex (i.e. moving to a new building). Tenants were most likely to take actions that were fairly simple to put into place such as closing windows and/or balcony doors or masking the

smell of the drifting ETS. Few tenants sealed leaks, talked to smokers or moved to a new building or unit. This suggests that while tenants were bothered by the drifting ETS, and while many wanted to take at least some kind of action, they were unlikely to take actions which required larger commitments of time or money, or which involved confronting the smoker. Attempting to mask the smells of the drifting ETS would do nothing to minimize the dangers of exposure, though it may relieve some of the concern associated with the smell. While closing the windows may prevent some of the tobacco smoke from entering the unit, especially as nearly half of the tenants indicated windows or balcony/patio doors were the most common point of entry for drifting ETS, it also affects a tenant's enjoyment of the unit. The fact many tenants identified closing windows and/or balcony and patio doors as an effective means of reducing their exposure is important for future policy considerations. If in fact one of the main sources of drifting ETS is open windows, suggesting the smoking may be occurring outside, when considering smoke-free housing options those policies which restrict smoking on patios and balconies and within a set distance of the building should be considered over those which only restrict indoor smoking. In addition, additional research should be conducted to determine if in fact the majority of the ETS is drifting from the outside into the building, or if tenants are merely more likely to perceive that as the mode of entry.

Arguably, one of the most important actions a tenant could take if they were exposed to and bothered by drifting ETS in their unit would be to speak with their landlord. The current view of many of those working in the smoke-free MUDs movement, and the view entrenched in the 'National Strategy for Smoke-Free Multi-unit Dwellings', is to take a voluntary approach to smoke-free MUDs rather than a legislative approach (NSRA et al., 2009). This suggests landlords should be the ones to make their buildings/complexes smoke-free, rather than government introducing legislation on the issue and imposing regulations on landlords. If landlords are going to consider implementing smoke-free regulations, they need to be aware of the issue, and know if it is an issue of concern for their

tenants specifically. This research suggests tenants are not speaking with their landlord about this issue. Of the tenants who indicated they were exposed to drifting ETS in their unit, 86% had not spoken to their landlord about their exposure. This result is not unexpected. Previous research also suggests the majority of tenants will not speak with their landlord about the issue of drifting ETS. A survey of individuals living in MUDs in British Columbia found 77% of those who rent their unit did not speak with their landlord or building representative about the issue of drifting ETS (Context Research Ltd., 2008) and in a survey of tenants living in MUDs in Minnesota, 83% of tenants did not speak with their landlords (MCEE, 2001a).

As the research consistently suggests tenants do not speak with their landlords, a survey of landlords would be useful to determine if they perceive drifting ETS as an issue of concern for their tenants, even if the majority of tenants are not complaining. Anecdotal evidence suggests they may not be aware of the problem. In a newspaper editorial published in the Waterloo Record in the fall of 2009, the regional manager of one of the largest private property management companies in the region was quoted as saying they rarely receive complaints from non-smokers about drifting ETS, and when they do arise they are able to fix the problem with small modifications to the units (Waterloo Region Record, 2009). This suggests that a lack of complaints from tenants may affect the way the landlord or property manager understands the issue. As they had not received many complaints, they did not assume it was an issue of major concern, however given the results of this research it is unlikely that no one in their buildings is exposed to or bothered by the drifting ETS. The lack of complaints to the landlord cannot be taken as proof of a lack of exposure as the research shows individuals often do not complain about the drifting ETS even when it is a concern.

The issue, however, is not just that tenants are not speaking with their landlords, but that in many cases, when they do speak up, they receive mixed responses. The respondents who indicated they had spoken with their landlord about the issue received a variety of responses. Over half (52.5%) said

their landlord did not seem to care, and some (16.6%) said the landlord didn't think they were able to do anything about the smoke. Others found their landlord to be more helpful, offering to speak with the smoker (36.5%) or suggesting ways to minimize the smoke (7.8%). Given the variety of responses from landlords, it would not be surprising if some tenants did not speak to their landlord because they were unsure of the response they would receive. Some tenants did identify that as the reason why they didn't speak with their landlord saying they knew they wouldn't be helpful (17.5%) or they didn't think the landlord could do anything to help (19.8%). The majority of respondents however, said they didn't speak with their landlord because they weren't bothered enough by the smoke (44.4%) or they didn't want to cause a problem in the building (25.4%). Interestingly, of those who said they weren't bothered enough to talk to their landlord, over 80% of them indicated they were at least 'somewhat' bothered by the drifting ETS.

This research suggests that while tenants are willing to take basic, simple actions in response to drifting ETS, they are less willing to take larger actions or to approach landlords about their concerns. This is an important point that warrants additional research. Although a general question about why tenants elected to not speak with their landlord was asked, no in depth information was collected on this issue. If the consensus is that the issue of smoke-free MUDs should be left to the market, and that it is not an issue for legislation, greater insight is needed on how to make landlords aware of the problem and how to encourage landlords to implement smoke-free policies. Having tenants speak with their landlords is a critical piece, and greater research is needed to gain insight into why tenants do not speak with their landlords, and what could be done to encourage them to do so if they are exposed to and bothered by the drifting ETS.

6.1.3 Are perceived smoking restrictions in multi-unit dwellings prevalent in Kitchener?

It does not appear that smoking restrictions in MUDs are prevalent in the city of Kitchener. Less than six per cent of respondents said smoking was not allowed on balconies, in the ground level parking lot, by the front door of the building or, on the grounds of the building. While 15.8% of tenants did indicate that smoking was not permitted in the units within their building, there was very little agreement between tenants living in the same building on these restrictions. There was only one building in the sample where two or more tenants returned the survey and all tenants agreed the building was smoke-free in terms of smoking in units. As there was minimal agreement between tenants on the smoking restrictions in place in their building, it is unclear how many tenants do in fact live in buildings where smoking is not permitted in the units. To accurately determine the proportion of buildings had smoke-free regulations in place, a landlord survey would need to be completed asking landlords directly if they had implemented any regulations.

It would not be implausible to believe the majority of the buildings where individuals indicated smoking was not permitted in fact do not have smoke-free policies in place. In a survey of tenants conducted by the Minnesota Center for Energy and the Environment (MCEE), 14% of tenants indicated their landlord had banned smoking in all apartment units within the building. Believing this was an improbably high proportion of smoke-free buildings, they contacted landlords to confirm the regulations and found in fact a better estimate of the proportion of tenants living in smoke-free buildings was 2.4% (MCEE, 2001a). While there is no way to know what the actual proportion of tenants living in smoke-free MUDs in Kitchener is from these results, it is not unlikely that the same trend would occur if landlords were contacted in this case.

Although it seems there are few official smoke-free regulations in place for units in MUDs in Kitchener, it is interesting to note that many of the tenants choose to make their home smoke-free

regardless of any regulation in place by the landlord. Eighty-two per cent of all respondents indicated they lived in a unit where both tenants and guests were not permitted to smoke in their home. Only 10% of tenants indicated they allowed both tenants and guests to smoke in the unit. This suggests that even in the absence of an official smoking ban in the building, many individual households are making the decision to limit or completely restrict smoking in their individual unit. This is a trend that has been seen in the population as a whole. In a 2001 study, 80% of Ontarians indicated their home was smoke-free (Ferrence et al., 2005). In 2006, in the city of Kitchener specifically, 69.3% of homes were smoke-free (ROWPH, 2009b). This is a smaller proportion of homes than seen in the current study. The proportion for the city as a whole is an older number, suggesting there may have been an increase in the proportion of homes which are smoke-free in the past three years. It may also suggest there are differences between individuals living in MUDs and individuals in the general population. Finally, this may be due to the fact that those individuals with smoke-free homes may have been more likely to respond to the survey than those who permit smoking in the home, however, the rate seen in this study is similar to the provincial average.

While few tenants indicated smoking was not permitted in units and in outdoor areas of the complex, the majority of tenants did indicate that smoking was not permitted in various common areas in their building. This was the expected result as the Smoke-Free Ontario (SFO) Act bans smoking in all common areas of multi-unit dwellings. Over ninety per cent of respondents correctly indicated that smoking was not permitted in the laundry room, lobby and party rooms. Awareness of the regulation in gyms or indoor pool areas and underground parking lots was lower. Less than half of the respondents indicated that smoking was not permitted in their underground parking lot. This was the lowest level of awareness seen for any of the areas associated with the SFO Act. This suggests future awareness campaigns, education and monitoring should emphasize the inclusion of underground parking lots and indoor recreation areas in the non smoking regulations in place due to

the SFO Act. It is interesting to note however, that awareness of the SFO Act may have increased over time. A survey of Ontario tenants of MUDs by Ipsos Reid in 2007 found only half of those surveyed knew smoking was banned in hallways, lobbies/common areas and the laundry room (Ipsos Reid, 2007). The current study found rates of awareness for these areas of over 90%, suggesting more individuals are aware of the regulations now than they were two years ago.

To determine overall perceived compliance with the regulations, tenants who indicated that an area was smoke-free were asked how often they saw individuals smoking in those areas over the past three months. In regards to areas which were covered by the SFO Act, the highest level of compliance was in party rooms, where 100% of individuals indicated they never noticed others smoking. Gyms and indoor pool areas and laundry rooms also had high levels of compliance with only 2% and 9% respectively noticing smoking in those areas ‘sometimes’ or ‘often’. Underground parking lots, hallways and lobbies had lower levels of enforcement, with 31%, 35% and 36% of tenants respectfully indicating they noticed smoking occurring ‘sometimes’ or ‘often’ in those areas.

These results suggest there is basic awareness of the non-smoking regulations in place in the buildings due to the SFO Act, but that the awareness of the regulations is not consistent across all areas, and is especially low in regards to underground parking. Although individual tenants overall are aware of the regulations due to the SFO Act, enforcement of the regulations may be lacking as nearly a third of tenants who knew the regulation still noticed smoking in three of the common areas. In the context of drifting ETS and individual tenant’s exposure to ETS in their home, the fact that a third of individuals noticed smoking in the hallways and in the lobby is especially troublesome as these are the areas where the smoke could easily drift into the units.

6.1.4 Is there a market for smoke-free rental housing? If so, what characteristics predict membership in this market?

This research strongly supports a potential market for smoke-free housing in Kitchener. Nearly all tenants surveyed (89.1%) indicated they would be interested in living in a smoke-free building and nearly half (48.3%) said they were extremely interested. A large proportion of respondents had already made their personal unit smoke-free, so moving to an entirely smoke-free building would not involve a drastic change in behaviour for them, but would ensure the rest of the tenants in the building followed the same regulations preventing involuntary exposure to ETS in their unit. Not only are tenants interested in smoke-free housing, but just under half would be interested in strong restrictions making the property completely smoke-free. These results are supported by previous research. When tenants of Waterloo Region Housing were asked if they would like their building to be 100% smoke-free, including balconies and patios 50% indicated they would (ROWPH, 2009a) and the Ipsos Reid study found 64% of tenants would select a smoke-free building over one where smoking was permitted (Ipsos Reid, 2007).

Younger tenants (under the age of 30), non-smokers, those who spend fewer hours at home on the weekend and those who believe smoking indoors increases the risk of fire were most likely to be members of the smoke-free rental housing market. It is intuitive that smokers would be less likely than non-smokers to be interested in living in smoke-free housing. Smokers are the individuals who would, in theory, need to make the most drastic changes to their behaviour to live in a smoke-free building. Many of the arguments against smoke-free housing hinge on the right of the smoker to smoke in their own home if they wish. Although in terms of the odds, the smoker is significantly less likely to want to live in smoke-free housing than the non-smoker, it is interesting to note that 59.1% of smokers were interested in smoke-free housing. The assumption, therefore, should not be made that all smokers would be against smoke-free housing. Future research should further investigate the

views of smokers to understand how they perceive smoke-free rental housing and why they are or are not interested in living in a smoke-free building. Gaining insight into this area of the rental housing market would allow for a better understanding of how to develop smoking policies that will work to protect the health of all tenants and support the smoker to make healthier choices.

Tenants not only demonstrated interest in smoke-free rental housing, but appear to be willing to make sacrifices to live in a smoke-free building. The majority of tenants were willing to make at least one sacrifice to live in a smoke-free building. While some of the more popular sacrifices were things that are not common in rental MUDs, such as dishwashers or underground parking, tenants were also willing to make sacrifices that would affect them on a day to day basis. Nearly half of the tenants surveyed for example indicated they would be willing to drive ten minutes farther to work in order to live in a smoke-free building. The fact tenants are willing to make sacrifices for smoke-free housing provides even greater confidence that there is a potential market for smoke-free housing. In order to be willing to make sacrifices tenants would have to believe they are getting something of equal or greater value in return, suggesting smoke-free status of a building may very well be a selling point for landlords.

6.2 Limitations

This research is not without limitations and these must be considered when interpreting the results of the work. The sample for this research came from a single city in southwestern Ontario and the response rate for the survey was low at 8.5%. This will have an impact on the generalizability of the results. Although the response rate was low, it is not unexpectedly so. While the response rates for many of the surveys completed to date on this issue have been higher, the research out of Nova Scotia also saw a low response rate at 16.1% (ThinkWell Research, 2008).

As the response rate was low, there is a potential for non-response bias. Individuals who chose to respond to the survey may be different in some way from those who choose not to respond. Survey weights were developed in an attempt to adjust the sample to ensure it was representative of the target population as a whole. The survey weights, however, were also not without limitations. As the data available on the demographic characteristics of this exact sample, individuals living in rented MUDs in Kitchener, Ontario, were limited national and municipal level data was used to develop the survey weights. This suggests the survey weights may not be completely accurate. Although this is a limitation, it is important to note the overall results of the study did not appear to change drastically with the addition of the survey weights. The weighted and unweighted data both provided similar results, and would have lead to similar conclusions. The results of this work are also similar to the results of previous studies on many measures which provides additional reassurance that non-response bias, while it may have played a role, likely did not change the overall results drastically.

Additionally, as the sample came from a single city caution should be used when applying these results to other jurisdictions. The results of this study may apply only to the city of Kitchener. Kitchener is a city located in Southern Ontario with a population of 204,668. The mean age of the population is 36.6 years which is slightly below the average age of Ontarians (Statistics Canada, 2008). The smoking rate in Kitchener in 2007 was 23% which was higher than the Ontario smoking rate which was 20.8% (ROWPH, 2009b). While it is not clear if the results of this study are representative of other jurisdictions, it may be representative of similar mid-sized cities. The results are likely not representative of large urban centres or of smaller rural cities.

While other research has suggested similar results, we also know the issue of smoke-free MUDs was one of interest to policymakers in this Region at the time of the study which may have affected the results. The Region of Waterloo considered, and approved, a policy to make the buildings operated by Waterloo Region Housing smoke-free as of April 1, 2010 in the Fall of 2009 (Region of

Waterloo, 2009). Although the bulk of the media coverage for this policy and the final decision on smoke-free MUDs policies at the Regional level occurred after data collection, individual tenants may have been aware that this was an issue of importance to the Region, which may have had an impact on their views and perceptions. It is also important to note that the climate on smoke-free MUDs in Kitchener may be much different now than it was when this data was collected. The decision by the Region of Waterloo to move forward on smoke-free MUDs within their housing properties attracted media attention, both positive and negative, and debate. This may have increased the awareness of the issue or allowed tenants to consider various arguments for and against smoke-free housing which may change their perceptions of the magnitude and severity of drifting ETS in their own building, or their desire for smoke-free housing. It is also unknown, what impact, if any, this decision had on private landlords and if the Region's decision to implement regulations changed their perceptions or encouraged them to consider smoke-free regulations as well.

It is important to note that while the low response rate, and the fact the sample came from a single city may reduce the generalizability of the final results, this study was primarily exploratory in nature, and as such provides insight into an issue with the knowledge additional work is needed to confirm and expand on the results. Additional research should be completed in other jurisdictions to determine if the results are unique to the city of Kitchener, or if other jurisdictions would show similar results. A follow-up study in the city of Kitchener could also provide interesting information on what impact, if any, the Region's decision to make some social housing units smoke-free had on the perceptions of tenants living in market rate housing.

This research focused on tenant's perceptions of drifting ETS and did not include any measurements of the actual levels of ETS in the unit. This is a limitation as it is unknown if the individual tenant's perception is an accurate measure of their exposure, or if there is a difference between the perceived and observed exposure. While some research has been completed on how ETS

can drift through a building, additional work is needed to link the observed measurements of ETS with tenant perceptions. While this is a limitation, it does not discount the value of this work. Tenant perceptions are critical to the issue, they are the ones who must live in the MUDs and who deal with this issue.

Finally, this research did not include landlords in the sample. The work provided insight into the perceptions of tenants and their understanding of the issue, but did not provide any insight into the views and perceptions of the landlord. Future research should include landlords to determine if they see this as a major issue of concern and if they have an interest in smoke-free housing. This would also allow for comparisons between tenant and landlord perceptions of the issue and would also allow for a more accurate measure of the proportion of buildings which are already smoke-free.

6.3 Implications

The results of this research have implications for a variety of stakeholders in government and the tobacco control and housing sectors. While there is a strong need for additional research in this field, the current research provides additional support for smoke-free multi-unit dwellings and suggests there is merit in further investigating the issue.

This research has a variety of policy implications. Smoke-free rental housing is quickly gaining momentum in the policy arena. Regional governments in Ontario including Hamilton, Peel Region and the Region of Waterloo, are considering and debating this issue. The leadership taken by the Region of Waterloo as the first public social housing provider in Ontario to implement smoke-free policies in their properties will likely encourage others to consider the issue, and to investigate the potential for implementing similar policies. Peel Region has also asked the provincial government to look at this issue to determine what role, if any, provincial legislation could play in mandating smoke-free rental housing. This research supports the increased focus on this issue by health officials and

policymakers. It is clear from this work that tenants are exposed to drifting ETS and they do show interest in smoke-free buildings. What is unclear is the most appropriate way to move forward with this issue, if it should occur at the legislative level or if it should be left to the market and public health and governments should support landlords in their efforts to make buildings smoke-free. Additional research investigating which policy options have the most support at the tenant, landlord and policymaker levels is needed.

There are various policy options available to governments. The United States provides a variety of models which may be considered in Canada. The state of Utah has explicitly stated that ETS is a nuisance and that landlords are permitted to ban smoking in apartments (Hewett et al., 2007). This could potentially be a useful policy option in Ontario as well. Research has suggested landlords are not clear on the legalities of smoke-free MUDs, and while all research completed to date indicates it is legal for landlords to take this step, it is not explicitly stated in any government regulations. It is also known that some landlords have had success in upholding a no-smoking policy at the landlord tenant board, but that adjudicators are not bound by precedent and therefore the results of a challenge cannot be predicted (Hill, 2008; NSRA, 2007). If the Ontario government, like the government in Utah, made it explicit that ETS was a nuisance, and made it clear landlords could implement and enforce no-smoking regulations in MUDs, landlords may not only be more willing to implement the policies, but it may bring additional attention to the issue. Governments in the United States have also considered the legislative route to smoke-free MUDs. Various governments have had success in implementing various forms of smoke-free regulations in both public and private MUDs. This is another option for both Regional and Provincial governments to consider. The Region of Peel did consider this option, and decided against it; however, that is not to say other regions or municipalities should not investigate this option. As we have seen with previous smoking by-laws, municipalities and regions can play a large role in starting the ball rolling, and introducing new forms of smoking

restrictions. If the legislative route is considered, careful planning and consideration should occur to ensure the policy has the support of tenants and landlords in the region. While this research provides some evidence that there is support for smoke-free housing, additional research should be conducted with a specific emphasis on the views of tenants on the role they believe private landlords and governments should play in moving this issue forward.

If this issue is going to be left to the market, finding ways to encourage tenants to speak up and discuss the issue with their landlord and other policymakers will be critical. This research supports previous work which has suggested few tenants actually speak with their landlord about the issue of drifting ETS, even when they are exposed and are bothered by the exposure. If the market is to take the lead on this issue, the landlords need to be made aware of the magnitude of the problem, and helping tenants to speak with their landlords would be a strong first step in raising awareness.

One way of moving this issue forward would be with a media campaign. Tobacco control has had a great deal of success utilizing social media to attempt to change social norms surrounding smoking, and media campaigns in general have been found to be effective for promoting health (Farrelly et al., 2003; Murphy-Hoefer, R. et al., 2008; Noar, 2006). The results of this research suggest tenants are exposed to and bothered by drifting ETS, but that there are information needs. Overall, while tenants were aware drifting ETS could be harmful to their health, there was less certainty in the sample about the health effects of drifting ETS compared to ETS generally. A social media campaign could raise awareness of the health effects of drifting ETS. A social marketing campaign would also be useful in raising awareness of the need to for tenants who are exposed and who are bothered to speak to their landlord, government officials or advocacy groups about the issue. Tenants, generally, are not speaking with their landlord about this issue and many tenants indicated it was because they did not want to cause problems in their building, or because they did not know what, if anything, their landlord could do about the issue. Educating tenants about their rights, the steps landlords can take

and the legalities of no-smoking regulations could be helpful. If social media campaigns are considered, additional research should be conducted to determine which messages would be most effective, and what the most effective way of getting the message across would be.

Conducting additional research on this topic, especially from the landlord and measurement perspectives, should be a priority for tobacco control researchers. The dangers associated with ETS exposure are well known, and smoke-free spaces regulations have successfully reduced individuals' exposure in public spaces. Involuntary exposure within the home due to drifting ETS cannot be ignored and smoke-free rental housing options should be a priority. This research supports the past work which has occurred on the issue of drifting ETS. We have a fairly clear understanding that many tenants living in MUDs are exposed, are bothered by drifting ETS and want smoke-free housing options however there is a need for additional research on the more specific issues. Specifically, gaining a better understanding of why tenants do or do not speak with their landlords and, why some smokers are interested in smoke-free housing and others are not are important issues that warrant additional research. In addition, gaining insight into the landlord perspective and air quality monitoring will be critical to gaining a full understanding of this issue. To date little attention has been paid to these two pieces of research in Ontario, and that needs to change if there is going to be a strong background of research for landlords and legislators to use when considering the issues surrounding drifting ETS.

6.4 Final Conclusions

The issue of drifting environmental tobacco smoke in multi-unit dwellings should be a concern for those individuals who are interested in tobacco control be it through policy, research or advocacy. The home is a critical point of intervention in regards to smoking behaviours, and exposure to ETS. As the issue of smoke-free MUDs moves to the front of policy agendas, research is needed to inform

future policy decisions. This research clearly suggests there is a potential market for smoke-free rental housing. Additional research is needed to replicate these findings in other jurisdictions and with larger samples, to gain insight into the landlord's perspective and to obtain objective measurements of drifting ETS via air quality monitoring.

Overall, many tenants are exposed to drifting ETS, the majority of those who are exposed are bothered and there is a strong interest in smoke-free housing. Tenants, however, do not seem to be willing to complain about the drifting ETS, especially to their landlords, which may lead to a lack of awareness of the problem and of the potential market for smoke-free housing. In order to move the smoke-free housing movement forward, additional research is needed to gain insight into the perspectives of all stakeholders in this issue to increase the understanding of the magnitude of the problem of drifting ETS and to determine the next steps that should be taken to increase the number of smoke-free multi-unit dwellings.

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Appendix A

Power Calculations

Assumptions:

- The intracluster correlation was estimated to be 0.2
- It was assumed the response rate within clusters would be low. The average cluster size was assumed to be 6.
- A 95% confidence interval and a p value of 0.5 were assumed
- The total number of rental units available in the city of Kitchener which meet the inclusion criteria is 20,921
- A response rate of 20% was assumed.

Design Effect:

$$\begin{aligned}
 DEFF &= 1 + (m-1)ICC \\
 &= 1 + (6-1)0.2 \\
 &= \mathbf{2}
 \end{aligned}$$

Required Sample Size

$$\begin{aligned}
 n_0 &= \frac{1.96^2 p(1-p)(DEFF)}{d^2} \\
 &= \frac{1.96^2 0.5(1-0.5)(2)}{0.05^2} \\
 &= \mathbf{768.3}
 \end{aligned}$$

Adjusting sample size for size of population

$$\begin{aligned}
 n &= \frac{n_0}{1 + \frac{(n_0-1)}{N}} \\
 n &= \frac{768.3}{1 + \frac{(768.3-1)}{20,921}} \\
 &= \mathbf{741.1}
 \end{aligned}$$

Sample size accounting for estimated response rate

$$\begin{aligned}
 n &= \frac{741}{.2} \\
 &= \mathbf{3705}
 \end{aligned}$$

Final number of potential participants to be contacted was 3705.

Appendix B

Initial Information Letter and Consent to Re-contact Form

DEPARTMENT OF HEALTH STUDIES AND GERONTOLOGY

FACULTY OF APPLIED HEALTH SCIENCES

University of Waterloo

200 University Avenue West

Waterloo, Ontario, Canada N2L 3G1

519-888-4567 | Fax: 519-746-2510

March 2009

Dear Resident:

I am a master's student in the Department of Health Studies and Gerontology at the University of Waterloo conducting research under the supervision of Dr. Paul McDonald on the impact of second-hand smoke on tenants living in multi-unit dwellings. This survey has been sent to a randomly selected group of individuals living in multi-unit dwellings (apartment buildings or townhouse complexes with five or more units) in the city of Kitchener, Ontario. As you live in a multi-unit dwelling, your opinions are important to this study.

I would appreciate it if you would complete the attached survey. Completion of the survey is expected to take approximately fifteen to twenty minutes. You may skip any questions you prefer not to answer. There are no known or anticipated risks to participation in this study. Participation is voluntary and anonymous. The data collected through this study will be kept for seven years in a locked office at the University of Waterloo.

The survey should be completed by one individual who is over the age of 18 years. If more than one individual living within the unit fits this description, please randomly choose one to complete the survey.

If you are interested in participating in this study, please return the completed questionnaire in the postage paid envelope provided at your earliest convenience. If you have any questions about this study, or would like additional information to assist you in reaching a decision about participation, please feel free to contact Laura McCammon-Tripp at (519) 888-4567 ext. 36396 or at lemccamm@uwaterloo.ca.

We would be happy to send you a summary of the results of the research via e-mail or post once they are available. If you are interested, please provide an e-mail or address where the summary can be sent on the attached form and include it with the survey in the return envelope. We expect the results to be available in the fall of 2009.

This research will increase our understanding of how tenants living in multi-unit dwellings are affected, if at all, by second-hand smoke and tenants views on smoking in these buildings. The results of this research will benefit tenants, landlords, researchers and policy makers and may inform future research and policy decisions. As this is an important and new area of research, future studies are planned on this topic. If you are willing to be contacted again regarding future research, please provide your contact information on the form provided. Providing your information does not mean you are obligated to participate, but only that you may be contacted.

This study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes in the Office of Research Ethics at 519-888-4567 ext. 36005.

Thank you in advance for your interest in this project.

Laura McCammon-Tripp

Student Investigator

**** Please complete this form and return it with the survey in the envelope provided ****

I agree to be contacted by Laura McCammon-Tripp and/or Dr. Paul McDonald in the Department of Health Studies and Gerontology at the University of Waterloo in regards to participation in future research projects related to the issue of second-hand smoke in multi-unit dwellings.

YES NO (Please circle your choice)

If yes, please provide your contact information. This will be used only to get in contact with you for the future study and will be kept completely confidential.

Phone number: _____ (Please print)

E-mail: _____

I would like to receive information on the results of this study when they are available and would like them to be sent to the following e-mail or mailing address:

E-mail or mailing address: _____

Appendix C

Reminder Postcard

<p>Dear Resident,</p> <p>Two weeks ago a survey seeking your experiences with secondhand smoke in your building and your thoughts on smoke-free housing was delivered to you. Your building/complex was drawn from a random sample of all multi-unit dwellings in Kitchener to participate in this research.</p> <p>If you have already completed and returned the survey to us, please accept our sincere thanks. If not, please do so today. Because it was sent to a small, but representative, sample of Kitchener residents it is extremely important that your responses are included in the study if the results are to accurately represent all Kitchener residents living in multi-unit dwellings.</p> <p>If by some chance you did not receive the survey, or if it was misplaced, please call me at 519-888-4567 ext. 36396 or email me at lemccamm@uwaterloo.ca and I will get another copy in the mail to you today.</p> <p style="text-align: right;">Laura McCammon-Tripp University of Waterloo</p>	<p><i>Current Resident</i></p> <hr/> <p><i>5 Anywhere Drive, Unit 101</i></p> <hr/> <p><i>Kitchener, Ontario</i></p> <hr/> <p><i>XIX 1X1</i></p> <hr/>
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Appendix D

Follow-up Information Letter

DEPARTMENT OF HEALTH STUDIES AND GERONTOLOGY

FACULTY OF APPLIED HEALTH SCIENCES

University of Waterloo

200 University Avenue West

Waterloo, Ontario, Canada N2L 3G1

519-888-4567 | Fax: 519-746-2510

Date, 2009

Dear Resident:

A few weeks ago you should have received a survey on your experiences with secondhand smoke in your building and your thoughts on smoke-free housing being conducted by researchers at the Department of Health Studies and Gerontology at the University of Waterloo. If you have completed and returned the survey, please accept our sincere thanks. If you have not yet done so, please do at your earliest convenience. I have included another copy of the survey in case you did not receive it or it was misplaced.

Completion of the survey is expected to take approximately fifteen to twenty minutes. You may skip any questions you prefer not to answer. There are no known or anticipated risks to participation in this study. Participation is voluntary and anonymous. The data collected through this study will be kept for seven years in a locked office at the University of Waterloo.

The survey should be completed by one individual who is over the age of 18. If more than one individual living within the unit fits this description, please randomly choose one to complete the survey.

If you are interested in participating in this study, please return the completed questionnaire in the postage paid envelope provided at your earliest convenience. If you have any questions about this study, or would like additional information to assist you in reaching a decision about participation, please feel free to contact Laura McCammon-Tripp at 519-888-4567 ext. 36396 or lemccamm@uwaterloo.ca

We would be happy to send you a summary of the results of the research via e-mail or post once they are available. If you are interested, please provide an e-mail or mailing address where the summary can be sent on the attached form and include it with the survey in the return envelope. We expect the results to be available in the fall of 2009.

This research will increase our understanding of how tenants living in multi-unit dwellings are affected, if at all, by second-hand smoke and tenants views on smoking in these buildings. The results of this research will benefit tenants, landlords, researchers and policy makers and may inform future research and policy decisions. As this is an important and new area of research, future studies are planned on this topic. If you are willing to be contacted again regarding future research, please provide your contact information on the form provided. Providing your information does not mean you are obligated to participate in any future research, but only that you may be contacted.

This study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes in the Office of Research Ethics at 519-888-4567 ext. 36005.

Thank you in advance for your interest in this project.

Laura McCammon-Tripp
Student Investigator

Appendix E

Tenant Survey

Section 1 - Background Information

1. How many people, including yourself, live in your unit?
 - One
 - Two
 - Three
 - Four
 - Five
 - Six
 - Seven
 - Eight or more

2. How many of the people living with you are under the age of 18?
 - None
 - One
 - Two
 - Three
 - Four
 - Five or more

3. Are you:
 - Male?
 - Female?

4. How old are you? *Please write your age on the line and then fill in the appropriate numbers:*
 - I am _____ years old

5. Thinking of a typical weekday (Monday to Friday), how many hours a day do you spend at home on average over the course of the whole day?
 - 0-4 hours
 - 5-10 hours
 - 11-15 hours
 - 16-20 hours
 - 21-24 hours

6. Thinking of a typical weekend day (Saturday to Sunday), how many hours a day do you spend at home on average over the course of the whole day?
 - 0-4 hours
 - 5-10 hours
 - 11-15 hours
 - 16-20 hours
 - 21-24 hours

7. What is the highest level of education you have completed?
- High School or equivalent
 - Registered apprenticeship
 - Other trades certificate/diploma
 - College certificate/diploma
 - Other non-university certificate/diploma
 - University certificate or diploma below the bachelor's level
 - University certificate, diploma, or degree at the bachelor's level
 - University certificate, diploma, or degree above the bachelor's level (Master's, PhD., professional degree)
8. What is your total household income, including all earners in your household?
- Less than \$10,000
 - \$10,000 to \$19,999
 - \$20,000 to \$29,999
 - \$30,000 to \$39,999
 - \$40,000 to \$49,999
 - \$50,000 to \$59,999
 - \$60,000 to \$69,999
 - \$70,000 to \$79,999
 - \$80,000 to \$89,999
 - \$90,000 to \$99,999
 - \$100,000 or more
9. Over the course of your lifetime have you smoked 100 or more cigarettes?
- Yes
 - No
10. Have you smoked, even a single puff, in the last 30 days?
- Yes
 - No
11. How long have you lived in this building? *Please write the number of years and months on the appropriate lines and then fill in the corresponding numbers:*
- I have lived here for ____ years and ____ months.
12. Do you allow guests to smoke in your unit?
- No
 - Yes → How often do you let guests smoke in your house?
 - Daily
 - A few times a week
 - A few times a month
 - A few times a year

13. Including yourself, of the people you live with how many smoke inside your unit?

- I don't know → please go to question 14
- None → please go to question 14
- One or more: Please indicate how many _____



How often do you/they smoke inside your unit?

- Daily → please skip to question 21
- A few times a week
- A few times a month
- A few times a year

Section 2 - Experiences with Second-Hand Smoke

14. How often are you exposed to second-hand smoke in your home? This may include smoke coming in from the outside.

- Never
- Sometimes
- Very Often
- Always

15. How often have you noticed tobacco smoke odours entering your unit from a source outside of your unit?

- Never or almost never → please skip to question 21
- At least once a month → please go to question 16
- At least once a week → please go to question 16
- Every day or almost everyday → please go to question 16
- I don't know → please go to question 16

16. When tobacco smoke odour does enter your unit, how much does it bother you or others in your home?

- Not at all
- A little
- A lot
- So much I'm considering moving

17. What is the most common way tobacco smoke odours enter your unit from outside of your unit?

- Through the windows or balcony/patio doors when they are open
- From the hallway
- Through the bathroom or kitchen fans
- Through the ventilation system (i.e. heating or air conditioning vents)
- Through air leaks from other apartments into mine (i.e. cracks in walls, gaps around fixtures)
- Another way: Please explain _____
- I'm not sure how the tobacco smoke odour gets in

18. When you experienced tobacco smoke odour entering your unit from somewhere else, what did you do about it? Did you...(please select Y or N for each)

How much did this help? (please select one answer if you answered "yes" for the action)

	No	Yes	Not at all	Somewhat	A lot
Talk to the people who smoked?	<input type="checkbox"/>				
Turn off the fans?	<input type="checkbox"/>				
Try to mask the smell with air freshener, etc.?	<input type="checkbox"/>				
Close your windows or balcony/patio doors?	<input type="checkbox"/>				
Talked to the people who smoked?	<input type="checkbox"/>				
Seal any leaks in the walls, floors, or ceilings?	<input type="checkbox"/>				
Move to a different unit in the building?	<input type="checkbox"/>				
Move to a new building?	<input type="checkbox"/>				
Something else? If so, what did you do?	<input type="checkbox"/>				

19. Have you ever talked to your landlord/building representative about the problem of tobacco smoke odours entering your apartment from somewhere else?

- No → Why not? (check all that apply)
 - The smoke didn't bother me enough to do anything about it
 - I knew the landlord wouldn't be helpful
 - I didn't think there was anything the landlord could do to help
 - I didn't want to cause a problem in the building
 - Other, please explain: _____
- Yes → What was their reaction to your conversation? (check all that apply)
 - They are unable to do anything about the smoke
 - They offered to speak to the smoker
 - They offered suggestions on how to minimize the amount of smoke entering your unit
 - They did not seem to care or think it was a very big issue
 - Other, please explain: _____

20. Have you ever spoken to anyone else, other than the smoker and your landlord, about the problem of tobacco smoke odours entering your apartment from somewhere else?

- No
- Yes → Who have you spoken to? (*check all that apply*)
 - The public health department
 - Advocacy groups, please indicate who: _____
 - Government officials
 - Other tenants
 - Friends and family
 - Other, please specify: _____

Section 3 - Experiences with Smoking Restrictions in Multi-Unit Dwellings

21. Is smoking allowed in any of the following areas of your building? (*select one for each area, if your building does not have this select "not applicable"*)

Thinking of the last three months, how often have you noticed individuals smoking in each of the areas where it was not allowed? (*select one for each "no" response*)

	No	Yes	N/A	Never	Sometimes	Often
All residential units						
Some residential units	<input type="checkbox"/>					
Hallways	<input type="checkbox"/>					
Laundry room	<input type="checkbox"/>					
Lobby	<input type="checkbox"/>					
Party rooms	<input type="checkbox"/>					
Gyms or indoor pool areas	<input type="checkbox"/>					
Balconies or patios	<input type="checkbox"/>					
Ground level parking lot	<input type="checkbox"/>					
Underground parking lot	<input type="checkbox"/>					
Outside the building entrance	<input type="checkbox"/>					
On the building grounds	<input type="checkbox"/>					

Section 4 – Views on Smoking

22. Which of the following statements do you agree with the most?

- People smoking inside a building does not increase the risk of fires
- People smoking inside a building slightly increases the risk of fires
- People smoking inside a building increases the risk of fires
- People smoking inside a building increases the risk of fires a lot
- I'm not sure how much people smoking inside a building increases the risk of fires

23. Do you or any of the others in your home have health problems that get worse when you breathe in second-hand smoke?

- Yes
- No
- I don't know

24. Do you or others in your home suffer from any of the following health problems?

	Yourself		Others in your home	
	No	Yes	No	Yes
Asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Respiratory issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic cough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ear infections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nose and/or throat irritation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic heart disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. Which of the following statements do you agree with the most?

- Second-hand smoke is not at all harmful to people's health
- Second-hand smoke is not very harmful to people's health
- Second-hand smoke is somewhat harmful to people's health
- Second-hand smoke is very harmful to people's health
- I'm not sure how harmful second-hand smoke is to people's health

26. Which of the following statements do you agree with the most?
- Second-hand smoke that drifts into individual units from somewhere else in the building or from outside the building is not at all harmful to people's health
 - Second-hand smoke that drifts into individual units from somewhere else in the building or from outside the building is not very harmful to people's health
 - Second-hand smoke that drifts into individual units from somewhere else in the building or from outside the building is somewhat harmful to people's health
 - Second-hand smoke that drifts into individual units from somewhere else in the building or from outside the building is very harmful to people's health
 - I'm not sure how harmful second-hand smoke that drifts into individual units from somewhere else in the building or from outside the building is to people's health

Section 5 - Opinions on Smoke-Free Housing

27. If smoking was not allowed anywhere in your building, how easy would it be for you to ensure no one, including your guests, smoked in your apartment?
- Not easy at all
 - Not very easy
 - Somewhat easy
 - Very easy
28. If smoking was not allowed anywhere in the building, including all the individual units, how easy do you think it would be for your landlord to enforce the rule?
- Not easy at all
 - Not very easy
 - Somewhat easy
 - Very easy
29. Which of the following statements do you agree with the most?
- I would not be interested in living in a building where smoking is not allowed anywhere
 - I would be somewhat interested in living in a building where smoking is not allowed anywhere
 - I would be very interested in living in a building where smoking is not allowed anywhere
 - I would be extremely interested in living in a building where smoking is not allowed anywhere
30. Which of the following buildings would you prefer to live in?
- A building with no smoking restrictions at all
 - A building where smoking is banned in units on a specific wing or floor
 - A building where smoking is banned in the entire building, including all units
 - A building where smoking is banned in the entire building, including all units including balconies and patios
 - A building where smoking is banned in the entire building, including all units, all balconies and patios, and on the entire property, including green space and parking lots

31. If you were planning to move, would you be willing to do the following to live in a building that was designated as smoke-free? (*Assume the apartments are the same in every other way; select one answer for each*)

	No	Maybe	Yes	Not Applicable
Drive 10 minutes further to work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Travel 10 minutes further to recreation areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walk 3 blocks further to the bus stop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a somewhat less safe neighbourhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a somewhat noisier neighbourhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a building without underground parking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a building with somewhat less security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a building that was 20 years older	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a unit with one less bedroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a unit with smaller rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a building with older carpets and cabinets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live in a unit with no dishwasher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for your help with this important research! Please send the survey back to us with the completed permission to contact you for other research studies form in the prepaid envelope as soon as possible.