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# Increased knowledge of the effects of smoking and second-hand smoke encourages smoke-free homes

**Key messages**

- There are high levels of support for smoke-free homes in all four cities
- There are high levels of reported exposure to second-hand smoke
- Knowledge of some aspects of smoking and second-hand smoke exposure is varied but especially poor in the Indian and Chinese cities /samples
- Knowledge of second-hand smoke exposure risks, addictiveness of tobacco, level of smoking, concern for other house residents and anti-tobacco social marketing all affect smoke-free home support

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## Abstract

**Objective**

To establish the drivers for smoke-free homes among current daily smokers.

**Design**

A cross sectional study employing interviews (adults) and self-completed surveys (schoolchildren).

**Sample**

Children aged 12 and 14 in schools in four cities in China, India, Mexico and England. Adults in the community.

**Measurements**

Knowledge, attitude, beliefs and behaviour relevant to second-hand smoke in the home.

**Intervention**

None

**Results**

8,994 adults and 14,756 children were surveyed. Knowledge of some of the effects of tobacco is high, but others are poorly understood in all cities. In Thiruvananthapuram there is a lack of awareness of the addictiveness of tobacco and Hangzhou has poor knowledge in general.

**Conclusions**

Messages about reducing tobacco usage are effective in support of smoke-free homes in the city with poorest knowledge (Hangzhou) but other factors are more important where knowledge is high.

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# Introduction

## Objectives of the study

The aim of this study is to establish the drivers for smoke-free homes among current daily smokers.

## Background

Second-hand smoke is associated with morbidity and mortality for both adults and children. A 2004 global study with data from 192 countries revealed that more than 600,000 deaths which represent 1% of worldwide mortality, and more than ten million disability-adjusted life-years worldwide were due to second-hand smoke exposure (Oberg, Jaakkola, Woodward, Peruga, & Pruss-Ustun, 2011). There is a secular trend of increasing smoke-free homes. From 1992 to 2003 in the United States of America even children living with at least one smoker are increasingly likely to live in smoke-free homes (Anon, 2007) with an increase from 10% to 32% among households with at least one smoker and from 57% to 83% among households with no smoker. In Scotland the smoke-free legislation reduced second-hand smoke exposure in children (P. Akhtar, Currie, Currie, & Haw, 2007) despite responses that it did not affect smoking in the home (Robinson, et al., 2010) (Phillips, Amos, Ritchie, Cunningham-Burley, & Martin, 2007) and that mothers who smoke can be limited by their physical environment

in creating restricted spaces for smoking (Robinson & Kirkcaldy, 2007). The largest reduction in second-hand smoke exposure after the Scottish smoke-free legislation was in non-smokers living in non-smoking houses (Haw & Gruer, 2007) but there was no evidence of increased exposure associated with displacement of parental smoking in the home (P. Akhtar, et al., 2007).

Factors that may impact on the level of smoke exposure in the home may include the number of persons on smoke-free homes have found that voluntary home restrictions on smoking were associated with quitting as well as a reduced number of cigarettes smoked (Mills, Messer, Gilpin, & Pierce, 2009). In Nottingham in the midlands of England knowledge of the dangers of second-hand smoke exposure was incomplete and confused and it was proposed that providing evidence of the harm to children would promote smoke-free homes (Jones, et al., 2011). In Merseyside, in the northwest of England, parents of newborn babies protected them from second-hand smoke exposure but the protection was often removed weeks to months after birth as it was believed older children were not adversely affected (Robinson & Kirkcaldy, 2009), which again suggests greater knowledge might encourage smoke-free homes. Socioeconomic classification and affluence are related to second-hand smoke exposure with increased cotinine levels from high to low socioeconomic classification and affluence (P. C. Akhtar, Currie, Zachary, & Currie, 2010).

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Children from deprived households are more likely to be exposed to second-hand smoke (Sims, et al., 2010). Restrictions of home smoking are associated with lower second-hand smoke exposure and complete restriction was related to the lowest exposure (P. C. Akhtar, Haw, Currie, Zachary, & Currie, 2009). Interventions to create smoke-free homes have been developed in a variety of countries, with mixed success (Alwan, Siddiqi, Thomspon, Lane, & Cameron, 2011; Mittal & Das, 2011; Siddiqi, et al., 2010). An important and modifiable factor associated with supporting/having a smoke-free home is knowledge about the harm second-hand smoke can cause (Wilson, et al., 2010).

Social de-normalisation is high in the UK with 77% of smokers reporting society disapproves of smoking with similar values in the USA and Australia though higher values are seen in Canada (88%) (Hammond, Fong, Zanna, Thrasher, & Borland, 2006). De-normalisation in China, Mexico and India is evident from recent policies and laws. For example in China a new public policy banned smoking in many public places from May 1 2011 and from April 2012 cigarette packages show warnings. However cigarette gifting customs mitigate against de-normalisation (Zhang, Chan, Fong, Malone, & Lam, 2012). In a comparison of ten high income and six middle income countries the percentage of smokers and former smokers reporting that smoking is not allowed in the workplace was lowest in the United Kingdom (5.7%) with Mexico showing the lowest value for a middle income country (12.4%) and highest in China (73.9%) suggesting that the

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UK and Mexico have much higher social de-normalisation than China (The International Tobacco Control Policy Evaluation Project, 2012). In India advertising, promotion, and sponsorship have also been banned since October 2008 and from 2003 by law banned smoking in public places. In Mexico in 2007, 77% of smokers agreed or strongly agreed that people have the right to breathe smoke-free air (The International Tobacco Control Policy Evaluation Project, 2009). Support for smoke free workplaces was strong even among current smokers in India (69.5%) (Raute, Pednekar, Gupta, Fong, & Quah, 2012). While these various sources are not using directly comparable data in all cases it is reasonable to conclude the rank order of social de-normalisation of tobacco is highest in the UK, lowest in China with Mexico and India closer to the UK than China.

In this paper we present data from cities in China, India, the UK and Mexico. All had tobacco bans in place in public indoor spaces at the time of data collection; however enforcement of the bans varied widely. Smoking bans are largely infeasible for personal spaces, but educational campaigns could result in a greater number of smoke-free homes in diverse countries globally, especially those with high rates of tobacco use.

Leicester has two main ethnic groups, British White (45.7%) and Asian or British Indian (31.1%) with a large number of very much smaller ethnic groups (figures from 2011 UK census). Leicester is a young city, 45% of residents are under 29

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years old. Leicester is 20th poorest in England 2008 and getting poorer (2005 was ranked 35th poorest city). Some areas fall within the most deprived 5% of all areas in England. (Roberts-Thomson, 2009) Kerala has the highest social development indices in India with a high literacy rate and life expectancy. Hinduism is the predominant religion and the dominant ethnic group is Malayali; Malayalam is spoken by 96% of the population. Mexico City has a population of about ten million and Greater Mexico City is the largest metropolitan area in the western hemisphere and it is one of the richest metropolitan areas in the world. It is an ethnically diverse city, predominantly Catholic and Spanish speaking. Hangzhou City is the capital of Zhejiang Province, is located in the eastern part of China and is a rapidly expanding city with a population of roughly eight million in 2008, of which 69% lived in urban areas. Hangzhou City was the eighth richest city in China in 2008. It has high life expectancy similar to developed countries and the people are highly educated with about 16% having tertiary education, compulsory secondary education and high school enrollment of nearly 99%. Mandarin is the dominant spoken language. More than 99% of residents are from the Han ethnic group.

**Null Hypotheses**

The variables geographical location, knowledge about the effects of smoking and second-hand smoke, readiness to quit smoking and quit attempts, gender,

children or other adults in the house, level of education, level of smoking are all not significantly associated with support for smokefree homes.

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## Methods

### Design

This study is a cross-sectional study as part of a larger (Community Interventions for Health (CIH)) quasi-experimental study of interventions to reduce the three main risk factors for chronic disease - tobacco use, unhealthy diet and physical inactivity. Data collection and intervention took place in four settings: community, schools, workplaces, and community health centres. The methods of the CIH Study are described in O'Connor, Duffany et al (2011).

Ethical approval was granted at each site through their local ethics committees (China: IRB00001052-08003 certified by Peking University Medical Ethics Committee, India: IEC/184, Mexico: Oficio JST /1003 /08, UK De Montfort University Ethics Committee: HLSFREC: 444). Written or verbal informed consent was obtained from the participants prior to the start of the interview for the adult survey. Children and parents were similarly informed and consent was obtained. For example in the UK participant information sheets were given to children and parents explaining that completion of the survey were voluntary and anonymous and consent sheets were given to parents to allow them to opt out their child. Completion of the child survey was assumed to give consent. Both surveys were anomised.

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The subjects are from adult and child samples from Hangzhou (China), the area surrounding Thiruvananthapuram city (Kerala, India), Mexico City (Mexico) and Leicester (UK). Sites were selected based upon previous community work on non-communicable diseases (NCDs) /NCD risk factors. Data were collected in late 2009.

**Sample**

For each of the four sites the target was to sample 2,000 adults and 4,000 children. These figures were based on a power analysis to test the original hypotheses of CIH that were all concerned with interventions to improve the risk factors of chronic disease such as tobacco smoking. We over-recruited and obtained larger samples, especially for children.

For adults a random cross-sectional sample of subjects 18–65 years of age was obtained employing the Kish method (Kish, 1949) to select individuals within the households to ensure an even selection by age and gender. For children at least two classrooms (those that had the most 12 year olds and 14 year olds) from each school were randomly selected. These ages were chosen as they could report on their own behaviours (younger children require their parents complete surveys). Among the adults almost all smokers (92%) were daily smokers and 30% were not in favour of smoke-free homes compared with only 7% of non-smokers. Therefore we included daily smokers and excluded occasional smokers and non-smokers as the daily smokers were the group where there was most

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possibility of beneficial change. Surveys were self completed in schools and by interviews in the community.

Data were entered into SPSS by trained staff. Error-checking was conducted on a 10% random sample of the entered surveys. As a second level of error-checking, each country's submitted dataset was cleaned by the coordinating centre's biostatistician to identify errors and data inconsistencies which were addressed by data staff on site in each of the participating countries.

**Measures**

The data described herein are from the survey of adults selected from the community and interviewed face-to-face by trained interviewers and a self-completed survey of schoolchildren in those classes containing mostly 12 and 14 year olds. The survey questions were taken from existing validated questionnaires, in some cases modified (O'Connor Duffany, et al., 2011). Of relevance to this paper the surveys include contributions from previously developed, reputable surveys the Global Adult Tobacco Survey (Centers for disease control and prevention, 2009a) and the Global Youth Tobacco Survey (Centers for disease control and prevention, 2009b) .

The questions on tobacco included tobacco use (both quantity and frequency of use), quit attempts, exposure to the smoking of others, exposure to positive and negative messages about tobacco use, knowledge of harmful effects of smoking

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(including second-hand smoke exposure) and support for smoke-free policies in indoor and outdoor public and private spaces.

**Analytic Strategy**

All statistical analyses were conducted in SPSS v19. Nonparametric statistical methods were utilised as no analysed variables were approximately normally distributed. After univariate analyses, effects were examined multivariately in logistic regression where a backward stepwise approach was used to create a reduced, parsimonious model.

## Results

The overall adult community sample in the four sites was 8,940 adults at baseline which breaks down to Hangzhou (2,016, 48.5% male), Thiruvananthapuram (2,178, 46.0% male), Mexico City (2,000, 47.1% male) and Leicester (2,746, 46.1% male). On average there was a 25% combined nonresponse and refusal rate. There was variation by country, with the lowest rate in India at 20%. Rates in China and Mexico were closer to 30% because the lists of household units that were obtained were out-of-date. While there were more up-to-date census data, these were not yet accessible so previous census lists had to be utilized. In China, this meant that many of the buildings had been torn down or people gone. In addition, in the China sampling area there was a large population of elderly which meant that sampling had to continue in order to get persons in the required age range of 18-65. In Mexico, this meant generating

additional random lists of households as the census did not differentiate between business/industrial and residential units. For children there was a 100% response rate with no refusals to complete the questionnaire though some children may have been absent on the survey day for reasons of illness.

The prevalence rate of smoking and the gender breakdown of smokers varied across country, with the highest rate of current daily smoking occurring for Hangzhou males (40%), followed by Leicester males (29%), Thiruvananthapuram males (26%) and Mexico City males (22%) (adult data on smoking not shown). In addition to having a higher rate of smoking, Hangzhou respondents tended to be heavier smokers and have fewer attempts to quit in the last year. Smoking rates for women in Hangzhou and Thiruvananthapuram were negligible, but 10% of Mexico City adult women and 19% of Leicester adult women were currently smoking daily.

At baseline data for children came from 26 schools in Hangzhou, 40 in Thiruvananthapuram, 29 in Mexico City and 5 in Leicester with a total of 14,756 children. There were many fewer children in the Leicester site in part due to the different demographic pattern in the UK, and in part as some schools did not join the study in Leicester. The response rates and gender breakdown are shown in Table 2.

There were 1,769 adult current daily smokers in the cross-country sample used in these analyses. As seen in Table 1, the vast majority of smokers (68-98%)

reported having another adult living in their household and roughly one-half to two-thirds of smokers reported having at least one child under the age of eighteen in their household (44-67%). Support for smoke-free homes was high but so also was exposure to second-hand smoke. Knowledge regarding the harmful effects of second-hand smoke varied across countries (Figure 1). For example, the knowledge that smoking could affect children's lung problems was reported by over half of Hangzhou daily smokers (54%), three-quarters of Thiruvananthapuram smokers (74%), four fifths of Leicester (82%) and almost all Mexico City smokers (95%). Mexico City's knowledge rates were always the highest, while presence of knowledge about the link between second-hand smoke and sudden infant death syndrome was the least-endorsed condition in all countries. Similarly, we see variation in smoke-free home support by adult current daily smokers across countries, with a low of 39% in Leicester and 49% in Hangzhou compared to 82% in Thiruvananthapuram and 80% in Mexico City (Table 1).

That there is a problem of second-hand smoke exposure is evident from Table 2, with data from the schools survey showing high levels of smoking in Mexico City and Leicester, but particularly second-hand smoke exposure in schoolchildren. Children most often report a male caregiver as a smoker which was expected given the prevalence data; children did report smoking by other family members including their siblings. Reported exposure to second-hand smoke by school

children in settings where smoking has been banned (e.g., restaurants, schools) is somewhat surprising. Table 1, with data from the adult survey, shows high levels of support for smoke-free homes and very high levels of second-hand smoke exposure.

Knowledge of the effects of smoking and second-hand smoking (see Figure 1), other adults in house, other children in the house, gender, readiness to quit smoking, age of first smoking, recent attempts to quit smoking, and level of education were examined for relationship with support for smoke-free homes (Table 3). All directions of effect were as predicted with greater knowledge, presence of other adults or children in the home associated with more support for smoke-free homes, except gender (males more in support) and education (higher educated less in support)[1].

We used logistic regression employing a backward conditional method with dependent variable smoke-free home support and the independent variables

[1] Considering only non-smokers in the analysis reversed the education relationship to the expected direction, with higher educated people more in support of smoke-free homes. There was no difference between the genders, so the effects detailed in this paper seem specific to smokers.

those found significant in univariate analysis as above at an alpha level of 0.1 [2]. The variables that remained significant are shown in Table 4; their effect sizes were consistently small to modest (0.12-0.18). Since the four cities are very different with respect to, for example, knowledge about smoking and second-hand smoke exposure, we conducted a logistic regression sub-analysis by country. These analyses showed similar results as the combined data with knowledge of effects of smoking and second-hand smoke exposure, other adults in the house, level of smoking, readiness to quit smoking all significant in two or three cities. Smoking reduction messages were only significant for Hangzhou.

[2] Final multivariable model - Cox & Snell recorded $R^2$=0.196 and Hosmer & Lemeshow p=0.117.

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## Limitations

The data utilized in this paper are self reported and therefore liable to bias and error. While the samples are likely to be representative of the areas they may not be representative of the countries in the study.

## Discussion

As expected, the areas involved in CIH (Hangzhou, Thiruvananthapuram, Mexico City and Leicester) are at different phases in the trajectory of population smoking, including adoption by women and public health efforts to reduce and ban smoking because of its effects to smokers as well as those exposed to second-hand smoke. In all four sites, men smoke more than women. Leicester in unusual in having two ethnic groups, British White (45.7%) and Asian or British Indian (31.1%) with a large number of very much smaller ethnic groups – the next largest being Other White (3.6%). The smoking rates for women in the Asian or British Indian group in Leicester are low (2.5% compared with 18% for men) but in the British White group in Leicester 32% of women smoke and 38% of men. The vast majority of smokers in all four countries live with others therefore exposing them to second-hand smoke. The high rates of other adults and children under the age of 18 in the households of current daily smokers demonstrate the importance of smoke-free homes for keeping both adults and

children healthy by removing exposure to second-hand smoke where they live. Support for smoke-free homes was higher among smokers in Thiruvananthapuram or Mexico City compared to Hangzhou or Leicester.

The CIH study findings add to the literature on smoke-free home since its surveys were comprehensive and include multiple countries. The univariate analyses support the majority of findings of the literature on implementation of smoke-free homes, for example greater level of support for smoke-home associated with having a child or another adult in the home, smoking less, having tried to quit in the last 12 months (stopped for $\geq$24 hours), possessing belief/knowledge of the negative health effects of smoking, and knowledge of harm of second-hand smoke exposure. New findings include greater level of support for smoke-home associated with later stage of change regarding quitting smoking, knowledge of the addictiveness of tobacco, and preventive tobacco messages.

Although the data are cross-sectional in nature, we can thereby see the variety in knowledge regarding both smoking and second-hand smoke exposure and the association of these with support for smoke-free home which provides suggestions for cost-effective policy. This is especially the case considering the cost of second-hand smoke exposure against the relatively low cost of producing educational materials. Mexico has high rates of knowledge about harm of both primary and second-hand smoking as well as health promotion messaging.

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Knowledge findings are supported by previous literature from the state of Kerala that the link between tobacco and cancer is most often known (Pradeepkumar, et al., 2005). A study of diabetic patients in Kerala found that approximately half of diabetic patients believed there is no link between smoking and diabetes and none believed that second-hand smoke could exacerbate diabetes. The rate of knowledge of the harmful effects of second-hand smoke is similar to that reported in a community study of awareness of the Cigarettes and Other Tobacco Products Act (COPTA) in Assam Thiruvananthapuram (Sharma, Sarma, & Thankappan, 2010). We concur with the authors of the diabetes study who recommended anti-tobacco messages to patients are specific regarding the consequences of smoking on health conditions in order to impact people's tobacco habits. The fact that 45% of Thiruvananthapuram current daily smokers in the CIH study rated that they neither agree nor disagree with the statement that tobacco is addictive is disconcerting. Targeted efforts need to be made to address knowledge gaps – for example in Hangzhou to increase the support for smoke-free homes among smokers. It is critical to increase knowledge about second-hand smoke harm to children among smokers; this is particularly true in countries such as India where there are a multitude of barriers that exist simultaneously – namely that smoking is common, is higher among men than women, home space is not conducive to separation of smokers and the rest of

the family, and women are less powerful vis-à-vis decision-making power with respect to tobacco smoking in the home.

The CIH study adds to our knowledge of support for smoke-free homes in four diverse settings (Hangzhou, Thiruvnanthapuram, Mexico City and Leicester). Increased knowledge of the harmful effects of smoking is associated with increased support for smoke-free homes, even after adjustment for numerous other covariates. Increasing knowledge of the harmful effects of smoking in these diverse settings can been done at relatively low cost, taking advantage of best practices that are successful in these settings such as piggybacking on the work of community health workers and health outreach projects. The findings show some country-specific effects that suggest where interventions may have the most impact, for example tobacco messaging on prevention/reduction has an association with support for smoke-free home in Hangzhou, not seen in the other sites. Thus we could imagine placing priority on these different educational interventions in different settings.

The cities differ in their attitude to smoke-free homes with Leicester being the least favourable. Given the substantial public health initiatives aimed at smokers in the UK, it is likely the remaining smokers are a group particularly resistant to change. They know the dangers of smoking and messages about smoking may have little impact. When considering the fact that there is a high level of knowledge of the effect of SHS and low support for smoke-free homes, it is also

important to keep in mind that Leicester is among the poor areas of the UK, while the other three CIH sites are relatively affluent compared to other places in their respective countries. Knowledge of the effects of smoking and second-hand smoke exposure in Hangzhou is the lowest, and only here do messages about smoking seem to have a significant effect on attitude to smoke-free homes. It is likely that until knowledge in Hangzhou reaches that of the other cities such as Mexico City, social marketing to address this knowledge deficit will be useful as has been shown elsewhere. For example in India social marketing employing television and radio was considered effective in raising awareness of the dangers of smokeless tobacco where the majority of smokeless tobacco users recalled the campaign and most of these stated it made them stop and think and made them concerned about their habit (Murukutla, et al., 2012). Another national social marketing campaign, also using radio and television in India did however show differences in reach as campaign recall was greater in urban areas than rural (Turk, et al., 2012). However in rural areas proximal indicators of effectiveness such as whether the campaign made them stop and think, provided new information or made them concerned was higher so among those the campaign reached in rural areas it was more effective (Turk, et al., 2012). Knowledge of the effects of tobacco are generally high, though in Kerala a lack of awareness of the addictiveness of tobacco was seen and in Hangzhou knowledge of second-hand smoke exposure was poor. Messages about reducing

tobacco usage are effective in support of smoke-free homes where knowledge of the effects of smoking is poor.

Since knowledge affects smoke-free home support, nurses working in all sectors should take the opportunity when discussing tobacco use with patients to emphasise the effects of second-hand smoke. This is particularly important in areas where knowledge is poor such as (in these samples) India and China. Nurses working in public health should consider social marketing, including innovative methods such as employing social networking arenas like twitter and facebook, since this also may affect smoke-free home support.

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Table 1: Current daily adult smokers – Key indicators by country (%)

| | Hangzhou N=281 | Thiruvananthapuram N=170 | Mexico City N=304 | Leicester N=647 |
|---|---|---|---|---|
| Other adult(s) in the household | 92.5 | 98.2 | 88.2 | 67.8 |
| Child(ren) under 18 in household | 43.8 | 57.1 | 66.8 | 49.8 |
| Support smoke-free homes | 48.8 | 82.4 | 79.6 | 39.0 |
| Exposure to second-hand smoke | 93.2 | 98.8 | 88.2 | 76.4 |

Increased knowledge of the effects of smoking and second-hand smoke encourages smoke-free homes

**Table 2: Children smoking and second-hand smoke exposure (%)**

| | Hangzhou N=4549 | Thiruvananthapuram N=4459 | Mexico City N=4608 | Leicester N=533 |
|---|---|---|---|---|
| Gender (% Boys) | 52.1 | 50.8 | 45.2 | 45.7 |
| Ever smoked | 7.2 | 3.8 | 28.1 | 26.7 |
| Current smoker | 1.9 | 1.8 | 14.5 | 11.8 |
| Which members of your household use any form of tobacco? | | | | |
| • My father or male guardian | 57.3 | 34.2 | 27.9 | 31.4 |
| • My mother or female guardian | 2.1 | 1.4 | 13.2 | 28.4 |
| • My grandparents | 12.9 | 9.5 | 11.3 | 13.1 |
| • My siblings | 2.6 | 2.1 | 9.5 | 15.2 |
| During the past 30 days, in which of the following places has anyone smoked while you were there? | | | | |
| • Your home | 45.3 | 32.9 | 34.9 | 40..8 |
| • A friend's home | 20.0 | 16.7 | 20.1 | 31.6 |
| • Your work | 4.7 | 18.3 | 9.6 | 2.9 |
| • A private office building | 16.3 | 6.1 | 3.9 | 3.7 |
| • A school | 21.0 | 8.9 | 11.5 | 35.3 |
| • A health centre | 11.8 | 4.2 | 2.5 | 4.0 |
| • A restaurant | 56.3 | 20.8 | 14.2 | 10.0 |
| • A government building | 10.1 | 9.8 | 3.5 | 2.8 |

Increased knowledge of the effects of smoking and second-hand smoke encourages smoke-free homes

**Table 3: Univariate analyses of support for smoke-free homes (Outcome Yes/No): Adult data**

| Variable | Test | P value | Effect size (Phi/Cramer's V for chi square tests) |
|---|---|---|---|
| Smoking causes | Chi square | 0.09 | 0.09 |
| • Stroke | | | |
| • Lung cancer | Chi square | <0.001 | 0.10 |
| • Heart attack | Chi square | <0.001 | 0.12 |
| • Miscarriage | Chi square | 0.08 | 0.06 |
| • Cataracts | Chi square | 0.29 | n/a |
| • Low birth weight babies | Chi square | 0.012 | 0.07 |
| Second-hand smoke exposure causes | Chi square | <0.001 | 0.12 |
| • lung cancer | | | |
| • heart attack in adults | Chi square | <0.001 | 0.13 |
| • lung problems in children | Chi square | <0.001 | 0.12 |
| • sudden infant death syndrome | Chi square | <0.001 | 0.13 |

Increased knowledge of the effects of smoking and second-hand smoke encourages smoke-free homes

| Variable | Test | P value | Effect size (Phi/Cramer's V for chi square tests) |
|---|---|---|---|
| Tobacco is addictive | Mann Whitney | <0.001 | |
| Low tar cigarettes are less harmful | Mann Whitney | 0.016 | |
| Other adults in house | Chi square | <0.001 | 0.18 |
| Other children in house | Chi square | <0.001 | 0.12 |
| Gender | Chi square | <0.001 | 0.10 |
| Age started smoking | Mann Whitney | <0.001 | |
| Have you stopped using tobacco for 24 hours or more | Chi square | <0.001 | -0.173 |
| Ready to quit smoking | Chi square | <0.001 | 0.170 |
| Level of education | Mann Whitney | <0.001 | |
| Level of smoking | Mann Whitney | <0.001 | |

Increased knowledge of the effects of smoking and second-hand smoke encourages smoke-free homes

**Table 4: Logistic regression (Predicting support for smoke-free homes; Leicester is reference category in country variable): adult data**

| Variable | P value | Odds ratio |
|---|---|---|
| Hangzhou | <0.001 | 2.25 |
| Thiruvananthapuram | <0.001 | 3.98 |
| Mexico City | <0.001 | 4.10 |
| Ready to quit smoking (3 level ordinal scale - ready now, thinking about it, not ready) | <0.001 | 1.58 |
| Second-hand smoke does not causes heart disease in adults | 0.002 | 0.51 |
| Don't know if second-hand smoke causes sudden infant death syndrome | <0.001 | 0.52 |
| Tobacco is addictive (5 point Likert scale) | 0.002 | 1.01 |
| Level of smoking (number cigarettes and other smoking products per day) | 0.004 | 0.98 |
| Messages for reducing tobacco use (count of 17 possible sources – television, radio, posters etc.) | 0.068 | 1.04 |
| Presence of other adults in the house | 0.001 | 1.70 |
| Presence of children in the house (yes/no) | 0.043 | 1.26 |