Use of less expensive cigarettes in six cities in China: findings from the International Tobacco Control (ITC) China Survey

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ABSTRACT

Objective The existence of less expensive cigarettes in China may undermine public health. The aim of the current study is to examine the use of less expensive cigarettes in six cities in China.

Methods Data was from the baseline wave of the International Tobacco Control (ITC) China Survey of 4815 adult urban smokers in 6 cities, conducted between April and August 2006. The percentage of smokers who reported buying less expensive cigarettes (the lowest pricing tertile within each city) at last purchase was computed. Complex sample multivariate logistic regression models were used to identify factors associated with use of less expensive cigarettes. The association between the use of less expensive cigarettes and intention to quit smoking was also examined.

Results Smokers who reported buying less expensive cigarettes at last purchase tended to be older, heavier smokers, to have lower education and income, and to think more about the money spent on smoking in the last month. Smokers who bought less expensive cigarettes at the last purchase and who were less knowledgeable about the health harm of smoking were less likely to intend to quit smoking.

Conclusions Measures need to be taken to minimise the price differential among cigarette brands and to increase smokers’ health knowledge, which may in turn increase their intentions to quit.

INTRODUCTION

It is well accepted that the most effective way to reduce cigarette consumption is to raise the price of cigarettes. Most econometric studies conducted in Western countries yielded price elasticity for cigarette demand estimates between −0.3 and −0.5, which implies that a 10% increase in cigarette price may result in 3% to 5% decrease in cigarette consumption. Article 6 of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC), the first ever global public health treaty, asks party countries to raise the price of and tax on tobacco products.

Economists used to believe that cigarette price elasticity was higher in developing countries compared to developed countries. However, several studies suggest that China may have lower price elasticity than Western countries. For example, Lance et al estimated that the price elasticity in China was −0.082; and Mao et al concluded that price elasticity in China was −0.15. One possible interpretation proposed by Mao et al is that smokers’ brand switching behaviour from expensive cigarettes to cheaper cigarettes lowered price elasticity.

As shown in figure 1, when cigarette price goes up, smokers have different responses. Besides quitting and consumption reduction, some smokers may switch to less expensive brands or engage in tax avoidance behaviours; some smokers may purchase cigarettes from different retail outlets such as tobacco discount stores; there are also smokers engage in compensating behaviours, for example, switching to cigarettes higher in tar and nicotine. The current study focuses on the use of less expensive cigarettes in China.

Like most goods, the price of cigarettes differs among brands. Examples include the three-tier cigarette pricing structure in the US (premium, discount and generic) and Australia (premium, mainstream and supervalue). China is the largest cigarette-producing country in the world, and cigarette prices vary considerably among brands. In 2006, there were 40 tobacco companies producing more than 200 domestic cigarette brands in China, and within brand families there were multiple brand varieties. Chinese cigarettes are classified into different grades according to the quality of tobacco leaves and the price of cigarettes. As shown in table 1, according to the classification criteria of the China National Tobacco Company, there are five grades of cigarettes in China. The factory price of grade 1 cigarettes is at least six times higher than grade 5 cigarettes. In addition, China has a two-tier taxing system for cigarettes. Namely, the tax rate for higher grades of cigarettes is higher than lower grades of cigarettes, which further widens the price differential among different grades of cigarettes.

The tobacco monopoly system in China has policies that guarantee the supply of low-level (grades 4 and 5) cigarettes. China National Tobacco Company requires local tobacco companies produce certain amounts of low-level cigarettes each year and subsidises them to compensate for the relatively low profit margin. Thus, the production and the sale of low-level cigarettes in China are maintained according to objectives set by the China National Tobacco Company. For example, in 2006, 24.9% (505.9 billion sticks) of the cigarette production and 24.7% (500.6 billion sticks) of the cigarette sales in China were low-level cigarettes. The China National Tobacco Company claimed that low-level cigarettes may help satisfy low-income populations’ needs.

Cummings et al reported that in the US, smokers of discount or generic cigarette brands tend to be Caucasian, more addicted to smoking and to have...
a lower income. Studies also suggest that poorer and heavier smokers are sensitive to changes in cigarette prices and more likely to engage in tax-avoidant behaviours. Researchers proposed that less expensive cigarettes may undermine the public health effects of price and tax policies. Theoretically, when cigarette prices increase, smokers may switch to less expensive cigarettes to minimise the financial burden and to maintain their smoking habit. As shown in Figure 1, after a price increase, smokers who switch to less expensive cigarettes may not perceive much additional financial burden and may not choose to quit or reduce consumption. Given the enormous price differential among cigarette grades in China, it is particularly important to examine the use of less expensive cigarettes because of the increased potential for smokers to choose lower priced cigarettes. The aim of the current study is to determine the major characteristics of smokers of less expensive cigarettes, and whether the use of less expensive cigarettes is associated with decreased intentions to quit smoking.

### METHODS

#### The International Tobacco Control (ITC) China Survey

The ITC China Survey is a prospective cohort survey in six cities in China: Beijing, Shanghai, Guangzhou, Shenyang, Changsha and Yinchuan. The six cities were selected based on their size, diverse geographic location and level of economic development. Table 2 shows the registered population, gross domestic product (GDP), per capita annual disposable income and consumption expenses in 2006 in each of the six cities. The wave 1 survey was conducted between April and August 2006. In each wave, about 800 smokers and 200 non-smokers were interviewed in each city. Participants included in this study come from 4815 smokers who responded to the following two questions: (1) ‘The last time you bought cigarettes for yourself, how much did you pay for each pack of the cigarettes?’ For smokers who didn’t remember price paid per pack, the price was calculated from the smokers’ response to the following two questions: (1) ‘The last time you bought cigarettes for yourself, how much did you pay for all the cigarettes you bought last time?’ In this study, less expensive cigarettes were defined as cigarettes with reported prices paid in the lowest tertile within each city (coded as 1), whereas cigarettes with reported prices paid in the middle or the highest tertile were defined as regular cigarettes (coded as 0).

#### Intention to quit smoking

We asked current smokers: ‘Are you planning to quit smoking?’ Smokers who responded ‘within the next month’, ‘within the next 6 months’, or ‘sometime in the future, beyond 6 months’

#### Measures

**Dependent variables**

- **Purchase of less expensive cigarettes**
- **Per capita annual disposable income**
- **Per capita annual consumption expenses**

**Table 2.** City population, gross domestic product (GDP), per capita annual disposable income and consumption expenses in 2006*

| City        | Number of registered residents | GDP    | Per capita annual disposable income (¥) | Per capita annual consumption expenses (¥) |
|-------------|--------------------------------|--------|----------------------------------------|-------------------------------------------|
| Beijing     | 11                             | 7720   | 19978                                  | 19978                                     |
| Guangzhou   | 5                              | 6068   | 19851                                  | 15445                                     |
| Shanghai    | 13                             | 10297  | 20686                                  | 14762                                     |
| Changsha    | 2                              | 1791   | 13924                                  | 10680                                     |
| Shenyang    | 6                              | 2483   | 11651                                  | 8670                                      |
| Yinchuan    | 1                              | 335    | 10068                                  | 8288                                      |

*Data were from Statistical Report on the 2006 Economic and Social Development of each city.
† Data were not available for 2006 in Beijing.
were defined as having any intention to quit smoking (coded as 1), whereas smokers who responded ‘not planning to quit’ or ‘don’t know/cannot say’ were defined as ‘having no intention to quit or others’ (coded as 0).

Independent variables
The major independent variables in this study included:
- City (Beijing, Shenyang, Shanghai, Changsha, Guangzhou, Yinchuan)
- Gender (male, female)
- Age (18–34 years, 35–44 years, 45–54 years, 55 years or older)
- Highest level of education (low=no education or elementary school, medium=junior high school or high school/technical high school, high=college, university or higher)
- Household income per month (low: <1000¥ per month, medium: 1000¥ to 2999¥, high: >5000¥, don’t know/cannot say)
- Ethnicity (Han, others)
- Number of cigarettes smoked per day (1–10, 11–20, 21–50, 51+)
- How often did you think about the money spent on smoking in the last month? (never, occasionally, often, don’t know/cannot say)

Knowledge about the adverse health effects of smoking: This index was based on smokers’ responses to the following questions: ‘Based on what you know or believe, does smoking cause the following: (1) stroke; (2) impotence in male smokers; (5) lung cancer in smokers; (4) emphysema; (5) stained teeth in smokers; (6) premature ageing; (7) lung cancer in non-smokers from secondhand smoke; and (8) CHD (coronary heart disease). Response options were: ‘yes’ (coded as 1), ‘no’ (coded as 0), ‘don’t know/cannot say’ (coded as 0). The index was computed by summing the scores for the eight questions.

Weighting procedures
Sampling weights were constructed to provide the best possible prevalence estimates. The weights were constructed separately for male adult smokers and female adult smokers. Wave 1 weights were constructed by accounting for the four levels of sample selection: Jie Dao, Ju Wei Hui, household and individual. The final weight for a sampled individual was the number of people in the city population and the sampling category represented by that individual. A full description of the weighting methodology is available at http://www.itcproject.org.

Statistical analyses
Descriptive analysis
SPSS for Windows, V17.0 (SPSS, Chicago, Illinois, USA), was used for all analyses. For each of the six cities, the median and the interquartile range for cigarette price paid were calculated.

Factors associated with purchasing less expensive cigarettes
Complex samples multivariate logistic regression models were constructed to examine factors associated with purchasing less expensive cigarettes. The dependent variable was purchase of less expensive cigarettes. Smokers who bought less expensive cigarettes at the last purchase tended to be older, heavier smokers, to have lower education and income, to smoke more cigarettes per day and to think more about the money spent on smoking in the last month.

Factors associated with intentions to quit smoking
Complex samples multivariate logistic regression models were constructed to examine whether use of less expensive cigarettes was associated with decreased intentions to quit. The dependent variable was intention to quit smoking, the major independent variable of interest was purchase of less expensive cigarettes. All categorical variables were changed to dummy variables before entering the model.

RESULTS
The demographics of the study participants can be found in Wu et al.18

Cigarette price in each city
Table 3 presents the median, interquartile range and the lowest tertile of cigarette price paid (per pack) of the last purchase by city. Overall, the self-reported price of cigarettes ranges from 0.70¥ RMB per pack to 100¥ RMB per pack. The median price paid per pack was highest in Shanghai (7.50¥), followed by Yinchuan (5.00¥), Changsha (4.40¥), Guangzhou (4.00¥), Beijing (4.00¥) and Shenyang (3.70¥). The lowest tertile of cigarette price paid (per pack) of the last purchase was 3.00 in Beijing, 2.80 in Shenyang, 7.53 in Shanghai, 4.00 in Changsha, 5.50 in Guangzhou and 4.00 in Yinchuan.

Factors associated with purchasing less expensive cigarettes
Table 4 shows the results of a complex samples multivariate logistic regression examining factors associated with purchasing less expensive cigarettes. Smokers who bought less expensive cigarettes at the last purchase tended to be older, heavier smokers, to have lower education and income, to smoke more cigarettes per day and to think more about the money spent on smoking in the last month.

Factors associated with intentions to quit smoking
Table 5 shows the results of a complex samples multivariate logistic regression model examining factors associated with intentions to quit smoking. Smokers who reported buying less expensive cigarettes at the last purchase were less likely to have intention to quit (OR=0.75, 95% CI 0.58 to 0.96). Compared to Beijing smokers, smokers in Shanghai (OR=0.50, 95% CI 0.27 to 0.92) and Guangzhou (OR=0.54, 95% CI 0.31 to 0.96) were less likely to have intention to quit. Other factors associated with decreased intention to quit included heavier smokers, smokers less knowledgeable about the harms of smoking and smokers who thought more about the money spent on smoking in the last month.

DISCUSSION
In this study, the median cigarette price paid ranged from 3.70¥ (about US$ 0.54) per pack in Shenyang to 7.50¥ (about US$ 1.10) per pack in Shanghai. The lowest tertile of cigarette price paid ranged from 2.80¥ (about US$ 0.41) per pack in Shenyang to 7.35¥ (about US$ 1.08) per pack in Shanghai. There are several possible interpretations for the huge differences among cities. The first one is the differences in city economy. As shown in table 2, the residents in the six cities differed in disposable

Table 3 Median, IQR and lowest tertile of cigarette price paid (per pack) in the six cities

| City       | Valid N | Median | IQR   | The lowest tertile of cigarette price paid (Yuan RMB) |
|------------|---------|--------|-------|-----------------------------------------------------|
| Beijing    | 761     | 4.00   | 2.20  | 3.00 (US$ 0.44)                                     |
| Shenyang   | 740     | 3.70   | 2.50  | 2.80 (US$ 0.41)                                     |
| Shanghai   | 783     | 7.50   | 1.50  | 7.33 (US$ 1.08)                                     |
| Changsha   | 793     | 4.40   | 1.00  | 4.00 (US$ 0.59)                                     |
| Guangzhou  | 777     | 4.00   | 3.70  | 3.50 (US$ 0.51)                                     |
| Yinchuan   | 784     | 5.00   | 3.50  | 4.00 (US$ 0.59)                                     |
The decrease in low-level cigarette sales is a shortage in supply, Tobacco Company clearly stated, if further research.

The cultural differences among cities, which is unclear and needs expensive cigarettes. The third possible interpretation might be if the supply of low-level cigarettes in some cities is not enough, then the city economies cannot explain all the huge shortages of low-level cigarettes is very low, local tobacco companies are inactive in producing these cigarettes, which results in shortages if the cultural differences among cities, which is unclear and needs further research.

In this study, the price differential among brands is large. The self-reported cigarette price ranged from 0.70¥/pack to 100¥/ pack, which gives smokers more choices in the price of cigarettes. In other words, Chinese smokers have more flexibility in choosing different prices of cigarettes than most Western smokers.

Older, heavier smokers and smokers with lower SES were more likely to buy less expensive cigarettes. These findings are consistent with previous studies. Poorer smokers bear more financial burden from smoking. In this study, about 20% of smokers reported that their household income was less than 1000¥ per month. Even if these smokers smoked cigarettes spent 75¥ per month on smoking, which is about 7.5% of their household income. Thus, although tobacco companies have claimed that low-level cigarettes may decrease the
financial burden on low-income smokers, poorer smokers still spend a fair amount of their income on smoking. In comparison, raising cigarette prices may help poor smokers to quit smoking, which would decrease their smoking expenditure to 0 and also would help them lower the risk of getting smoking-related diseases.

Smokers who reported buying less expensive cigarettes at the last purchase were less likely to intend to quit, which is consistent with Cummings et al’s study conducted in the US. This suggests that the existence of less expensive cigarettes may deter smoking cessation. In the 1980s and 1990s, US tobacco companies used discount and generic cigarettes to retain price sensitive smokers and to slow the decline of tobacco use rates among US adults. The China National Tobacco Company seems to be doing the same thing. In a paper published in the journal of China Tobacco in 2006, the authors from the China National Tobacco Company stated, ‘if we abandon the market of low-level cigarettes, we will lose consumers as well as the

nationwide tax on tobacco’. This finding has important policy relevance. The WHO FCTC requires party countries adopt price and tax policies to reduce tobacco consumption. However, when cigarette prices are increased in China, some smokers may easily find a less expensive cigarette brand to substitute for their old brand, which may damage the effects of price and tax policies. Therefore, if China is to adopt price and tax policies as suggested in WHO FCTC, accompanying measures should be taken to reduce the price differential among brands. One option is to set a minimum price for cigarettes, another possible option is to change the current two-tier tax structure and apply the same amount of specific tax to each pack of cigarettes and eliminate the two-tier ad valorem tax, as suggested by Hu et al.

Another interesting finding is that smokers who were more knowledgeable about the adverse health effects of smoking had more intent to quit smoking. The clear policy implication is that raising smokers’ health knowledge may be an effective way to increase cessation in China. Health education or other interventions are needed to educate Chinese smokers about the specific effects on health of smoking.

The advantages of this study included the large sample size, rigorous study design and the ability to do comparisons among cities. However, there were some limitations in this study. The first limitation is the use of self-reported price. Smokers may not be willing to report buying less expensive cigarettes in a face-to-face survey. However, for most respondents, we asked them to show the interviewers their cigarette pack, which may have lowered such possibility. The second limitation is that we used the lowest tertile of cigarette price paid at the last purchase to classify cigarettes as less expensive in each city. As shown in table 1, the cut-off of the lowest tertile was different across cities. However, this method may reflect the relative price within each city. The third limitation is the use of cross-sectional data, which restricts our ability to explore causal relationships. This issue will be addressed when the next wave of data is available. Fourth, we measured the price of the last brand of cigarettes purchased. However, the last brand purchased may not be smokers’ primary brand of cigarettes. Fifth, this study used self-reported data and may be subject to social desirability bias, namely respondents might tell the interviewer what they think he/she wants to hear. To minimise the social desirability bias, all the field interviewers were trained to be objective when administering the survey, although this may not have completely solved the problem.

In summary, there is a wide variation in the price of cigarettes in China. Smokers of less expensive cigarettes tend to be older, heavier smokers, to have lower education and income, and to think more about the money spent on smoking in the last month. Smokers who bought less expensive cigarettes who were less knowledgeable about the health harms of smoking at the last purchase were less likely to intend to quit smoking. Measures need to be taken to minimise the price differential among cigarette brands and to increase smokers’ health knowledge, which may in turn increase their intentions to quit.

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Competing interests None.

Patient consent Obtained.

Ethics approval This study was conducted with the approval of the All materials and procedures used in the ITC China Survey were reviewed and cleared for ethics by the Office of Research at the University of Waterloo (Waterloo, Canada) and the Institutional Review Boards at: Roswell Park Cancer Institute (Buffalo, USA), the Cancer Council Victoria (Victoria, Australia) and the China National Centers for Disease Control and Prevention (Beijing, China).

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REFERENCES
1. Culyer AJ, Newhouse JP. Handbook of health economics. 1 edn, New York: Elsevier, 2000.
2. World Health Organization. WHO report on the global tobacco epidemic, 2008. Geneva: The MPOWER package, 2008.
3. Gallus S, Schiavino A, La Vecchia C, et al. Price and cigarette consumption in Europe. Tob Control 2006;15:114–19.
4. Huang B-N, Yang C-W, Hwang M-J. New evidence on demand for cigarettes: a panel data approach. Int J Appl Econ 2004;1:81–97.
5. Gruber J, Sen A, Stabile M. Estimating price elasticities when there is smuggling: evidence from Canada. Int J Health Policy Manag 2016;5:365.
6. Nelson J. Cigarette demand, structural change and advertising bans: international evidence. Contributions to Economic Analysis and Policy 2003;2:1–27.
7. Lewith EM, Doane D. The potential for using excise taxes to reduce smoking. J Health Econ 1982;1:121–45.
8. Warner KE. Tobacco taxation as health policy in the Third World. Am J Public Health 1990;80:329–31.
9. Lance PM, Akin JS, Dow WH, et al. Is cigarette smoking in poorer nations highly sensitive to price? evidence from Russia and China. J Health Econ 2004;23:172–89.
10. Mao Z, Hu T-W, Yang G. New evaluating of the demand for cigarettes From Chinese residents. Chinese Health Economics 2005;45:7.
11. White VM, Gilpin EA, White MM, et al. How do smokers control their cigarette expenditures? Nicotine Tob Res 2005;7:625–35.
12. **Hyland A, Bauer JE, Li Q, et al.** Higher cigarette prices influence cigarette purchase patterns. *Tob Control* 2005;14:86—92.

13. **Farrelly MC, Nimsch CT, Hyland A, et al.** The effects of higher cigarette prices on tar and nicotine consumption in a cohort of adult smokers. *Health Econ* 2004;13:49—58.

14. **Cummings KM, Hyland A, Lewit E, et al.** Use of discount cigarettes by smokers in 20 communities in the United States, 1988—1993. *Tob Control* 1997;6(Suppl 2):S25—30.

15. **Carter SM.** The Australian cigarette brand as product, person, and symbol. *Tob Control* 2003;79—86.

16. **China National Tobacco Company.** *China tobacco yearbook*. Beijing: China Economic Publishing House, 2006.

17. **Hyland A, Higbee C, Li Q, et al.** Access to low taxed cigarettes deters smoking cessation attempts. *Am J Public Health* 2005;95:994—5.

18. **Wu C, Thompson ME, Fong GT, et al.** Methods of the International Tobacco Control (ITC) China Survey. *Tob Control* 2010;19(Suppl 2):i1—i5.

19. **The new atlas of tobacco (in Chinese).** http://www.p5w.net/newfortune/hygc/200903/t2225241.htm.

20. **Guangzhou Tobacco Company.** Analysis of Guangzhou cigarette market. 2005 [in Chinese] http://gztobacco.gov.cn/qydt/qydt2005052501.htm.

21. **Wang H, Sindelar JL, Busch SH.** The impact of tobacco expenditure on household consumption patterns in rural China. *Soc Sci Med* 2006;62:1414—26.

22. **Lu Y.** Appreciate the importance of low-level cigarettes and increase the supply [in Chinese]. *China Tobacco* 2006. http://www.echinatobacco.com/news/2006/17/jngji/jjzhuanti/2010846.shtml.

23. **Hu TW, Mao Z, Shi J.** Recent tobacco tax rate adjustment and its potential impact on tobacco control in China. *Tob Control* 2010;19:80—2.
摘要
目的: 低价卷烟在中国的存在会对中国的公共卫生起到破坏作用。本研究的目的就是为了调查低价卷烟在中国六城市的使用情况。
方法: 本研究数据来自国际烟草控制 (ITC) 中国调查的基线调查数据。ITC 中国调查于 2006 年 4 月至 8 月开展, 覆盖中国六个城市 4815 名成年城市吸烟者。我们计算了每个城市自报最后一次购烟价格的中位数, 使用复杂样本多元 Logistic 回归模型确定与低价烟 (每个城市卷烟价格最低的三分位数) 使用有关的因素, 并探讨使用低价烟与戒烟意图之间的联系。
结果: 报告最后一次购烟时购买了低价烟的吸烟者更倾向于是年龄较大、吸烟量较大、教育水平较低、收入水平较低, 以及过去一个月内更多考虑吸烟的花费的人群。最后一次购烟时购买低价烟的吸烟者和对吸烟危害认知水平较差的吸烟者打算戒烟的可能性更小。
结论: 应采取措施, 尽量减少不同卷烟之间的价格差异, 并增加吸烟者的健康知识, 从而提高他们的戒烟打算。

背景
提高卷烟价格是公认的减少卷烟消费量最有效的方法。1,2 西方国家开展的大多数经济学研究得出的卷烟需求价格弹性估计水平在-0.3 到 -0.5 之间,3-7 也就是说, 卷烟价格上涨 10% 可以导致卷烟消费量降低 3% 到 5%。世界卫生组织《烟草控制框架公约》(WHO FCTC) 是世界上第一份全球性的公共卫生条约, 其中第 6 条要求各成员国提高烟草产品的价格和税率。经济学家曾经认为发展中国家的卷烟价格弹性要比西方国家还低。18 但多项研究显示, 中国的卷烟价格弹性可能低于西方国家。10 例如, Lance 等人估计, 中国的卷烟价格弹性指数为 -0.082,11 而 Mao 等人估计的中国卷烟价格弹性为 -0.15。12 Mao 等人认为可能的一种解释是中国吸烟者从高价卷烟转吸低价卷烟的品牌转换行为导致了价格弹性较低。12 如图 1 所示, 吸烟者在烟价上涨时会做出不同的反应。除了戒烟和减少消费量以外, 一些吸烟者可能转向价格更便宜的品牌或者参与避税行为,11-12 另一些吸烟者可能改吸焦油和尼古丁含量更高的卷烟。13 这与吸烟者对于低价卷烟的使用情况。

同大多数商品一样, 不同品牌的卷烟价格也不同, 例如美国 (高级、折扣和普通) 和澳大利亚 (高级、主流和超值) 的三级烟价体系。中国是世界上最大的烟草生产国, 不同品牌之间的价格差异很大。2006 年, 中国共有 40 家烟草企业, 生产国产品牌 2000 余种, 而在各品牌系列下又还有多个不同品种。中国卷烟根据其烟叶品质和成品价格分为不同等级。如表 1 所示, 根据中国国家烟草公司的分类标准, 中国卷烟共分五个等级, 其中一类卷烟的出厂价格是三类卷烟价格的至少六倍以上。此外, 中国对于卷烟采取的是双级税制, 即高卷烟的税率高于低档卷烟, 这一差异又进一步加大了不同等级卷烟之间的价格差距。中国的烟草垄断制度下设置了多项政策, 保证低档 (四类和五类) 卷烟的供应。中国国家烟草公司要求各地烟草企业每年要生产一定数量的低档卷烟, 并对其进行相应的补贴, 弥补其相对较低的利润率。因此, 中国低档卷烟的生产和销售是根据中国国家烟草公司制定的目标进行维持的。例如, 2006 年中国 24.9% (5039 亿支) 的卷烟产量和 24.7% (5006 亿支) 的销售量都来自于低档卷烟。16 中国烟草公司宣称低档卷烟有助于满足低收入人群的需要。
图1：卷烟价格效应的补偿模型

方法
国际烟草控制（ITC）中国调查
ITC中国调查是一项针对中国六个城市的前瞻性人群研究，包括北京、上海、广州、沈阳、长沙和银川。这六个城市是依据其城市规模、地理位置和经济发展水平选择。表2是2006年六城市户籍人口数、国民生产总值（GDP）、人均可支配年收入和消费支出数据。ITC中国调查第一轮调查于2006年4-8月进行。每轮调查在每个城市约访谈800名吸烟者和200名非吸烟者。本研究分析了完成第一轮调查的4815名吸烟者。有关该研究的设计，Wu等人的文章有详尽的描述。

简言之，ITC中国调查在每个城市采用多阶段整群抽样法抽取具有代表性的成年城市吸烟者和非吸烟者。ITC中国调查采用的是面对面访谈方式。第一轮的合作率从约80.0%（北京、广州）到95.0%（长沙）之间不等，应答率从39.4%（银川）到66.0%（广州）之间不等。

ITC中国调查所使用的所有材料和程序均经过滑铁卢大学（加拿大滑铁卢）研究办公室和罗斯威尔癌症研究所（美国布法罗）、维多利亚癌症委员会（澳大利亚维多利亚）和中国疾病预防控制中心（中国北京）的机构评审委员会的伦理学审批。本研究仅使用其中的现在吸烟者数据。

自变量
本研究所涉及的主要自变量包括：
- 城市（北京、沈阳、上海、长沙、广州、银川）
- 性别（男性、女性）
- 年龄（18-34岁、35-44岁、45-54岁、55岁或以上）
- 最高受教育程度（低=未受过教育或小学文化程度；中=初中或中学/中专文化程度；高=大学或更高）
- 每月家庭收入（低:<1000元/月；中: 1000到2999元/月；高: 3000元/月及以上；不知道/无法回答）
- 民族（汉族、其他）
- 每日吸烟支数（1-10、11-20、21-30、30+）
- 在过去的一个月里，你考虑吸烟的花费的频率（从不、偶尔、经常、不知道/无法回答）

表1：2006年中国不同等级卷烟出厂价

| 卷烟等级 | 增值税前每条卷烟价格（元） | 从价税率 |
|----------|-----------------------------|----------|
| 1        | 50-                         | 45%      |
| 2        | 30-49                       | 30%      |
| 3        | 15-30                       | 30%      |
| 4        | 10-14                       | 30%      |
| 5        | <10                         | 30%      |

注：4类及5类烟为“低档烟”，1类及2类烟为“高档烟”，3类烟为“中档烟”。

表2：2006年中国城市人口、国民生产总值（GDP）、人均可支配年收入和消费支出数据

| 城市 | 户籍居民（百万） | GDP | 支配年收入 | 消费支出 |
|------|------------------|-----|-------------|-----------|
| 北京 | 11               | 7720 | 19978       | †         |
| 广州 | 5                | 6068 | 19851       | 15445     |
| 上海 | 13               | 10297| 20668       | 14762     |
| 长沙 | 2                | 1791 | 13924       | 10680     |
| 沈阳 | 6                | 2483 | 11851       | 8670      |
| 银川 | 1                | 335  | 10068       | 8288      |

*：数据来源于2006年各城市经济与社会发展统计报告。
†：2006年北京未报告数据。
关于吸烟健康危害的知识：这一指标是根据吸烟者对下列问题的回答得出：“你认为吸烟是否会引起以下疾病：（1）中风；（2）阳痿；（3）吸烟者患肺病；（4）肺气肿；（5）牙齿发黄；（6）加速衰老；（7）被动吸烟者患肺病；（8）冠心病”。答案选项包括：“是”（编码：1），“否”（编码：0），“不知道/无法回答”（编码：0）。该指标通过对其所有8个问题的得分求和计算。

### 授权程序

对样本进行授权，从而得出最可能的流行率估算值。对男性和女性成年吸烟者分别进行授权。第一轮调查权重通过计算样本选择的四个级别得出，包括：街道、居委会、家庭和个人。每个样本的最终权重为该样本所代表的该城市中该个人所在采样类别人口数。对授权方法的详细介绍请参见：http://www.itcproject.org。

### 统计学分析

#### 描述性分析

所有分析均采用Windows系统下的SPSS V.17.0（SPSS, Chicago, Illinois, USA）软件。对每个城市计算其支付烟价的中位数和四分位间距。

#### 与购买低价烟有关的因素

建立复杂样本多元Logistic回归模型以研究与购买低价烟相关的因素。其因变量为购买低价烟，自变量代入线性模型。所有分类变量在代入模型前全部转化为哑变量。

#### 与戒烟打算有关的因素

建立复杂样本多元Logistic回归模型，研究使用低价烟是否与戒烟打算相关。因变量为戒烟意图，主要涉及的自变量包括购买低价烟。所有类别变量在代入模型前全部转化为哑变量。

### 讨论

在本次研究中，支付烟价的中位数范围从沈阳的每包3.70元（约合0.54美元）到上海的7.50元（约合1.08美元）不等。支付烟价的最低三分位范围从沈阳的每包2.80元（约合0.41美元）到上海的7.33元（约合1.08美元）。对于城市间的巨大差异有几种可能的解释。第一是城市间的经济差异，如表所示，2006年各城市居民的可支配收入和消费支出存在较大差异，上海是各城市中最富裕的，因此可以部分解释上海的高卷烟价格。然而，城市经济上的差异并不能完全解释各城市间卷烟价格的巨大差异。例如，2006年北京和上海居民的收入和支出水平差不多，但北京的低价烟使用却比上海高。第二个可能的解释是低价烟供应的差异。由于低价烟的利润率非常低，因此地方烟草企业对于生产低价烟并不积极，这就使得低价烟的供应存在短缺。增加烟草公司的文章明确指出：“……低价烟销售下降的主要原因是由供应不足”。如果部分城市低价卷烟供应不足，那么就可能出现这些城市低价卷烟的供应存在短缺。广州烟草公司的一篇文章指出：“……低档烟销售下降的主要原因是由供应不足”。如果部分城市低价卷烟供应不足，那么就可能出现这些城市低价卷烟的供应存在短缺。增加烟草公司的文章明确指出：“……低价烟销售下降的主要原因是由供应不足”。如果部分城市低价卷烟供应不足，那么就可能出现这些城市低价卷烟的供应存在短缺。增加烟草公司的文章明确指出：“……低价烟销售下降的主要原因是由供应不足”。

在本次研究中，各种品牌卷烟之间的价格差异很大。自报烟价范围从0.70元/包到100元/包不等，这就给了吸烟者更多的价格选择空间。换言之，中国吸烟者在选择不同价格的卷烟问题上比西方国家的吸烟者有更多的灵活性。

### 结果

本研究调查对象的人口学特征详见Wu等人文章。

### 每个城市的价格

表3是分城市向吸烟者支付支付烟价的中位数，四分位数间距和最低三分位数据。总体上讲，卷烟的每包自报支付价格范围从0.70元/包到100元/包不等。每包支付价格中位数最高的是上海（7.50元），其次是银川（5.00元）、长沙（4.40元）、广州（4.00元）、北京（4.00元）和沈阳（3.70元）。上次购烟支付烟价（每包）最低三分位分别为：北京：3.00，沈阳：2.80，上海：7.33，长沙：4.00，广州：3.50，和银川：4.00。

### 与购买低价烟有关的因素

表4是与购买低价烟有关的因素的复杂样本多元Logistic回归分析结果。上次购烟购买低价烟的吸烟者多为年龄较大、吸烟量较大的吸烟者，其次教育程度和收入水平较低，每日吸烟量较高，同时上个月内会更多地考虑吸烟的花费问题。

### 与戒烟打算有关的因素

表5是与戒烟打算有关的因素的复杂样本多元Logistic回归分析结果。报告上次购烟时购买低价烟的吸烟者更倾向于戒烟，北京（OR=0.56, 95% CI: 0.27-0.92）和广州（OR=0.54, 95% CI: 0.31-0.96）的吸烟者有戒烟打算的比例较低。其它与戒烟打算低相关的原因包括每日吸烟量大，对吸烟危害知识水平较低和上个月内更多考虑吸烟花费。
研究论文

一致的。这表明，低价烟的存在可能阻碍戒烟。上世纪80年代和90年代，美国烟草企业采用折扣卷烟和普通卷烟的策略来维持那些对烟价敏感的吸烟者，同时减缓美国成年人中烟草使用率的降低速度。而在中国国家烟草公司也在做同样的事。《中国烟草》杂志2006年刊载的一篇文章指出：如果我们放弃低档烟市场，那么我们在失去顾客的同时还会失去烟草产业持续发展的基础……”

### 表4 与购买低价卷烟有关的因素：多元Logistic回归分析结果

| 比例 | 购买低价卷烟% | OR | 95% C.I. |
|------|----------------|----|----------|
| 性别 | | | |
| 男性 | 4487 | 35.4 | 对照 |
| 女性 | 232 | 57.1 | 1.37 | 0.80-2.34 |
| 年龄（岁） | | | |
| 18-34 | 470 | 23.0 | 对照 |
| 35-44 | 1153 | 25.2 | 0.82 | 0.58-1.16 |
| 45-54 | 1624 | 32.4 | 1.08 | 0.79-1.48 |
| 55岁及以上 | 1463 | 53.1 | 2.61 | 1.90-3.59 |
| 民族 | | | |
| 汉族 | 4484 | 33.3 | 对照 |
| 其他 | 235 | 36.4 | 1.01 | 0.86-1.15 |
| 教育程度 | | | |
| 低 | 607 | 64.1 | 对照 |
| 中 | 3092 | 36.7 | 0.58 | 0.44-0.78 |
| 高 | 1014 | 16.3 | 0.28 | 0.20-0.39 |
| 家庭月收入 | | | |
| 低 | 911 | 57.4 | 对照 |
| 中 | 2120 | 39.6 | 0.50 | 0.39-0.64 |
| 高 | 1344 | 18.2 | 0.21 | 0.16-0.28 |
| 不知道/无法回答 | 340 | 29.9 | 0.34 | 0.22-0.51 |
| 每日吸烟量 | | | |
| 1-10 | 1631 | 32.8 | 对照 |
| 11-20 | 2316 | 36.3 | 1.23 | 1.03-1.46 |
| 21-30 | 400 | 45.9 | 1.74 | 1.28-2.35 |
| 31支及以上 | 344 | 40.7 | 1.32 | 0.95-1.83 |
| 过去一个月内考虑吸烟花费 | | | |
| 从不 | 3130 | 37.2 | 对照 |
| 偶尔 | 961 | 36.8 | 1.18 | 0.95-1.45 |
| 经常 | 571 | 54.9 | 2.10 | 1.62-2.71 |
| 不知道/无法回答 | 53 | 34.5 | 0.90 | 0.42-1.94 |
| 吸烟危害健康知识得分 | | | |
| 0-1 | 928 | 44.2 | 对照 |
| 2-3 | 1110 | 37.5 | 0.92 | 0.68-1.24 |
| 4-5 | 1419 | 33.7 | 0.89 | 0.70-1.12 |
| 6-8 | 1234 | 31.3 | 0.77 | 0.59-1.01 |

### 表5：与戒烟意愿有关的因素：多元Logistic回归结果

| 城市 | 有戒烟意愿（%） | OR | 95% C.I. |
|------|-----------------|----|----------|
| 北京 | 29.1 | 对照 |
| 沈阳 | 32.4 | 1.13 | 0.61-2.09 |
| 上海 | 16.5 | 0.50 | 0.27-0.92 |
| 长沙 | 25.2 | 0.99 | 0.58-1.69 |
| 广州 | 14.8 | 0.54 | 0.31-0.96 |
| 银川 | 28.3 | 0.88 | 0.50-1.55 |
| 性别 | | | |
| 男性 | 24.3 | 对照 |
| 女性 | 25.3 | 0.92 | 0.53-1.61 |
| 年龄（岁） | | | |
| 18-34 | 25.3 | 对照 |
| 35-44 | 25.4 | 1.13 | 0.79-1.61 |
| 45-54 | 24.5 | 1.19 | 0.80-1.76 |
| 55岁及以上 | 23.2 | 1.21 | 0.83-1.77 |
| 民族 | | | |
| 汉族 | 26.9 | 对照 |
| 其他 | 24.3 | 0.92 | 0.59-1.43 |
| 教育程度 | | | |
| 低 | 19.1 | 对照 |
| 中 | 24.7 | 1.16 | 0.85-1.58 |
| 高 | 27.3 | 1.10 | 0.72-1.67 |
| 家庭月收入 | | | |
| 低 | 22.8 | 对照 |
| 中 | 25.6 | 1.13 | 0.85-1.51 |
| 高 | 25.5 | 1.27 | 0.91-1.77 |
| 不知道/无法回答 | 16.6 | 0.85 | 0.52-1.39 |
| 每日吸烟量 | | | |
| 1-10 | 20.5 | 对照 |
| 11-20 | 22.6 | 0.71 | 0.60-0.84 |
| 21-30 | 15.7 | 0.50 | 0.36-0.70 |
| 31支及以上 | 15.6 | 0.49 | 0.33-0.72 |
| 过去一个月内考虑吸烟花费 | | | |
| 从不 | 19.6 | 对照 |
| 偶尔 | 29.6 | 1.61 | 1.26-2.05 |
| 经常 | 42.2 | 2.78 | 2.17-3.57 |
| 不知道/无法回答 | 12.4 | 0.85 | 0.35-2.02 |
| 吸烟危害健康知识得分 | | | |
| 0-1 | 26.2 | 对照 |
| 2-3 | 31.1 | 1.18 | 0.75-1.58 |
| 4-5 | 27.5 | 1.23 | 0.75-1.94 |
| 6-8 | 37.8 | 1.39 | 0.89-2.19 |

### 上次购烟时是否购买低价烟

| | 购买低价烟% | OR | 95% C.I. |
| | | | |
| 否 | 26.2 | 对照 |
| 是 | 21.0 | 0.75 | 0.58-0.96 |

### 吸烟危害健康知识得分

| | 购买低价烟% | OR | 95% C.I. |
| | | | |
| 0-1 | 11.8 | 对照 |
| 2-3 | 17.1 | 1.49 | 1.09-2.04 |
| 4-5 | 27.5 | 2.56 | 1.95-3.35 |
| 6-8 | 37.8 | 3.69 | 2.59-5.23 |

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一致的。这表明，低价烟的存在可能阻碍戒烟。上世纪80年代和90年代，美国烟草企业采用折扣卷烟和普通卷烟的策略来维持那些对烟价敏感的吸烟者，同时减缓美国成年人中烟草使用率的降低速度。而在中国国家烟草公司也在做同样的事。《中国烟草》杂志2006年刊载的一篇文章指出：“如果我们放弃低档烟市场，那么我们在失去顾客的同时还会失去烟草产业持续发展的基础……”这一结论具有十分重要的政策相关性。WHO FCTC要求成员国采取价格和税收政策降低烟草消费量。然而，当中国卷烟价格上涨时，部分吸烟者可以很容易地找到另一种比较便宜的品牌替代之前吸的老品牌，这就影响了价格和税收政策的效果。因此，如果中国要按照WHO FCTC的建议采取价格和税收政策，那么同时就还要采取措施缩小各种卷烟品牌间的价格差距。其中一个可能的办法是设置一个卷烟最低价格，另一个可能的办法是改变当前的两级税收制度。
中国吸烟者占全球吸烟者总人数的三分之一。中国不同卷烟之间的价格差距十分巨大。西方国家的研究结果显示，低价卷烟的使用可能阻碍戒烟。然而，关于中国低价卷烟使用对戒烟影响的数据还极为缺乏。本文指出，使用低价烟和对吸烟健康危害认知水平较差的中国吸烟者戒烟打算也较低。需要采取措施尽量缩小不同香烟品牌之间的价格差距，提高吸烟者的健康认知水平，从而提高他们的戒烟打算。

研究论文

1. Culyer AJ, Newhouse JP. Handbook of health economics. 1 edn, New York: Elsevier, 2000.
2. World Health Organization. WHO report on the global tobacco epidemic, 2006. Geneva: The MPOWER package, 2008.
3. Gallus S, Schiaffino A, La Vecchia C, et al. Price and cigarette consumption in Europe. Tob Control 2006;15:i14—19.
4. Huang B-N, Yang C-W, Hwang M-J. New evidence on demand for cigarettes: a panel data approach. Int J Appl Econ 2004;1:81—97.
5. Gruber J, Sen A, Stabile M. Estimating price elasticities when there is smuggling: the sensitivity of smoking to price in Canada. J Health Econ 2003;22:821—42.
6. Nelson J. Cigarette demand, structural change and advertising bans: international evidence. Contributions to Economic Analysis and Policy 2003;2:11—27.
7. Lewitt EM, Coate D. The potential for using excise taxes to reduce smoking. J Health Econ 1982;1:121—45.
8. Warner KE. Tobacco taxation as health policy in the Third World. Am J Public Health 1990;80:529—35.
9. Hyland A, Bauer JE, Li Q, et al. Higher cigarette prices influence cigarette purchase patterns. Tob Control 2005;14:86—92.
10. Farrelly MC, Nimsch CT, Hyland A, et al. The effects of higher cigarette prices on tar and nicotine consumption in a cohort of adult smokers. Health Econ 2004;13:49—58.
11. Cummings KM, Higbee C, Li Q, et al. Use of discount cigarettes by smokers in 20 communities in the United States, 1988-1993. Tob Control 1997;6(Suppl 2):S25—30.
12. Carter SM. The Australian cigarette brand as product, person, and symbol. Tob Control 2003;79—86.
13. China National Tobacco Company. China tobacco yearbook. Beijing: China Economic Publishing House, 2006.
14. Hyland A, Higbee C, Li Q, et al. Access to low taxed cigarettes deters smoking cessation attempts. Am J Public Health 2005;95:994—5.
15. Wu C, Thompson ME, Fong GT, et al. Methods of the International Tobacco Control (ITC) China Survey. Tob Control 2010;19(Suppl 2):i1—i5.
16. Griffiths M, Crookes P, Yee A, et al. The new atlas of tobacco (in Chinese). http://www.p5w.net/newfortune/hycg/200903/1225422.htm.
17. Guangzhou Tobacco Company. Analysis of Guangzhou cigarette market. 2005 (in Chinese) http://gztobacco.gov.cn/qydt/qydt2005052501.htm.
21. Wang H, Sindelar JL, Busch SH. The impact of tobacco expenditure on household consumption patterns in rural China. *Soc Sci Med* 2006;62:1414—26.

22. Lu Y. Appreciate the importance of low-level cigarettes and increase the supply (in Chinese). *China Tobacco* 2006. http://www.echinen.com/news/2006/17/jingji/jijihuanti/2010846.shtml.

23. Hu TW, Mao Z, Shi J. Recent tobacco tax rate adjustment and its potential impact on tobacco control in China. *Tob Control* 2010;19:80—2.