

# Beliefs about the relative harm of "light" and "low tar" cigarettes: findings from the International Tobacco Control (ITC) China Survey

T Elton-Marshall,<sup>1</sup> G T Fong,<sup>1,2</sup> M P Zanna,<sup>1</sup> Y Jiang,<sup>3</sup> D Hammond,<sup>1</sup> R J O'Connor,<sup>4</sup> H-H Yong,<sup>5</sup> L Li,<sup>5</sup> B King,<sup>5</sup> Q Li,<sup>1,3</sup> R Borland,<sup>5</sup> K M Cummings,<sup>4</sup> P Driezen<sup>1</sup>

<sup>1</sup> University of Waterloo, Waterloo, Canada; <sup>2</sup> Ontario Institute for Cancer Research, Toronto, Canada; <sup>3</sup> National Tobacco Control Office of the Chinese Center for Disease Control and Prevention, Beijing, China; <sup>4</sup> Roswell Park Cancer Institute, Buffalo, NY, USA; <sup>5</sup> The Cancer Council Victoria, Melbourne, Australia

Correspondence to:  
Tara Elton-Marshall, Department of Psychology, PAS Building, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1; teelton@uwaterloo.ca

Received 3 December 2008  
Accepted 29 July 2009

## ABSTRACT

**Background:** Many smokers in Western countries perceive "light" or "low tar" cigarettes as less harmful and less addictive than "regular" or "full flavoured" cigarettes. However, there is little research on whether similar perceptions exist among smokers in low and middle incomes, including China.

**Objective:** To characterise beliefs about "light" and "low tar" cigarettes among adult urban smokers in China.

**Methods:** We analysed data from Wave 1 of the ITC China Survey, a face-to-face household survey of 4732 adult Chinese smokers randomly selected from six cities in China in 2006. Households were sampled using a stratified multistage design.

**Findings:** Half (50.0%) of smokers in our sample reported having ever tried a cigarette described as "light," "mild" or "low tar". The majority of smokers in our sample (71%) believed that "light" and/or "low tar" cigarettes are less harmful compared to "full flavoured" cigarettes. By far the strongest predictor of the belief that "light" and/or "low tar" cigarettes are less harmful was the belief that "light" and/or "low tar" cigarettes feel smoother on the respiratory system ( $p < 0.001$ , OR = 53.87, 95% CI 41.28 to 70.31).

**Conclusion:** Misperceptions about "light" and/or "low tar" cigarettes were strongly related to the belief that these cigarettes are smoother on the respiratory system. Future tobacco control policies should go beyond eliminating labelling and marketing that promotes "light" and "low tar" cigarettes by regulation of product characteristics (for example, additives, filter vents) that reinforce perceptions that "light" and "low tar" cigarettes are smoother on the respiratory system and therefore less harmful.

It is estimated that there are 320 million smokers in China.<sup>1</sup> Approximately 57% of adult males and 3% of adult females in China are current smokers.<sup>2</sup> Currently, about one million smokers in China will die from tobacco-related illnesses per year<sup>1</sup> but it is expected to rise to 2.2 million deaths by 2020.<sup>3</sup>

We can examine the experiences of Western countries to predict what might happen in China. In Western countries, "light" and "low tar" cigarettes were initially introduced in the 1960s and 1970s as smokers became aware of the health risks of smoking. These cigarettes have been marketed using advertising and packaging which suggests that these brands are less harmful alternatives to "full flavour" or "regular" brands<sup>4,5</sup> and therefore appeal to health concerned smokers.<sup>6-9</sup> Consequently, the availability of "low tar" cigar-

ettes is likely to have discouraged some smokers from quitting,<sup>10-11</sup> although this evidence is not conclusive.<sup>12</sup> Brands that are described as "low tar" typically generate lower levels of tar and nicotine emissions under machine testing owing to higher levels of filter ventilation and filtration. However, smokers have been shown to compensate for the reduced deliveries of nicotine in order to achieve target nicotine doses, therefore increasing tar delivery and suggesting that the originally anticipated benefits of "low tar" cigarettes would not eventuate.<sup>13-16</sup> This is in accordance with the epidemiological evidence, which has shown that these brands are no less harmful to consumers.<sup>17,18</sup>

It is unclear to what extent similar marketing practices have been employed in China. Tobacco industry documents have demonstrated that Philip Morris launched Marlboro Lights in 1994 in major urban centres in the People's Republic of China. Philip Morris predicted that young adult smokers would follow the established trend in Hong Kong towards lower tar and nicotine products.<sup>19</sup> There is also evidence that "low tar" cigarettes were associated with "lower risk"—see figure 1 for an example. Tar yield numbers are also printed on the side of many Chinese cigarette packages, reinforcing the belief that they are less harmful. Anecdotal evidence, however, suggests that the use of terms such as "light" or "mild" to market "low tar" cigarettes has been less common in mainland China than in Western countries. These terms do appear on some cigarette packages (for example, Zhongnanhai Light), but typically appear only in English.

Brands with higher levels of filter ventilation and other design features that generate low tar under machine tests are less prevalent in China than in Western countries primarily because of a lack of domestic production technology and a limited presence of foreign brands in the Chinese market to stimulate interest in alternatives to the traditional higher tar cigarette.<sup>20</sup>

Although smokers in China are less aware and health concerned about the health risks of smoking compared to other countries,<sup>21,22</sup> this may soon be changing. As China implements more stringent tobacco control policies in accordance with the Framework Convention on Tobacco Control (FCTC), it is anticipated that there will be an increase in public education about the health risks of smoking. Chinese smokers are therefore more likely to become concerned about health, and it is anticipated that the market share of lower tar



**Figure 1** An advertisement for Zhongnanhai Lights Cigarettes.

brands will increase in response to these rising concerns. Regulations that prohibit the sale of cigarettes above 15 mg tar/stick in 2004 are also expected to reduce the machine tar numbers, as is the increasing presence of multinational companies.<sup>20</sup>

Use of "light" and "low tar" cigarettes is likely to increase; however, to our knowledge no research has examined beliefs about the relative health risks of "light" and "low tar" cigarettes compared to full flavoured cigarettes among smokers in China. It will be important to know whether these cigarettes are also seen as "less harmful" and therefore could be appealing to health-concerned smokers in China. The International Tobacco Control (ITC) China Survey, conducted in six Chinese cities among representative samples of adult smokers included a number of survey questions designed to assess beliefs about "light" and/or "low tar" cigarettes (which we will refer to as "LLT"). We also examined which factors are independently associated with a belief that LLT cigarettes are less harmful relative to full flavoured cigarettes.

We focused on beliefs about the sensory experience of LLT cigarettes as a potentially important factor that could lead smokers to believe that LLT cigarettes are less harmful. Previous research has demonstrated an association between the belief that LLT cigarettes are smoother and the belief that LLT cigarettes are less harmful.<sup>7 8 23</sup> This study will examine whether smokers in China who believe that LLT cigarettes are smoother on the respiratory system compared to regular cigarettes are more likely to believe that LLT cigarettes are less harmful. In countries where "light" and "low tar" descriptors were removed, smokers continued to believe that LLT cigarettes are less harmful particularly if they believed that these cigarettes are smoother on the throat and chest.<sup>24</sup> We therefore tested whether this association also existed in China.

This was a critical time to evaluate beliefs about the relative harm of "light" and "low tar" cigarettes because China introduced a ban on these descriptors in January 2006 (however, the tobacco industry was given a grace period until April 2006). Because our survey started in April 2006, we are not able to compare changes in smokers' perceptions about "light" and "low tar" cigarette labelling before and after the regulation took effect even though it is likely that some cigarettes with "light" and "low tar" labels were still on store shelves after the official

policy took effect. However, future research waves can address the impact of this ban.

## METHOD

### Sample

Participants were from Wave 1 of the ITC China Survey conducted in April to August 2006. The ITC China Survey is a prospective, face-to-face, cohort survey of adult smokers and non-smokers 18 years of age or older. The current study examined smokers only (respondents who had smoked more than 100 cigarettes in their life and smoked at least weekly, n = 4732). Respondents were from six cities: Beijing (n = 785), Guangzhou (n = 791), Shenyang (n = 781), Shanghai (n = 784), Changsha (n = 800) and Yinchuan (n = 791). A seventh city, Zhengzhou, was initially included in the study. Wave 1 and 2 data were examined across both waves. A random sample of the survey data and MP3 recordings of survey interviews were examined in each city to ensure consistency in responses between waves. In Zhengzhou there was a significant level of inconsistencies between Wave 1 and Wave 2 (for example, different genders for the supposedly same respondents), the city was therefore removed from the study (there were virtually no such cases in the other six cities). Cooperation rates were 80.0% in Beijing (estimated), 80.0% in Guangzhou (estimated), 81.2% in Shenyang (exact), 84.2% in Shanghai (exact), 80.0% in Changsha (estimated) and 90.3% in Yinchuan (exact). Response rates were 50.0% in Beijing (estimated), 50.0% in Guangzhou (estimated), 50.0% in Shenyang (exact), 61.3% in Shanghai (exact), 50.0% in Changsha (estimated), and 39.4% in Yinchuan (exact). The cooperation rates were comparable to (and the response rates were generally higher than) those obtained in the ITC Four Country Survey (a telephone survey of smokers in Canada, United States, United Kingdom and Australia). Table 1 presents the sample characteristics of respondents included in these analyses.

### Procedure

In each of the six cities, the survey team led by investigators at the Chinese Center for Disease Control and Prevention selected 10 Jie Dao (street districts), with the probability of selection proportional to size. Within each Jie Dao, two Ju Wei Hui (residential blocks) were selected, again with the probability of selection proportional to size. Within each Ju Wei Hui, the addresses of all households were listed and a sample of 300 addresses was randomly selected without replacement.

Among these 300 households, basic information was collected on every person over the age of 18 to determine eligibility for the survey. From these 300 households, 50 people were randomly selected to participate in the survey (40 adult smokers and 10 adult non-smokers). The "next birthday method" was used to select the respondent in households with more than one eligible respondent.<sup>25</sup>

The smoker survey was a 40-minute face-to-face survey conducted in Mandarin by experienced survey interviewers specially trained to conduct the ITC China survey. Further details about the team structure are available in the ITC China Wave 1 technical report.<sup>26</sup> Respondents were given a small gift (soap) worth 10–20 Yuan in appreciation for their participation. This compensation is typical for survey participation in China.

The ITC China Survey was constructed with reference to ITC surveys being conducted in 14 other countries. The survey and training manual were translated from English into Chinese and standardised across all cities. The survey fieldwork was

**Table 1** Unweighted sample characteristics for the six Chinese cities in the ITC China Survey

| Factor                           | Beijing (n = 785) |        | Shenyang (n = 781) |        | Shanghai (n = 784) |        | Changsha (n = 800) |        | Winchuan (n = 791) |        | Guangzhou (n = 791) |        | Overall (n = 4732) |        |
|----------------------------------|-------------------|--------|--------------------|--------|--------------------|--------|--------------------|--------|--------------------|--------|---------------------|--------|--------------------|--------|
|                                  | No (%)            | No (%) | No (%)             | No (%) | No (%)             | No (%) | No (%)             | No (%) | No (%)             | No (%) | No (%)              | No (%) | No (%)             | No (%) |
| <b>Gender</b>                    |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| Male                             | 743 (94.6)        |        | 741 (94.9)         |        | 765 (97.6)         |        | 732 (91.5)         |        | 772 (97.6)         |        | 746 (94.3)          |        | 4499 (95.1)        |        |
| Female                           | 42 (5.4)          |        | 40 (5.1)           |        | 19 (2.4)           |        | 68 (8.5)           |        | 19 (2.4)           |        | 45 (5.7)            |        | 233 (4.9)          |        |
| <b>Age (years)</b>               |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| 18-39                            | 120 (15.3)        |        | 111 (14.2)         |        | 89 (11.3)          |        | 201 (25.1)         |        | 258 (32.6)         |        | 118 (14.9)          |        | 897 (19.0)         |        |
| 40-54                            | 373 (47.5)        |        | 456 (58.4)         |        | 456 (58.2)         |        | 362 (45.3)         |        | 343 (43.4)         |        | 348 (44.0)          |        | 2338 (49.4)        |        |
| 55+                              | 292 (37.2)        |        | 214 (27.4)         |        | 239 (30.5)         |        | 237 (29.6)         |        | 190 (24.0)         |        | 325 (41.1)          |        | 1497 (31.6)        |        |
| <b>Ethnicity</b>                 |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| Other                            | 42 (5.4)          |        | 40 (5.1)           |        | 11 (1.4)           |        | 11 (1.4)           |        | 125 (15.8)         |        | 6 (0.8)             |        | 235 (5.0)          |        |
| Han*                             | 743 (94.6)        |        | 741 (94.9)         |        | 773 (98.6)         |        | 789 (98.6)         |        | 666 (84.2)         |        | 785 (99.2)          |        | 4497 (95.0)        |        |
| <b>Income</b>                    |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| Low                              | 74 (9.4)          |        | 244 (31.2)         |        | 113 (14.4)         |        | 226 (28.3)         |        | 174 (22.0)         |        | 94 (11.9)           |        | 925 (19.6)         |        |
| Medium                           | 323 (41.2)        |        | 435 (55.7)         |        | 348 (44.4)         |        | 335 (41.9)         |        | 396 (50.1)         |        | 295 (37.3)          |        | 2132 (45.1)        |        |
| High                             | 322 (41.1)        |        | 79 (10.1)          |        | 291 (37.2)         |        | 198 (24.8)         |        | 156 (19.7)         |        | 286 (36.2)          |        | 1332 (28.2)        |        |
| Don't know                       | 65 (8.3)          |        | 23 (2.9)           |        | 31 (4.0)           |        | 41 (5.1)           |        | 64 (8.1)           |        | 116 (14.7)          |        | 340 (7.2)          |        |
| <b>Education</b>                 |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| Low                              | 76 (9.7)          |        | 60 (7.7)           |        | 47 (6.0)           |        | 142 (17.8)         |        | 107 (13.5)         |        | 188 (23.9)          |        | 620 (13.1)         |        |
| Medium                           | 496 (63.2)        |        | 570 (73.1)         |        | 588 (75.0)         |        | 486 (60.8)         |        | 486 (61.5)         |        | 472 (59.9)          |        | 3098 (65.5)        |        |
| High                             | 213 (27.1)        |        | 150 (19.2)         |        | 149 (19.0)         |        | 172 (21.5)         |        | 197 (24.9)         |        | 128 (16.2)          |        | 1009 (21.3)        |        |
| <b>Daily/weekly smoking</b>      |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| Daily smoker                     | 730 (93.0)        |        | 733 (93.9)         |        | 742 (94.6)         |        | 749 (93.6)         |        | 721 (91.2)         |        | 747 (94.4)          |        | 4422 (93.4)        |        |
| Weekly smoker                    | 55 (7.0)          |        | 48 (6.1)           |        | 42 (5.4)           |        | 51 (6.4)           |        | 70 (8.8)           |        | 44 (5.6)            |        | 310 (6.6)          |        |
| <b>Cigarettes per day</b>        |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| 1-10                             | 299 (38.4)        |        | 292 (37.5)         |        | 266 (34.0)         |        | 194 (24.4)         |        | 336 (42.7)         |        | 253 (32.2)          |        | 1640 (34.8)        |        |
| 11-20                            | 374 (48.0)        |        | 372 (47.8)         |        | 389 (49.7)         |        | 407 (51.3)         |        | 356 (45.3)         |        | 409 (52.0)          |        | 2307 (49.0)        |        |
| 21-30                            | 58 (7.4)          |        | 68 (8.7)           |        | 71 (9.1)           |        | 87 (11.0)          |        | 48 (6.1)           |        | 73 (9.3)            |        | 405 (8.6)          |        |
| 31+                              | 48 (6.2)          |        | 46 (5.9)           |        | 57 (7.3)           |        | 106 (13.4)         |        | 46 (5.9)           |        | 51 (6.5)            |        | 354 (7.5)          |        |
| <b>Ever tried light, low tar</b> |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| Yes                              | 443 (56.4)        |        | 329 (42.1)         |        | 467 (59.6)         |        | 303 (37.9)         |        | 407 (51.5)         |        | 417 (52.7)          |        | 2366 (50.0)        |        |
| No                               | 316 (40.3)        |        | 410 (52.5)         |        | 295 (37.6)         |        | 447 (55.9)         |        | 321 (40.6)         |        | 334 (42.2)          |        | 2123 (44.9)        |        |
| Don't know                       | 26 (3.3)          |        | 42 (5.4)           |        | 22 (2.8)           |        | 50 (6.3)           |        | 63 (8.0)           |        | 40 (5.1)            |        | 243 (5.1)          |        |
| <b>Tar level</b>                 |                   |        |                    |        |                    |        |                    |        |                    |        |                     |        |                    |        |
| Don't know                       | 282 (36.6)        |        | 284 (38.1)         |        | 246 (31.5)         |        | 400 (50.1)         |        | 230 (29.3)         |        | 321 (40.9)          |        | 1763 (37.8)        |        |
| Invalid tar level                | 4 (0.5)           |        | 2 (0.3)            |        | 11 (1.4)           |        | 6 (0.8)            |        | 8 (1.0)            |        | 4 (0.5)             |        | 35 (0.8)           |        |
| 15 mg                            | 202 (26.2)        |        | 204 (27.3)         |        | 310 (39.6)         |        | 38 (4.8)           |        | 208 (26.5)         |        | 335 (42.7)          |        | 1297 (27.8)        |        |
| 11-14 mg                         | 169 (21.9)        |        | 235 (31.5)         |        | 102 (13.2)         |        | 349 (43.7)         |        | 326 (41.5)         |        | 101 (12.6)          |        | 1269 (27.6)        |        |
| 10 mg or less                    | 113 (14.7)        |        | 21 (2.8)           |        | 112 (14.3)         |        | 5 (0.6)            |        | 14 (1.8)           |        | 17 (2.2)            |        | 282 (6.0)          |        |

\*Han is the majority ethnicity in China; approximately 91.3% of the national population is Han.<sup>17</sup>

supervised by members of the local Centers for Disease Control and Prevention (CDC) in each of the six cities and was coordinated by the China National CDC and the ITC Project Data Management Centre at the University of Waterloo. Research ethics approval was obtained from the University of Waterloo, Roswell Park Cancer Institute, the Cancer Council Victoria, and the Chinese National CDC.

Sampling weights were constructed separately for male smokers, female smokers, and non-smokers. Wave 1 weight construction accounted for four levels of sample selection: Jie Dao, Ju Wei Hui, household, and individual. The final Wave 1 weight for a sampled individual was the number of people in the city population and the sampling category represented by that individual.

For additional information about the methods of the ITC China Survey see Wu *et al*<sup>28</sup> and the ITC China Survey Technical Report.<sup>26</sup>

## Measures

### Beliefs about "light" and/or "low tar" cigarettes

Respondents were asked whether they strongly agree, agree, neither agree or disagree, disagree, strongly disagree or don't know with each of two statements: "low tar cigarettes are less harmful than regular cigarettes" and "light cigarettes are less harmful than regular cigarettes." Although the terms "light" and "low tar" are often used synonymously, separate questions were asked in order to ensure that we captured all possible awareness of these types of cigarettes. The term "low tar" is used in China both in marketing the product as "low tar" and also because of the tar levels on cigarette packaging. "Light" descriptors are typically written in English only on cigarette packages. Thus only those who read English would understand the meaning. The terms were similar enough, however, that we collapsed responses across beliefs about "light" and "low tar" cigarettes.

Responses were recoded so that "strongly agree" and "agree" were coded as 1 and other responses coded as 0. Beliefs about "light" and "low tar" cigarettes were combined so that having one or both of these beliefs was coded 1 and having neither of these beliefs was coded 0. Before collapsing across beliefs about "light" and "low tar" cigarettes we tested each model separately. The results were similar to those we obtained when combining beliefs about "light" and "low tar" cigarettes.

### Demographics and smoking behaviour

Standard demographic measures included sex, ethnicity (Han vs other ethnic groups), age (18–39, 40–54, 55+; there were few respondents (1.4%) in the 18–24 category and it was therefore collapsed with the 25–39 category), household income per month (low: <1000 yuan per month, medium: ≥1000 yuan and ≤2999 yuan per month, high: ≥3000 yuan, don't know), education (low: no education or elementary school, medium: junior high school or high school/technical high school, high: college, university or higher) and city. Daily cigarette smokers responded "every day" to the question: "Do you smoke every day, less than every day, or not at all?" and weekly smokers indicated that they smoked "less than every day". Cigarettes smoked per day was calculated by asking daily smokers: "On average, how many cigarettes do you smoke each day, including both factory-made and hand-rolled cigarettes?" and weekly smokers: "On average, how many cigarettes do you smoke each week?" (divided by 7). Impossible per day values (greater than 100) were treated as coding errors and recoded as 100. In the

logistic regression equation, cigarettes per day was centred and treated as a continuous variable.

### Knowledge of health effects of smoking

Respondents were asked whether smoking causes stroke, impotence, lung cancer in smokers, emphysema in smokers, stained teeth, premature ageing, lung cancer in non-smokers and cardiovascular heart disease. Responses were coded so that no and don't know/cannot say = 0 and yes = 1. The measure of health knowledge was the sum of all eight responses. The Cronbach  $\alpha$  for this measure was 0.79, suggesting that the scale was reliable.

### Self-reported use of "light" and "low tar" cigarettes

We asked respondents whether they had ever tried cigarettes described as "light," "mild" or "low tar" (yes, no or don't know). We also asked respondents to provide the tar level of the brand they currently smoked most often. Responses were coded as 1 = ≤10 mg of tar, 2 = ≥11 mg of tar to ≤14 mg of tar, 3 = 15 mg of tar, 4 = invalid tar level and 5 = don't know. Because China banned cigarettes above 15 mg of tar, any respondent who reported greater than 15 mg was given an invalid code and treated as a separate category.

### Health concerns about smoking

To assess health concerns, respondents were asked: "to what extent, if at all, has smoking damaged your health?" and "how worried are you, if at all, that smoking will damage your health in the future?" (not at all/don't know, a little, very much). We also asked smokers to rate their health with response options from 1 = poor to 5 = excellent. Smokers were asked whether they considered themselves addicted to cigarettes (not at all, a little, somewhat, a lot).

### Quitting related variables

We asked respondents whether they had ever tried to quit smoking (yes or no). Quit intentions were assessed by asking respondents: "are you planning to quit smoking?" (within the next month, within the next 6 months, sometime in the future, beyond 6 months, not planning to quit/don't know). To assess quitting efficacy respondents were asked: "if you decided to give up smoking completely in the next 6 months, how sure are you that you would succeed?" (not at all sure, somewhat sure, very sure, extremely sure, don't know).

### Smoothness beliefs

Respondents were asked whether they strongly agree, agree, neither agree nor disagree, disagree, strongly disagree or don't know with the statements: "low tar cigarettes are smoother on your respiratory system than regular cigarettes", and "light cigarettes are smoother on your respiratory system than regular cigarettes". (Surveys typically ask "Do light cigarettes feel smoother on the throat and chest?") However, in Chinese, this question was interpreted as referring to outside the throat and chest. To capture the sensation within the throat and chest, our Chinese translation team suggested the translation should be "on the respiratory system".

Responses were recoded so that "strongly agree" and "agree" were coded as 1 and other responses coded as 0. Again, beliefs about "light" and "low tar" cigarettes were combined so that having one or both of these beliefs was coded as 1 and having neither of these beliefs was coded as 0.

## Statistical analyses

SPSS (version 17) was used for all statistical analyses. A complex samples logistic regression model was used to test which variables were independently associated with the beliefs that LLT cigarettes are less harmful. All analyses were conducted on weighted data. These predictors were related to beliefs that "light" cigarettes confer health benefits among smokers in the ITC Four Country Survey.<sup>15</sup>

## RESULTS

Half (50.0% unweighted; 48.5% weighted) of the respondents reported having ever tried a cigarette described as "light", "mild" or "low tar" (table 1). Approximately 28% of respondents reported their current brand had 15 mg of tar, 27.6% had a brand with 11–14 mg of tar, and 6% had a brand with 10 mg of tar or less. Reported use of "light" and "low tar" cigarettes varied by city with lower tar cigarette brands being more common in more Westernised cities (Beijing, Shanghai).

### Beliefs about "light" and/or "low tar" cigarettes

Table 2 presents overall beliefs about "light" and "low tar" cigarettes. The majority of smokers (71.0%) believed that LLT cigarettes are less harmful and that LLT cigarettes are smoother on the respiratory system (73.3%).

### Factors associated with the belief that "light" and/or "low tar" cigarettes are less harmful

Table 3 presents the results of a logistic regression analysis to determine what factors were independently associated with the belief that LLT cigarettes are less harmful. Smokers in the oldest age category were more likely than smokers in the youngest category to believe that LLT cigarettes are less harmful ( $p<0.001$ , OR = 1.97 CI 1.36 to 2.87). Compared to people with a high education, people who were low educated were significantly less likely to believe that LLT cigarettes are less harmful ( $p = 0.007$ , OR = 0.55 CI 0.34 to 0.89).

By far the strongest predictor of the misconception that LLT cigarettes are less harmful was the belief about the sensory perception of LLT cigarettes. Smokers who thought that LLT cigarettes are smoother on the respiratory system were significantly more likely to believe that LLT cigarettes are less harmful ( $p<0.001$ , OR = 53.87, CI 41.28 to 70.31). Of the smokers who believed that LLT cigarettes are smoother on the respiratory system, 90.9% said that these cigarettes are less harmful than regular cigarettes. In sharp contrast, among those who did *not* believe that LLT cigarettes are smoother on the respiratory system, only 16.4% believed that these cigarettes are less harmful.

## Interactions with the belief that "light" and/or "low tar" cigarettes are smoother

We tested interactions between the smoother belief and each variable. It should be noted that the main effect for smoother belief was enormous, and so even if there exist statistically significant interactions, the effect of those interactions would be differences around a main effect corresponding to an odds ratio of 53.

Among smokers who ever used "light" or "low tar" cigarettes, those who believed that these types of cigarettes are smoother have significantly greater odds of believing that LLT cigarettes are less harmful than those who did not believe that these cigarettes are smoother ( $p<0.001$ , OR = 40.03, CI = 28.59 to 56.03). Those who never used "light" or "low tar" cigarettes and who believed that these types of cigarettes are smoother were more likely to believe that LLT cigarettes are less harmful than those who did not believe that these cigarettes are smoother ( $p<0.001$ , OR = 71.52, CI = 50.86 to 100.57). The relation between smoothness and less harm was therefore stronger for those who had never tried "light" or "low tar" cigarettes compared to those who had tried "light" or "low tar" cigarettes ( $p = 0.004$ , OR = 1.79, CI 1.22 to 2.62).

There was no significant interaction between the tar level of the respondent's current brand and the belief that LLT cigarettes are smoother predicting the belief that these cigarettes are less harmful. Few other predictors interacted with the perception that LLT cigarettes are smoother to predict the belief that they are less harmful. There was a significant overall interaction by city ( $p = 0.02$ ) and education ( $p = 0.006$ ). In every case, those who believed that LLT cigarettes are smoother were more likely to believe that LLT cigarettes are less harmful (the lowest odds ratio was 25.6 and the highest odds ratio was 85.5).

## DISCUSSION

Over two-thirds of Chinese smokers surveyed held the false belief that LLT cigarettes are less harmful. This is a much higher level of belief than smokers in Canada (16%), the US (28%), the UK (43%) and Australia (27%).<sup>15</sup> This may be a reflection of marketing campaigns in China that continue to use explicit health claims. For example, a two-page spread magazine advertisement for one Chinese brand, "Zhongnanhai Light" cigarettes, claims "Every product fuses the world's most advanced low-harm cigarette technology, offering a guarantee of health for your smoking life." Another print ad claims: "A little lower is healthier! Low-harm tobacco, more technological components, greater loving care for your body!" (see fig 1). Since the Chinese government has allowed these companies to

**Table 2** Weighted beliefs about the relative harm and sensory characteristics of "light" and "low tar" cigarettes and inter-item correlations

| Belief   | "Light" less harmful | "Low tar" less harmful | LLT less harmful | "Light" smoother | "Low tar" smoother | LLT smoother | % Agree or strongly agree with belief item | 95% CI for belief item |
|--|----------------------|------------------------|------------------|------------------|--------------------|--------------|--|------------------------|
| "Light" cigarettes are less harmful than regular cigarettes                          | 1                    |                        |                  |                  |                    |              | 55.7                                       | 52.8% to 58.6%         |
| "Low tar" cigarettes are less harmful than regular cigarettes                        | 0.51                 | 1                      |                  |                  |                    |              | 62.0                                       | 59.4% to 64.4%         |
| LLT cigarettes are less harmful  | 0.72                 | 0.83                   | 1                |                  |                    |              | 71.0                                       | 68.4% to 73.5%         |
| "Light" cigarettes are smoother on your respiratory system than regular cigarettes   | 0.76                 | 0.49                   | 0.63             | 1                |                    |              | 60.4                                       | 57.5% to 63.2%         |
| "Low tar" cigarettes are smoother on your respiratory system than regular cigarettes | 0.46                 | 0.68                   | 0.60             | 0.48             | 1                  |              | 61.4                                       | 58.9% to 63.9%         |
| LLT cigarettes are smoother on your respiratory system than regular cigarettes       | 0.61                 | 0.62                   | 0.73             | 0.75             | 0.76               | 1            | 73.3                                       | 70.7% to 75.8%         |

**Table 3** Weighted logistic regression of belief "light"/"low tar" cigarettes are less harmful

| Factor                             | No   | % of smokers believing LLT cigarettes are less harmful* | Adjusted odds ratio (95% CI) | p Value |
|------------------------------------|------|---|------------------------------|---------|
| <b>Demographic variables</b>       |      |   |                              |         |
| Gender                             |      |   |                              |         |
| Male                               | 4499 | 71.1  | 0.84 (0.60 to 1.18)          | 0.31    |
| Female                             | 233  | 70.5  | 1.00 (reference)             |         |
| Age (years)                        |      |   |                              |         |
| 18–39                              | 897  | 67.4  | 1.00 (reference)             | <0.001  |
| 40–54                              | 2338 | 70.3  | 1.17 (0.87 to 1.57)          |         |
| 55+                                | 1497 | 74.4  | 1.97 (1.36 to 2.87)          |         |
| Ethnicity                          |      |   |                              |         |
| Other                              | 235  | 62.2  | 0.93 (0.55 to 1.56)          | 0.77    |
| Han                                | 4497 | 71.5  | 1.00 (reference)             |         |
| Income                             |      |   |                              |         |
| Don't know                         | 340  | 61.5  | 1.05 (0.69 to 1.59)          | 0.20    |
| Low                                | 925  | 69.1  | 1.27 (0.90 to 1.80)          |         |
| Medium                             | 2132 | 73.6  | 1.50 (1.01 to 2.23)          |         |
| High                               | 1332 | 70.6  | 1.00 (reference)             |         |
| Education                          |      |   |                              |         |
| Low                                | 620  | 64.2  | 0.55 (0.34 to 0.89)          | 0.007   |
| Medium                             | 3098 | 72.6  | 0.85 (0.55 to 1.31)          |         |
| High                               | 1009 | 70.9  | 1.00 (reference)             |         |
| City                               |      |   |                              |         |
| Beijing                            | 785  | 74.7  | 1.36 (0.85 to 2.18)          | 0.46    |
| Shenyang                           | 781  | 74.6  | 1.47 (1.00 to 2.17)          |         |
| Shanghai                           | 784  | 66.5  | 1.19 (0.75 to 1.89)          |         |
| Changsha                           | 800  | 72.3  | 1.33 (0.88 to 1.99)          |         |
| Yinchuan                           | 791  | 67.3  | 1.27 (0.89 to 1.83)          |         |
| Guangzhou                          | 791  | 70.9  | 1.00 (reference)             |         |
| <b>Smoking behaviour</b>           |      |   |                              |         |
| Daily/weekly smoking               |      |   |                              |         |
| Daily smoker                       | 4422 | 70.7  | 0.81 (0.53 to 1.22)          | 0.30    |
| Weekly smoker                      | 310  | 75.3  | 1.00 (reference)             |         |
| Cigarettes per day                 |      |   |                              |         |
| 0–10                               | 1640 | 72.2  | 1.01 (0.99 to 1.03)†         | 0.53    |
| 11–20                              | 2307 | 71.0  |                              |         |
| 21–30                              | 405  | 65.5  |                              |         |
| 31+                                | 354  | 73.6  |                              |         |
| <b>Health knowledge</b>            |      |   |                              |         |
| 0                                  | 360  | 56.8  | 1.01 (0.94 to 1.08)†         | 0.84    |
| 1                                  | 570  | 59.4  |                              |         |
| 2                                  | 502  | 69.9  |                              |         |
| 3                                  | 610  | 74.5  |                              |         |
| 4                                  | 665  | 76.7  |                              |         |
| 5                                  | 760  | 76.8  |                              |         |
| 6                                  | 602  | 75.4  |                              |         |
| 7                                  | 375  | 71.4  |                              |         |
| 8                                  | 261  | 70.2  |                              |         |
| <b>Ever tried light, low tar</b>   |      |   |                              |         |
| No                                 | 2123 | 68.6  | 0.91 (0.68 to 1.22)          | 0.63    |
| Don't know                         | 243  | 68.6  | 1.11 (0.66 to 1.85)          |         |
| Yes                                | 2366 | 73.6  | 1.00 (reference)             |         |
| <b>Tar level</b>                   |      |   |                              |         |
| Don't know                         | 1763 | 71.4  | 0.72 (0.42 to 1.21)          | 0.19    |
| Invalid tar level                  | 35   | 61.4  | 0.38 (0.15 to 0.96)          |         |
| 15 mg                              | 1297 | 69.5  | 0.61 (0.37 to 1.01)          |         |
| 11–14 mg                           | 1289 | 72.0  | 0.71 (0.44 to 1.14)          |         |
| 10 mg or less                      | 282  | 76.5  | 1.00 (reference)             |         |
| <b>Health concern</b>              |      |   |                              |         |
| Worried smoking has damaged health |      |   |                              |         |
| Very                               | 770  | 76.1  | 1.08 (0.75 to 1.55)          | 0.48    |

Continued

**Table 3** Continued

| Factor                                | No   | % of smokers believing LLT cigarettes are less harmful* | Adjusted odds ratio (95% CI) | p Value |
|---------------------------------------|------|---|------------------------------|---------|
| A little                              | 1973 | 75.9  | 1.17 (0.91 to 1.52)          |         |
| Not at all/don't know                 | 1983 | 64.3  | 1.00 (reference)             |         |
| Worried smoking will damage health    |      |   |                              |         |
| Very                                  | 855  | 77.0  | 1.22 (0.80 to 1.87)          | 0.30    |
| A little                              | 1984 | 75.7  | 1.23 (0.95 to 1.59)          |         |
| Not at all/don't know                 | 1890 | 63.3  | 1.00 (reference)             |         |
| Describe your health                  |      |   |                              |         |
| 1 Poor                                | 131  | 72.7  | 1.04 (0.86 to 1.26)†         | 0.68    |
| 2                                     | 273  | 66.5  |                              |         |
| 3                                     | 2218 | 72.0  |                              |         |
| 4                                     | 1445 | 70.6  |                              |         |
| 5 Excellent                           | 653  | 70.4  |                              |         |
| Perceived addiction                   |      |   |                              |         |
| A little                              | 2132 | 72.3  | 1.09 (0.69 to 1.72)          | 0.81    |
| Somewhat                              | 1359 | 71.9  | 1.22 (0.70 to 2.14)          |         |
| A lot                                 | 515  | 67.0  | 1.18 (0.49 to 2.82)          |         |
| Not at all                            | 666  | 70.4  | 1.00 (reference)             |         |
| Quitting                              |      |   |                              |         |
| Past quit attempt                     |      |   |                              |         |
| No                                    | 2219 | 69.6  | 1.12 (0.78 to 1.61)          | 0.52    |
| Yes                                   | 2512 | 72.3  | 1.00 (reference)             |         |
| Quit intention                        |      |   |                              |         |
| In the next month                     | 377  | 73.8  | 0.74 (0.48 to 1.13)          | 0.53    |
| In the next 6 months                  | 297  | 77.0  | 0.80 (0.45 to 1.42)          |         |
| In the future beyond 6 months         | 437  | 77.3  | 0.92 (0.59 to 1.43)          |         |
| No intention/don't know               | 3602 | 69.6  | 1.00 (reference)             |         |
| Quit efficacy                         |      |   |                              |         |
| Don't know                            | 334  | 61.3  | 1.20 (0.70 to 2.06)          | 0.68    |
| Extremely sure                        | 612  | 71.1  | 0.94 (0.61 to 1.44)          |         |
| Very sure                             | 622  | 73.4  | 1.13 (0.71 to 1.80)          |         |
| Somewhat sure                         | 1158 | 76.8  | 1.21 (0.91 to 1.61)          |         |
| Not at all sure                       | 2004 | 68.5  | 1.00 (reference)             |         |
| Light/low tar smoother                |      |   |                              |         |
| Agree/strongly Agree                  | 3451 | 90.9  | 53.87 (41.28 to 70.31)       | <0.001  |
| Disagree/strongly disagree/neutral/DK | 1280 | 16.4  | 1.00 (reference)             |         |

\*The belief prevalences presented for each response category of each factor are not adjusted for the other predictor variables in the model. †Continuous variable.

make explicit health claims, even after the ban, it is not surprising that a relatively high number of smokers in China believe that these cigarettes are less harmful compared to conventional high tar yield brands.

Consistent with previous research that has found that the sensory experience of smoking “low tar” cigarettes with higher levels of filter ventilation reinforces the belief in reduced harm,<sup>14</sup> we found that the factor most strongly associated with the belief that LLT cigarettes are less harmful was the belief that LLT cigarettes are smoother on the respiratory system. We also found a stronger association between the belief that LLT cigarettes are smoother on the airway and the belief that they are less harmful than regular cigarettes, among those who had never tried “light” or “low tar” cigarettes compared to those who had ever tried these cigarettes.

One might suspect that the experience of smoking LLT cigarettes would strengthen the belief that they are smoother because in most cases they would be smoother. However, the belief that LLT cigarettes are smoother is also communicated through package designs (that is, lighter colours), as well as descriptors that say “smooth”, “mellow”, etc. Perhaps the

smoothness implied in marketing for these cigarettes differs from the actual smoking experience. Also, the fact that “light” and “low tar” cigarettes are only recently being introduced into the market is another factor that may account for the finding. In addition, there was no interaction between the tar level of the respondent's current brand and the belief that LLT cigarettes are less harmful. It should be pointed out that whatever the nature of the interaction, it was still the case for both groups that the relation between the smoother belief and the lower harm belief was very substantial.

### Limitations

The findings reported in this article are from six cities in China. However, we can see no reason why they would not generalise to other urban Chinese cities as the cities in our study cover a broad range of economic and social conditions. There are plausible reasons why the findings might be somewhat different in rural China, where “light” cigarettes may be less likely to be promoted and there may be a smaller range of cigarette brands available. Still, with a starting point of an odds ratio of 53, we believe that it is extremely unlikely that the very strong relation

## What this paper adds

This is the first study to examine beliefs about "light" and "low tar" cigarettes among smokers in China, the world's largest consumer of tobacco. There was a very strong relation between the belief that "light" and/or "low tar" cigarettes are smoother on the respiratory system and the belief that "light" and/or "low tar" cigarettes are less harmful. The findings suggest that future tobacco control policies should go beyond eliminating labelling and marketing that promotes "light" and "low tar" cigarettes (the focus of Article 11 of the Framework Convention on Tobacco Control (FCTC)), and address the tobacco product characteristics (for example, additives, filter vents) that reinforce the belief that "light" and "low tar" cigarettes are less harmful (Articles 9 and 10 of the FCTC).

would not hold across a very broad range of locations across all of China.

As with any survey research, there are always concerns about survey non-response and under-representation of certain groups. We addressed this issue by conducting weighted analyses for each city. Although we did have a low number of respondents in the youngest age category (18–24), this is consistent with samples from China's 1996 National Prevalence Study.<sup>22</sup>

## Implications

In January 2006, China banned descriptors such as: "light", "ultra-light", "mild", "medium/low tar", "low tar", "low tar content" on cigarette packaging and inserts. However, the tobacco industry was given a period of grace until April 2006. In addition, sources in China have indicated that although the Chinese terms for "light", etc, have been removed, the English descriptors are not covered under this ban and remain on cigarette packages. Because our survey started in April 2006, we were unable to evaluate the initial impact of the ban, although we did not expect any immediate impact of the ban, rather we expected any changes in beliefs to take time. In follow-up surveys with this cohort of smokers we will be able to measure whether perceptions about these brands will change as time from the ban elapses. What is known is that the majority of adult smokers in China hold the erroneous belief that LLT cigarettes are less harmful than conventional high yield cigarettes. Smokers in China, like those throughout the world, need to be educated that all combustion tobacco products are harmful and that there is no compelling evidence to support a meaningful difference in health risk between products no matter what the marketing claims might suggest.

These findings demonstrate the need for China to also consider banning advertising that supports the idea that certain cigarettes are less harmful than others, as well as the need to remove tar numbers from cigarette packages. China has joined other countries (for example, Thailand, Australia and the United Kingdom) to ban "light" and "mild" descriptors on cigarette packages. However, research suggests banning these terms may not be sufficient to change beliefs about the relative harm of "light" cigarettes at least in the short term.<sup>25</sup> Our findings highlight the importance of the association between the belief that these cigarettes are smoother on the respiratory system and the relative harmfulness of "light" and "low tar" cigarettes. Banning "light" or "low tar" descriptors does nothing to break the link between the lighter and smoother physical sensations associated with "light" and "low tar" cigarettes and their

presumed harmfulness. The association between the physical aspects of these cigarettes and their relative harm can certainly be created from package designs, advertising, descriptors, but our findings point to the powerful association created by the product itself that may provide illusory messages directly to the smoker that some brands are less harmful than others.

In addition, Articles 9 and 10 of the Framework Convention on Tobacco Control (FCTC)<sup>29</sup> relate to the regulation of tobacco products and these results point to the need to regulate the product to ban design features that would make a product smoother and lighter in sensation. Doing so could reduce perceptions of lower harm, which may be a key factor in increasing motivation to quit smoking.

**Acknowledgements:** The authors would like to acknowledge the Chinese National Centers for Disease Control and the local CDC representatives in each city for their role in data collection. The authors would also like to thank the three reviewers and the editor for their revisions to the manuscript.

**Funding:** Chinese Center for Disease Control and Prevention, Canadian Institutes of Health Research, Canada (No 79551), National Cancer Institute (NCI)/National Institute of Health (NIH R01 CA125116-01A1), Roswell Park Transdisciplinary Tobacco Use Research Center (TTURC- P50 CA11236), funded by the US National Cancer Institute, with additional support from a Canadian Institutes of Health Research Graduate Scholarship Master's Award, a Canadian Institutes of Health Research Doctoral Research Award, and the Canadian Institutes of Health Research Strategic Training Program in Tobacco Research. The Chinese Center for Disease Control and Prevention was responsible for data collection. Sponsors did not determine the data analysis, interpretation of data, writing of the report or the decision to submit the paper for publication.

**Competing interests:** None.

**Ethics approval:** Ethics approval was obtained from the Office of Research at the University of Waterloo (Waterloo Canada), and the internal review boards at Roswell Park Cancer Institute (Buffalo, USA), the Cancer Council Victoria (Victoria, Australia) and the Chinese Center for Disease Control and Prevention National Center for AIDS/STD Control and Prevention (Beijing, China).

**Provenance and peer review:** Not commissioned; externally peer reviewed.

## REFERENCES

1. World Health Organization. *Towards a tobacco-free China*. Geneva: WHO, 2007: available at: <http://www.wpro.who.int/china/sites/tfi/> (accessed 15 August 2007).
2. World Health Organization. *Report on the global tobacco epidemic, 2008: the MPOWER package*. Geneva: WHO, 2008: available at: [http://www.who.int/tobacco/mpower/mpower\\_report\\_full\\_2008.pdf](http://www.who.int/tobacco/mpower/mpower_report_full_2008.pdf) (accessed 20 June 2008).
3. Murray CJL, Lopez AD. Alternative projections of mortality and disability by cause 1990–2020: global burden of disease study. *Lancet* 1997; **349**:1498–1504.
4. Anderson SJ, Pollay RW, Ling PM. Taking advantage of lax advertising regulation in the USA and Canada: reassuring and distracting health-concerned smokers. *Soc Sci Med* 2006; **63**:1973–1985.
5. Pollay RW, Dewhurst T. The dark side of marketing seemingly "light" cigarettes: successful images and failed fact. *Tob Control* 2002; **11**(suppl 1):i18–31.
6. Pollay RW. Targeting youth and concerned smokers: evidence from Canadian tobacco industry documents. *Tob Control* 2000; **9**:136–47.
7. Shiffman S, Pillitteri JL, Burton SL, et al. Smokers' beliefs about "light" and "ultra light" cigarettes. *Tob Control* 2001; **10**(suppl 1):i17–23.
8. Borland R, Yong HH, King B, et al. Use of and beliefs about light cigarettes in four countries: Findings from the International Tobacco Control Policy Evaluation Survey. *Nicotine Tob Res* 2004; **6**(suppl 3):S311–21.
9. Kropp RY, Halpern-Felsher BL. Adolescents' beliefs about the risks involved in smoking "light" cigarettes. *Pediatrics* 2004; **114**:e445–e451.
10. Kozlowski LT, Goldberg ME, Yost BA, et al. Smokers' misperceptions of light and ultra-light cigarettes may keep them smoking. *Am J Prev Med* 1998; **15**:9–16.
11. Gilpin EA, Emery S, White MM, et al. Does tobacco industry marketing of "light" cigarettes give smokers a rationale for postponing quitting? *Nicotine Tob Res* 2002; **4**(suppl 2):S147–55.
12. Hyland A, Hughes JR, Farrelly M, et al. Switching to lower tar cigarettes does not increase or decrease the likelihood of future quit attempts or cessation. *Nicotine Tob Res* 2003; **5**:665–71.
13. Hammond D, Fong GT, Cummings KM, et al. Smoking topography, brand switching, and nicotine delivery: results from an *in vivo* study. *Cancer Epidemiol Biomarkers Prev* 2005; **14**:1370–5.
14. Kozlowski LT, O'Connor RJ, Sweeney CT. Cigarette design. In: *Risks associated with smoking cigarettes with low machine-measured tar and nicotine yields*. NCI Smoking and Tobacco Control Monograph No 13. Bethesda, MD: National Cancer Institute, 2001:13–38.

15. **Benowitz NL.** Compensatory smoking of low-yield cigarettes. In: *Risks associated with smoking cigarettes with low machine-measured tar and nicotine yields*. NCI Smoking and Tobacco Control Monograph No 13. Bethesda, MD: National Cancer Institute, 2001:39–63.
16. **Hammond D**, Collishaw NE, Callard C. Secret science: tobacco industry research on smoking behaviour and cigarette toxicity. *Lancet* 2006;**367**:781–7.
17. **Hecht SS**, Murphy SE, Carmella SG, et al. Similar uptake of lung carcinogens by smokers of regular, light, and ultralight cigarettes. *Cancer Epidemiol Biomarkers Prev* 2005;**14**:639–98.
18. **Thun MJ**, Burns DM. Health impact of “reduced yield” cigarettes: a critical assessment of the epidemiological evidence. *Tob Control* 2001;**10**(suppl 1):i4–i11.
19. **Philip Morris**. [People's Republic of China 920000-940000 plan]. 1992. Philip Morris. Bates No. 2504007962 <http://legacy.library.ucsf.edu/tid/rco19e00>
20. **Euromonitor International**. *The world market for tobacco*. March 2006; available at: [http://www.euromonitor.com/The\\_World\\_Market\\_for\\_Tobacco](http://www.euromonitor.com/The_World_Market_for_Tobacco) (purchase required) (accessed 9 August 2007).
21. **Yang G**, Fan L, Tan J, et al. Smoking in China: findings of the 1996 National Prevalence Survey. *JAMA* 1999;**282**:1247–53.
22. **Yang G**, Ma J, Chen A, et al. Smoking cessation in China: findings from the 1996 national prevalence survey. *Tob Control* 2001;**10**:170–4.
23. **Shiffman S**, Pillitteri JL, Burton SL, et al. Effect of health messages about “light” and “ultra light” cigarettes on beliefs and quitting intent. *Tob Control* 2001;**10**(suppl 1):i24–i32.
24. **Borland R**, Fong GT, Yong HH, et al. What happened to smokers’ beliefs about light cigarettes when “light/mild” brand descriptors were banned in the UK? Findings from the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2008;**17**:256–62.
25. **Binson D**, Canchola JA, Catania JA. Random selection in a national telephone survey: a comparison of the Kish, next-birthday, and last-birthday methods. *J Off Stat* 2000;**16**:53–60.
26. **Wave 1 ITC China Technical Report**. Waterloo, Canada: International Tobacco Control China Survey Team, June 2008. Available at: <http://www.itcproject.org/library/countries/itccchina/reports/finalitcc> (accessed 17 June 2009).
27. **National Bureau of Statistics of China**. China Statistical Yearbook 2008. Available at: <http://www.itcproject.org/library/countries/itccchina/reports/cn1techrpptrevjul72010.pdf> (accessed 22 Sep 2010).
28. **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.
29. **World Health Organization**. *Framework Convention on Tobacco Control*. Geneva: World Health Organization, 2005. Available at: [http://www.who.int/tobacco/framework/WHO\\_FCTC\\_english.pdf](http://www.who.int/tobacco/framework/WHO_FCTC_english.pdf) (accessed 6 February 2008).

# 关于“淡味”和“低焦油”卷烟相对危害的观点：国际烟草控制（ITC）中国调查结果

T Elton-Marshall,<sup>1</sup> G T Fong,<sup>1,2</sup> M P Zanna,<sup>1</sup> 姜垣,<sup>3</sup> D Hammond,<sup>1</sup> R J O'Connor,<sup>4</sup> H-H Yong,<sup>5</sup> Lin Li,<sup>5</sup> B King,<sup>5</sup> 李强,<sup>1,3</sup> R Borland,<sup>5</sup> K M Cummings,<sup>4</sup> P Driezen<sup>1</sup>

<sup>1</sup>加拿大安大略省滑铁卢市滑铁卢大学；

<sup>2</sup>加拿大多伦多安大略癌症研究所；

<sup>3</sup>中国北京中国疾控中心控烟办公室；

<sup>4</sup>美国纽约布法罗罗斯威尔帕克癌症研究所；

<sup>5</sup>澳大利亚墨尔本维多利亚癌症协会

## 通讯作者：

Tara Elton-Marshall, 加拿大滑铁卢大学心理学系, PAS Building, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1; teelton@uwaterloo.ca

## 收稿日期：

2008年12月3日

## 接受日期：

2009年7月29日

## 摘要

**背景：**西方国家很多吸烟者都以为“淡味”或者“低焦油”卷烟比“一般”或者“全口味”卷烟的危害更小，成瘾性更低。但是，目前尚没有太多研究探讨中低收入国家的吸烟者，包括中国，是否也有类似的认识。

**目的：**了解中国城市成年吸烟者对于“淡味”和“低焦”卷烟的认识情况。

**方法：**我们对ITC中国调查第一轮调查数据进行了分析。该调查于2006年开展，采取面对面入户调查方式，覆盖中国六个城市4732名随机选择的成年中国吸烟者。使用分层多阶段设计对调查家庭进行抽样。

**结果：**调查中50%吸烟者报告曾经尝试过“淡味”、“柔和”或者“低焦油”的卷烟。大多数吸烟者（71%）认为“淡味”和/或“低焦油”卷烟与“全口味”卷烟比起来危害较小。对于“淡味”和/或“低焦油”卷烟危害更小这一观点最主要源于调查对象认为呼吸系统感觉“淡味”和/或“低焦油”卷烟更加柔和（ $p<0.001$ , OR=53.87, 95%CI 41.28-70.31）。

**结论：**对于“淡味”和/或“低焦油”卷烟危害更小的错误认识与认为呼吸系统感觉这些卷烟更加柔和的观点之间存在很强的相关。今后的烟草控制政策不仅要取消推销“淡味”和“低焦油”在烟盒上的标签和营销措施，更要对产品的某些特性进行管制（如添加剂、过滤嘴等），因为对这些特性的鼓吹会强化“淡味”和/或“低焦油”卷烟对呼吸系统更加柔和，因此危害更小的错误认识。

烟者放弃了戒烟<sup>10-11</sup>，尽管这一证据尚缺乏结论性<sup>12</sup>。由于过滤嘴通气和滤过能力提高，号称“低焦油”的品牌通过机器测量产生的焦油和尼古丁释放物水平都比较低。然而，研究发现吸烟者为达到尼古丁剂量，会出现代偿吸烟行为，因此增加了焦油输送量。这就意味着原本期望的“低焦油”效果并没有实际实现。<sup>13-16</sup>这一结论得到了流行病学证据的支持，这些证据表明这类品牌卷烟并没有减少对消费者的危害。<sup>17-18</sup>

目前尚不清楚中国类似的营销手段现状如何。烟草企业文件指出，菲莫公司1994年就开始在中国的主要城市推广淡味万宝路。菲莫公司预计青年成人吸烟者将追随香港的发展趋势，转向焦油、尼古丁水平更低的产品。<sup>19</sup>同时证据还显示，“低焦”还被和“低风险”概念联系在了一起，如图1所示。此外，很多中国卷烟包装侧面还印有焦油释放量数据，进一步强化危害更小的概念。不过，有证据显示，中国大陆地区使用“淡味”、“柔和”等词汇推广“低焦油”卷烟的做法与西方国家相比还是很普遍。这些词汇出现在部分卷烟包装上（如中南海淡味），但通常仅以英文形式出现。

通过高过滤嘴通气性和其它设计使得机检焦油含量低的卷烟在中国的普及率低于西方国家，主要是因为国内缺乏相应的生产技术，同时中国市场上的外国品牌也有限，没有真正刺激起替代传统高焦油卷烟的兴趣。<sup>20</sup>

虽然和其他国家相比，中国吸烟者对于吸烟健康危害的认识水平较低，同时健康顾虑也较低，<sup>21-22</sup>但这种情况会很快得到改变。随着中国根据《烟草控制框架公约》（以下简称《公约》）的要求采取更加严格的烟草控制政策，预计对吸烟健康危害的公共教育将得到提升。因此中国吸烟者可能会开始关注健康问题，低焦油卷烟的市场占有率也就会相应提高。2004年出台的规定禁止销售焦油含量超过15mg/支的卷烟，与此同时跨国烟草企业也在更多地出现在中国市场上，这些因素都会促使机检焦油含量降低。<sup>20</sup>

“淡味”和“低焦油”卷烟的使用将会增加，但是据我们所知，目前还没有研究探讨中国吸烟者对“淡味”和“低焦油”卷烟与全口味卷烟比较的健康风险认识状况。了解这类卷烟是否也被认为“危害更小”，从而吸引关注健康的中国吸烟者是十分重要的。国际烟草控制（ITC）中

据估计中国约有3.2亿吸烟者。<sup>1</sup>约57%的成年男性和3%的成年女性为现在吸烟者。<sup>2</sup>目前，中国每年约100万吸烟者死于各种烟草相关疾病<sup>1</sup>，2020年这一数字将增加到220万。

我们可以借鉴西方国家的经验来预测中国今后的情况。在西方国家，“淡味”和“低焦油”卷烟最初出现于上世纪六七十年代，当时吸烟者已经认识到了吸烟的健康危害。这类卷烟一贯的营销手段就是在广告和包装上暗示这类品牌与“全口味”或者“普通”品牌相比危害更小，<sup>4-5</sup>从而吸引有健康忧虑的吸烟者。<sup>6-9</sup>其结果就是，但由于有了“低焦油”卷烟，一部分吸



本篇论文按照BMJ杂志解锁办法可在网上免费下载，详见：<http://tobaccocontrol.bmjjournals.org/site/about/unlocked.xhtml>

国调查针对中国六个城市具有代表性的成年吸烟者样本，其中有一部分问题用于评估吸烟者对于“淡味”和/或“低焦油”卷烟（简称“LLT”卷烟）的认识。同时研究还探讨了与LLT卷烟比全口味卷烟危害更小这一观点相关的因素。

LLT卷烟给人感官上的感受是导致吸烟者认为LLT卷烟危害更小的一个潜在的重要因素。以往研究结果显示，认为LLT卷烟更加柔和的观点与认为LLT卷烟危害更小的观点之间存在相关性。<sup>28-29</sup>本研究将检验认为LLT卷烟与普通卷烟相比呼吸系统感觉更加柔和的中国吸烟者是否更倾向于认为LLT卷烟危害更小。在取缔了“淡味”和“低焦油”等描述词语的国家，吸烟者仍继续认为LLT卷烟危害更小，特别是如果他们认为这些卷烟对喉咙和胸部感觉更加柔和。<sup>24</sup>因此，我们测试了这种联系是否也在中国存在。

现在是评价关于“淡味”和“低焦油”卷烟相对危害程度观点的关键时刻，因为中国在2006年1月禁止了这些描述词语（但给了烟草企业一段宽限期，可以持续使用到2006年4月）。由于我们的研究开始时间是2006年4月，尽管可能部分有“淡味”和“低焦油”用语标识的卷烟在该政策正式生效后依然在柜上销售，我们还是无法比较该规定生效前后吸烟者对于“淡味”和“低焦油”卷烟认识的变化。不过，未来几轮研究工作将有可能探索这一禁令的影响。

## 方法

### 样本

本研究对象来自2006年4月到8月开展的ITC中国调查第一轮调查。ITC中国调查是一项针对18岁及以上的成年吸烟者和非吸烟者的前瞻性面对面队列研究，本次研究仅涉及吸烟者部分（“吸烟者”定义：曾吸烟超过100支且每周至少吸烟一次的调查对象。 $n=4732$ ）。调查对象来自六个城市：北京（ $n=785$ ）、广州（ $n=791$ ）、沈阳（ $n=781$ ）、上海（ $n=784$ ）、长沙（ $n=800$ ）和银川（ $n=791$ ）。此外，郑州市也参与了前两轮调查。我们对前两轮数据进行了核查。对每个城市的调查数据和调查访谈MP3录音进行随机抽样和检验，确保两轮答案的一致性。结果发现，郑州数据第一、二轮之间存在显著的不一致（如同一调查对象性别数据不同），因此该城市最终被剔除（其他六个城市未发现类似情况）。调查的合作率为：北京：80.0%（估计值）；广州：80.0%（估计值）；沈阳：81.2%（确切值）；上海：84.2%（确切值）；长沙：80.0%（估计值）；银川：90.3%（确切值）。应答率为：北京：50.0%（估计值）；广州：50.0%（估计值）；沈阳：50.0%（确切值）；上海：61.3%（确切值）；长沙：50.0%（确切值）；银川：39.4%（确切值）。其中合作率与ITC四国调查（对加拿大、美国、英国和澳大利亚吸烟者的电话调查）水平相当（应答率总体上更高）。表1是本次分析所涉调查对象特征的数据。

### 调查过程

在每个城市，调查小组由中国疾控中心项目负责人带领，抽取10个街道，纳入概率与各街道人口数成正比。然后在每个街道内再选择2个居委会，同样纳入概率与各居委会人口成正比。在每个居委会内，首先制作一份全部家庭地址的清单，然后采取不放回简单随机抽样法抽取300户家庭。

对入选的300户家庭，首先收集每个年满18岁个人的基本信息，以确定其是否符合调查要求。从300户家庭当中随机选择50人参加调查（40名成年吸烟者，10名成年非吸烟



图1：中南海淡味卷烟的一则广告

者）。如果一户家庭有一个以上成员符合调查要求，则采用“下次生日法”确定一名调查对象。<sup>25</sup>

吸烟者调查时间为40分钟，由有经验并经过培训的调查人员使用普通话以面对面的方式进行调查。关于项目团队构成情况请参见《ITC中国调查第一轮技术报告》。<sup>26</sup> 调查对象可获得一份价值10-20元的小礼品（肥皂），对其参与表示感谢。这种对参与调查者进行补偿的措施在中国是常规做法。

ITC中国调查设计参考了在另外14个国家开展的ITC调查。其中的调查和培训手册均是从英文翻译成中文的，并在所有城市之间进行了统一。各城市调查现场工作由当地疾病控制预防中心（CDC）成员负责监督，由中国CDC和滑铁卢大学的ITC项目数据管理中心负责协调。本研究获得了滑铁卢大学、罗斯威尔帕克癌症研究所、维多利亚癌症委员会和中国CDC伦理委员会批准。

对男性吸烟者、女性吸烟者和非吸烟者分别计算样本权重。第一轮的权重重构架是基于样本选择的四个级别：街道、居委会、家庭和个人。每个被抽中的调查对象最终的权重为该个人代表的该城市相应抽样类别的人口数量。

关于ITC中国调查的其它信息请参考Wu等人发表的文章<sup>28</sup>和《ITC中国调查技术报告》。<sup>26</sup>

### 测量指标

#### 关于“淡味”和“低焦油”卷烟的认识

询问调查对象是否“非常同意”、“同意”、“无所谓”、“反对”、“非常反对”下面两个陈述，或者“不知道”：“低焦油含量的香烟比一般香烟危害小”和“淡味香烟比一般香烟危害小”。虽然“淡味”和“低焦油”两个词常常被当成同义词使用，但是提问使用的是各自单独的问题，以便确保我们获得对这些种类卷烟所有可能的认识信息。“低焦油”这个词在中国既用于对此类产品作为“低焦油”产品进行营销，同时这也是因为烟盒上本身也标出了产品的焦油含量。“淡味”这个描述词一般仅以英文形式出现在卷烟包装上，因此也就只有懂英文的人才能理解其含义。不过，由于这两个词非常接近，因此我们将“淡味”和“低焦油”卷烟的观点答案进行了合并。

对问题的选项重新赋值，“非常同意”和“同意”为“1”，其它选项为“0”。综合考虑“淡味”和“低焦油”卷烟的观点后重新赋值，两题至少有一题回答“是”为“1”，两题都回答“否”为“0”。在对“淡味”和“低焦油”卷烟的认识进行合并前，我们分别对两个模型进行了检验，结果与合并后的模型检验结果相似。

表1. ITC中国调查六城市未加权样本特征

| 因素                    | 北京 (n=785)<br>人数 (%) | 沈阳 (n=781)<br>人数 (%) | 上海 (n=784)<br>人数 (%) | 长沙 (n=800)<br>人数 (%) | 银川 (n=791)<br>人数 (%) | 广州 (n=791)<br>人数 (%) | 合计 (n=4732)<br>人数 (%) |
|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| <b>性别</b>             |                      |                      |                      |                      |                      |                      |                       |
| 男性                    | 743 (94.6)           | 741 (94.9)           | 765 (97.6)           | 732 (91.5)           | 772 (97.6)           | 746 (94.3)           | 4499 (95.1)           |
| 女性                    | 42 (5.4)             | 40 (5.1)             | 19 (2.4)             | 68 (8.5)             | 19 (2.4)             | 45 (5.7)             | 233 (4.9)             |
| <b>年龄 (岁)</b>         |                      |                      |                      |                      |                      |                      |                       |
| 18-39                 | 120 (15.3)           | 111 (14.2)           | 89 (11.3)            | 201 (25.1)           | 258 (32.6)           | 118 (14.9)           | 897 (19.0)            |
| 40-54                 | 373 (47.5)           | 456 (58.4)           | 456 (58.2)           | 362 (45.3)           | 343 (43.4)           | 348 (44.0)           | 2338 (49.4)           |
| 55+                   | 292 (37.2)           | 214 (27.4)           | 239 (30.5)           | 237 (29.6)           | 190 (24.0)           | 325 (41.1)           | 1497 (31.6)           |
| <b>民族</b>             |                      |                      |                      |                      |                      |                      |                       |
| 其他                    | 42 (5.4)             | 40 (5.1)             | 11 (1.4)             | 11 (1.4)             | 125 (15.8)           | 6 (0.8)              | 235 (5.0)             |
| 汉族*                   | 743 (94.6)           | 741 (94.9)           | 773 (98.6)           | 789 (98.6)           | 666 (84.2)           | 785 (99.2)           | 4497 (95.0)           |
| <b>收入</b>             |                      |                      |                      |                      |                      |                      |                       |
| 低                     | 74 (9.4)             | 244 (31.2)           | 113 (14.4)           | 226 (28.3)           | 174 (22.0)           | 94 (11.9)            | 925 (19.6)            |
| 中                     | 323 (41.2)           | 435 (55.7)           | 348 (44.4)           | 335 (41.9)           | 396 (50.1)           | 295 (37.3)           | 2132 (45.1)           |
| 高                     | 322 (41.1)           | 79 (10.1)            | 291 (37.2)           | 198 (24.8)           | 156 (19.7)           | 286 (36.2)           | 1332 (28.2)           |
| 不知道                   | 65 (8.3)             | 23 (2.9)             | 31 (4.0)             | 41 (5.1)             | 64 (8.1)             | 116 (14.7)           | 340 (7.2)             |
| <b>教育</b>             |                      |                      |                      |                      |                      |                      |                       |
| 低                     | 76 (9.7)             | 60 (7.7)             | 47 (6.0)             | 142 (17.8)           | 107 (13.5)           | 188 (23.9)           | 620 (13.1)            |
| 中                     | 496 (63.2)           | 570 (73.1)           | 588 (75.0)           | 486 (60.8)           | 486 (61.5)           | 472 (59.9)           | 3098 (65.5)           |
| 高                     | 213 (27.1)           | 150 (19.2)           | 149 (19.0)           | 172 (21.5)           | 197 (24.9)           | 128 (16.2)           | 1009 (21.3)           |
| <b>每日/每周吸烟者</b>       |                      |                      |                      |                      |                      |                      |                       |
| 每日吸烟者                 | 730 (93.0)           | 733 (93.9)           | 742 (94.6)           | 749 (93.6)           | 721 (91.2)           | 747 (94.4)           | 4422 (93.4)           |
| 每周吸烟者                 | 55 (7.0)             | 48 (6.1)             | 42 (5.4)             | 51 (6.4)             | 70 (8.8)             | 44 (5.6)             | 310 (6.6)             |
| <b>每日吸烟量 (支)</b>      |                      |                      |                      |                      |                      |                      |                       |
| 1-10                  | 299 (38.4)           | 292 (37.5)           | 266 (34.0)           | 194 (24.4)           | 336 (42.7)           | 253 (32.2)           | 1640 (34.8)           |
| 11-20                 | 374 (48.0)           | 372 (47.8)           | 389 (49.7)           | 407 (51.3)           | 356 (45.3)           | 409 (52.0)           | 2307 (49.0)           |
| 21-30                 | 58 (7.4)             | 68 (8.7)             | 71 (9.1)             | 87 (11.0)            | 48 (6.1)             | 73 (9.3)             | 405 (8.6)             |
| 31+                   | 48 (6.2)             | 46 (5.9)             | 57 (7.3)             | 106 (13.4)           | 46 (5.9)             | 51 (6.5)             | 354 (7.5)             |
| <b>是否曾经吸过淡味、低焦油卷烟</b> |                      |                      |                      |                      |                      |                      |                       |
| 是                     | 443 (56.4)           | 329 (42.1)           | 467 (59.6)           | 303 (37.9)           | 407 (51.5)           | 417 (52.7)           | 2366 (50.0)           |
| 否                     | 316 (40.3)           | 410 (52.5)           | 295 (37.6)           | 447 (55.9)           | 321 (40.6)           | 334 (42.2)           | 2123 (44.9)           |
| 不知道                   | 26 (3.3)             | 42 (5.4)             | 22 (2.8)             | 50 (6.3)             | 63 (8.0)             | 40 (5.1)             | 243 (5.1)             |
| <b>焦油量</b>            |                      |                      |                      |                      |                      |                      |                       |
| 不知道                   | 282 (36.6)           | 284 (38.1)           | 246 (31.5)           | 400 (50.1)           | 230 (29.3)           | 321 (40.9)           | 1763 (37.8)           |
| 无效焦油量                 | 4 (0.5)              | 2 (0.3)              | 11 (1.4)             | 6 (0.8)              | 8 (1.0)              | 4 (0.5)              | 35 (0.8)              |
| 15 mg                 | 202 (26.2)           | 204 (27.3)           | 310 (39.6)           | 38 (4.8)             | 208 (26.5)           | 335 (42.7)           | 1297 (27.8)           |
| 11-14 mg              | 169 (21.9)           | 235 (31.5)           | 103 (13.2)           | 349 (43.7)           | 326 (41.5)           | 107 (13.6)           | 1289 (27.6)           |
| 10 mg 以下              | 113 (14.7)           | 21 (2.8)             | 112 (14.3)           | 5 (0.6)              | 14 (1.8)             | 17 (2.2)             | 282 (6.0)             |

\*汉族为中国主要民族；约 91.6% 的全国人口是汉族<sup>27</sup>

#### 人口特征与吸烟行为

标准人口测量指标包括性别、民族（汉族与其他民族）、年龄（18-39岁、40-54岁、55+岁。由于18-24岁年龄组调查对象很少（1.4%），因此我们将这一组与25-39岁年龄组进行了合并）、每月家庭收入（低：<1000元/月；中：1000-2999元/月；高：3000+元；不知道）、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：大学及以上）和所在城市。每日吸烟者使用问题：“你每天都吸烟吗？”定义。当调查对象回答“每天”时被定义为每日吸烟者。每周吸烟者为报告“不是每天”吸烟的调查对象。每日吸烟支数根据对每日吸烟者对下列问题的答案计算：“你平均每天吸多少支烟，包括工厂生产和手工制作

的手卷烟？”，对每周吸烟者根据：“你平均每周吸多少支烟？”的答案计算（除以7）。不可能的每日值（超过100）作为编码错误，重新编码为“100”。在Logistic回归方程中，每日吸烟支数作为连续变量代入方程。

### 对吸烟健康危害的知识

询问调查对象吸烟是否会导致吸烟者中风、阳痿、肺癌、肺气肿、牙齿发黄、加速衰老、冠心病以及是否会导致非吸烟者肺癌。答案编码：“否”和“不知道/无法回答”=0；“是”=1。对健康知识的测量值为所有8个问题答案总得分。该测量值的Cronbach  $\alpha$  值为0.79，表明该量表可靠。

### 自报“淡味”和“低焦油”卷烟的使用

我们询问调查对象是否吸过“淡味”、“柔和”或者“低焦油”的香烟（答案选项为：是、否、不知道）。此外，我们还请调查对象提供他们目前最常吸的卷烟品牌的焦油含量，并编码为：1:  $\leq 10\text{mg}$ ; 2:  $\geq 11\text{mg}$  到  $\leq 14\text{mg}$ ; 3:  $15\text{mg}$ ; 4: 无效焦油含量; 5: 不知道。由于中国已经禁止了 $15\text{mg}$ 焦油含量的卷烟，所以任何高于 $15\text{mg}$ 的答案均作无效编码，单独作为一类。

### 与吸烟有关的健康顾虑

为了评估吸烟者的健康顾虑，询问调查对象：“吸烟已经在多大程度上损害了你的健康？”和“你是否担心吸烟会损害你今后的健康？”（答案：一点也不/不知道、有一点、很大）。此外，我们还要请吸烟者对自己的健康状况评分，分数选项从1分（差）到5分（好）。另外还询问吸烟者是否认为自己有烟瘾（答案：没有、有点、比较大、非常大）。

### 戒烟相关变量

我们询问调查对象是否曾经尝试戒烟（答案：是、否）。通过询问调查对象如下问题评估其戒烟打算：“你打算戒烟

吗？”（答案：下个月之内、接下来的6个月中、6个月以后的某一天、没打算戒烟/不知道）。通过询问调查对象下列问题评估其戒烟效能：“如果你想在接下来的6个月里彻底戒烟，你对戒烟成功的信心有多大？”（答案：一点也没有、有一点信心、有信心、非常有信心、不知道）。

### 对低呼吸道刺激的看法

询问调查对象是否“非常同意”、“同意”、“无所谓”、“反对”、“非常反对”或者“不知道”下面两个陈述：“和一般香烟比较，低焦油含量的香烟对呼吸道的刺激更小”和“和一般香烟比较，淡味香烟对呼吸道的刺激更小”。（其它调查通常使用的问题是“淡味烟会让你的咽喉和胸部感觉更柔和吗？”但是在中文里这个问题翻译过来是指喉咙和胸腔外面。为了获得喉咙和胸腔里面的感觉信息，我们的中文翻译小组建议将其翻译为“对呼吸道”。）

对答案进行编码，其中“非常同意”和“同意”编码为“1”，其它答案编码为“0”。同样，将“淡味”和“低焦油”卷烟的观点进行合并，有其中一种或两种观点的编码为“1”，两种观点都没有的编码为“0”。

### 统计分析

所有统计分析均采用SPSS软件（版本：17）。使用复杂样本Logistic回归模型检验哪些变量与LLT卷烟危害较小观点具有独立相关性。所有分析均使用加权数据。这些预测因素与ITC四国调查中吸烟者认为“淡味”卷烟可以带来健康益处的观点有关。<sup>15</sup>

## 结果

一半的调查对象（未加权：50.0%；加权：48.5%）报告曾经尝试过“淡味”、“柔和”或者“低焦油”的卷烟（表1）。约28%的调查对象报告他们当前所吸品牌焦油含量为

表2：对“淡味”和“低焦油”卷烟相对危害程度和呼吸道刺激性特征的观点及其相关性的加权计算结果

| 观点                                      | “淡味”危<br>害较小 | “低焦油”<br>危害较小 | “淡味”及/或<br>“低焦油”危<br>害较小 | “淡味”刺<br>激较小 | “低焦油”<br>刺激较小 | “淡味”及/或<br>“低焦油”刺<br>激较小 | % 同意或<br>强烈同意 | 95%可信<br>区间 |
|---|--------------|---------------|--------------------------|--------------|---------------|--------------------------|---------------|-------------|
| 和一般香烟比较，<br>淡味香烟危害更小                    | 1            |               |                          |              |               |                          | 55.7%         | 52.8-58.6%  |
| 和一般香烟比较，<br>低焦油香烟危害<br>更小               | 0.52         | 1             |                          |              |               |                          | 62.0%         | 59.4-64.4%  |
| 和一般香烟比较，<br>淡味及/或低焦油香<br>烟危害更小          | 0.83         | 0.72          | 1                        |              |               |                          | 71.0%         | 68.4-73.5%  |
| 和一般香烟比较，<br>淡味香烟对呼吸道<br>的刺激更小           | 0.76         | 0.49          | 0.63                     | 1            |               |                          | 60.4%         | 57.5-63.2%  |
| 和一般香烟比较，<br>低焦油香烟对呼吸<br>道的刺激更小          | 0.46         | 0.68          | 0.60                     | 0.48         | 1             |                          | 61.4%         | 58.9-63.9%  |
| 和一般香烟比较，<br>淡味及/或低焦油<br>香烟对呼吸道的刺<br>激更小 | 0.61         | 0.62          | 0.73                     | 0.75         | 0.76          | 1                        | 73.3%         | 70.7-75.8%  |

表3：对“淡味”/“低焦油”卷烟危害较小观点的加权Logistic回归

| 因素               | 人数   | “淡味和低焦油”合并*% | 调整比值比 (95% CI)     | p 值    |
|------------------|------|--------------|--------------------|--------|
| <b>人口学变量</b>     |      |              |                    |        |
| 性别               |      |              |                    |        |
| 男性               | 4499 | 71.1         | 0.84 (0.60-1.18)   | 0.31   |
| 女性               | 233  | 70.5         | 1.00 (对照)          |        |
| <b>年龄 (岁)</b>    |      |              |                    |        |
| 18-39            | 897  | 67.4         | 1.00 (对照)          | <0.001 |
| 40-54            | 2338 | 70.3         | 1.17 (0.87-1.57)   |        |
| 55+              | 1497 | 74.4         | 1.97 (1.36-2.87)   |        |
| <b>民族</b>        |      |              |                    |        |
| 其他               | 235  | 62.2         | 0.93 (0.55-1.56)   | 0.77   |
| 汉族               | 4497 | 71.5         | 1.00 (对照)          |        |
| <b>收入</b>        |      |              |                    |        |
| 不知道              | 340  | 61.5         | 1.05 (0.69-1.59)   | 0.20   |
| 低                | 925  | 69.1         | 1.27 (0.90-1.80)   |        |
| 中                | 2132 | 73.6         | 1.50 (1.01-2.23)   |        |
| 高                | 1332 | 70.6         | 1.00 (对照)          |        |
| <b>教育</b>        |      |              |                    |        |
| 低                | 620  | 64.2         | 0.55 (0.34-0.89)   | 0.007  |
| 中                | 3098 | 72.6         | 0.85 (0.55-1.31)   |        |
| 高                | 1009 | 70.9         | 1.00 (对照)          |        |
| <b>城市</b>        |      |              |                    |        |
| 北京               | 785  | 74.7         | 1.36 (0.85-2.18)   | 0.46   |
| 沈阳               | 781  | 74.6         | 1.47 (1.00-2.17)   |        |
| 上海               | 784  | 66.5         | 1.19 (0.75-1.89)   |        |
| 长沙               | 800  | 72.3         | 1.33 (0.88-1.99)   |        |
| 银川               | 791  | 67.3         | 1.27 (0.89-1.83)   |        |
| 广州               | 791  | 70.9         | 1.00 (对照)          |        |
| <b>吸烟行为</b>      |      |              |                    |        |
| 每日/每周吸烟者         |      |              |                    |        |
| 每日吸烟者            | 4422 | 70.7         | 0.81 (0.53-1.22)   | 0.30   |
| 每周吸烟者            | 310  | 75.3         | 1.00 (对照)          |        |
| <b>每日吸烟量 (支)</b> |      |              |                    |        |
| 0-10             | 1640 | 72.2         | 1.01 (0.99 -1.03)† | 0.53   |
| 11-20            | 2307 | 71.0         |                    |        |
| 21-30            | 405  | 65.5         |                    |        |
| 31+              | 354  | 73.6         |                    |        |
| <b>健康知识</b>      |      |              |                    |        |
| 0                | 360  | 56.8         | 1.01 (0.94-1.08)†  | 0.84   |
| 1                | 570  | 59.4         |                    |        |
| 2                | 502  | 69.9         |                    |        |
| 3                | 610  | 74.5         |                    |        |
| 4                | 665  | 76.7         |                    |        |
| 5                | 760  | 76.8         |                    |        |
| 6                | 602  | 75.4         |                    |        |
| 7                | 375  | 71.4         |                    |        |
| 8                | 261  | 70.2         |                    |        |

表3续

| 因素                   | 人数   | “淡味和低焦油”合并*% | 调整比值比 (95% CI)    | p 值  |
|----------------------|------|--------------|-------------------|------|
| <b>是否曾吸过淡味、低焦油卷烟</b> |      |              |                   |      |
| 否                    | 2123 | 68.6         | 0.91 (0.68-1.22)  | 0.63 |
| 不知道                  | 243  | 68.6         | 1.11 (0.66-1.85)  |      |
| 是                    | 2366 | 73.6         | 1.00 (对照)         |      |
| <b>焦油量</b>           |      |              |                   |      |
| 不知道                  | 1763 | 71.4         | 0.72 (0.42-1.21)  | 0.19 |
| 无效焦油量                | 35   | 61.4         | 0.38 (0.15-0.96)  |      |
| 15 mg                | 1297 | 69.5         | 0.61 (0.37-1.01)  |      |
| 11-14 mg             | 1289 | 72.0         | 0.71 (0.44-1.14)  |      |
| 10 mg 及以下            | 282  | 76.5         | 1.00 (对照)         |      |
| <b>健康担忧</b>          |      |              |                   |      |
| 担心吸烟已经损害了健康          |      |              |                   |      |
| 很大                   | 770  | 76.1         | 1.08 (0.75-1.55)  | 0.48 |
| 有一点                  | 1973 | 75.9         | 1.17 (0.91-1.52)  |      |
| 一点也不/不知道             | 1983 | 64.3         | 1.00 (对照)         |      |
| 担心吸烟会损害今后的健康         |      |              |                   |      |
| 很大                   | 855  | 77.0         | 1.22 (0.80-1.87)  | 0.30 |
| 有一点                  | 1984 | 75.7         | 1.23 (0.95-1.59)  |      |
| 一点也不/不知道             | 1890 | 63.3         | 1.00 (对照)         |      |
| <b>自我描述健康状态</b>      |      |              |                   |      |
| 1 差                  | 131  | 72.7         | 1.04 (0.86-1.26)† | 0.68 |
| 2                    | 273  | 66.5         |                   |      |
| 3                    | 2218 | 72.0         |                   |      |
| 4                    | 1445 | 70.6         |                   |      |
| 5 好                  | 653  | 70.4         |                   |      |
| <b>自觉成瘾性程度</b>       |      |              |                   |      |
| 有点                   | 2132 | 72.3         | 1.09 (0.69-1.72)  | 0.81 |
| 比较大                  | 1359 | 71.9         | 1.22 (0.70-2.14)  |      |
| 非常大                  | 515  | 67.0         | 1.18 (0.49-2.82)  |      |
| 没有                   | 666  | 70.4         | 1.00 (对照)         |      |
| <b>戒烟</b>            |      |              |                   |      |
| 过去戒烟尝试               |      |              |                   |      |
| 否                    | 2219 | 69.6         | 1.12 (0.78-1.61)  | 0.52 |
| 是                    | 2512 | 72.3         | 1.00 (对照)         |      |
| <b>戒烟意愿</b>          |      |              |                   |      |
| 下个月之内                | 377  | 73.8         | 0.74 (0.48-1.13)  | 0.53 |
| 接下来的6个月中             | 297  | 77.0         | 0.80 (0.45-1.42)  |      |
| 6个月以后的某一天            | 437  | 77.3         | 0.92 (0.59-1.43)  |      |
| 不打算戒烟/不知道            | 3602 | 69.6         | 1.00 (对照)         |      |
| <b>戒烟自我效能</b>        |      |              |                   |      |
| 不知道                  | 334  | 61.3         | 1.20 (0.70-2.06)  | 0.68 |
| 非常有信心                | 612  | 71.1         | 0.94 (0.61-1.44)  |      |
| 有信心                  | 622  | 73.4         | 1.13 (0.71-1.80)  |      |
| 有一点信心                | 1158 | 76.8         | 1.21 (0.91-1.61)  |      |
| 一点也没有信心              | 2004 | 68.5         | 1.00 (对照)         |      |

表3续

| 因素                  | 人数   | “淡味和低焦油”合并* | 调整比值比 (95% CI)      | p 值    |
|---------------------|------|-------------|---------------------|--------|
| <b>淡味/低焦油刺激性更低</b>  |      |             |                     |        |
| 同意/非常同意             | 3451 | 90.9        | 53.87 (41.28-70.31) | <0.001 |
| 反对/非常反对/无所<br>谓/不知道 | 1280 | 16.4        | 1.00 (对照)           |        |

\*各种认知的流行率未调整模型中其他变量。 †连续变量

15mg, 27.6%报告在11-14mg之间, 6%报告品牌焦油含量在10mg以下。报告的“淡味”和“低焦油”卷烟使用情况不同城市间存在差异, 低焦油卷烟品牌在更加“西化”的城市(北京、上海)更为常见。

#### 关于“淡味”和/或“低焦油”卷烟的观点

表2是关于“淡味”和“低焦油”卷烟的总体观点信息。大多数吸烟者(71.0%)认为LLT卷烟危害更小, 73.3%认为LLT卷烟对呼吸道的刺激更小。

#### 与“淡味”和“低焦油”卷烟危害更小有关的因素

本研究采取Logistic回归分析对哪些因素与“淡味”和“低焦油”卷烟危害更小观点具有独立相关性进行探讨。表3是Logistic回归分析结果。年龄最大一组的吸烟者比年龄最小一组的吸烟者更多地认为LLT卷烟危害更小( $p<0.001$ , OR=1.97, CI: 1.36-2.87)。与受教育程度高的人相比, 受教育程度低的人认为LLT卷烟危害更小的可能性更小, 差异有显著性( $p=0.007$ , OR=0.55, CI: 0.34-0.89)。到目前为止, 对LLT卷烟危害更小这一错误认识最大的预测因素是LLT卷烟对呼吸道刺激更小的观点。认为LLT卷烟对呼吸道刺激更小的吸烟者认为LLT卷烟危害更小的可能性更高, 差异有显著性( $p<0.001$ , OR=53.87, CI: 41.28-70.31)。在认为LLT卷烟对呼吸道刺激更小的吸烟者当中, 90.9%都认为这类卷烟比普通卷烟危害更小。与此形成鲜明对比的是, 在不认为LLT卷烟对呼吸道刺激更小的吸烟者当中, 仅有16.4%的人认为这类卷烟危害更小。

#### 各变量与“淡味”和/或“低焦油”卷烟刺激更小观点的交互作用

我们检验了各变量与“淡味”和/或“低焦油”卷烟刺激更小观点的交互作用。值得注意的是, 低刺激观点的主效应非常大, 因此即便存在具有统计学意义的交互作用, 其效应也是围绕主效应(对应比值比为53)的较小差异。

在曾经使用过“淡味”或者“低焦油”卷烟的吸烟者中, 认为这类卷烟对呼吸道刺激更小的吸烟者与不这样认为的吸烟者相比, 认为LLT卷烟危害更小的可能性更大, 差异有显著性( $p<0.001$ , OR=40.03, CI: 28.59-56.03)。从未使用过“淡味”或者“低焦油”卷烟且认为此类卷烟对呼吸道刺激更小的吸烟者比不这样认为的吸烟者认为LLT卷烟危害更小的可能性更大( $p<0.001$ , OR=71.52, CI: 50.86-100.57)。因此, 与曾经使用过“淡味”或者“低焦油”卷烟的吸烟者相比, 低呼吸道刺激与危害更小之间的联系对于从未尝试过此类卷烟的吸烟者更强( $p=0.004$ , OR=1.79, CI: 1.22-2.62)。

对于预测LLT卷烟危害更小的观点, 调查对象当前使用的品牌焦油含量与认为LLT卷烟对呼吸道刺激更小的观点之间并没有显著性的交互作用。其它预测因素也很少与LLT卷烟对呼吸道刺激更小之间存在交互作用。城市( $p=0.02$ )和教育程度( $p=0.006$ )与LLT卷烟对呼吸道刺激更小的观点之间存在显著的总体交互作用。在每种情况下, 认为LLT卷烟更加柔和的人认为LLT卷烟危害更小的可能性更大(比值比最小为25.6, 最大为85.5)。

## 讨论

接受调查的中国吸烟者当中超过三分之二都错误地认为LLT卷烟危害更小, 比在加拿大(16%)、美国(28%)、英国(43%)和澳大利亚(27%)吸烟者中的比例都高。<sup>15</sup>这可能是对中国境内仍在继续使用明确的健康功效宣传进行市场营销活动的一种反映。譬如, 中国品牌“中南海淡味”做的一个两页的杂志插页广告宣称:“每一款产品都凝结了世界领先的低危害卷烟生产技术, 为您的吸烟生活提供健康保证。”另一则印刷广告宣称:“低一点, 更多关爱! 低危害卷烟给您更多关爱!”(见图1)。由于中国政府允许烟草企业作出这样明确的健康功效宣传, 甚至在发布15mg焦油含量产品禁令之后依然如此, 因此在中国有这么大比例的吸烟者认为此类卷烟比传统高焦油含量品牌卷烟危害更小也就不足为奇了。

以往研究发现, 高过滤嘴通气能力产生的“低焦油”卷烟呼吸道刺激更低的体验可以强化低危害观点。<sup>14</sup>与这一结论一致, 我们也发现与LLT卷烟危害更小观点联系最强的就是LLT卷烟对呼吸道刺激更小这一观点。另外我们还发现, 与曾经尝试过“淡味”或者“低焦油”卷烟的人相比, 从未尝试过这类卷烟的人当中LLT卷烟对呼吸道刺激更小的观点与此类卷烟比普通卷烟危害更小这一观点之间的联系更强。

有人可能会怀疑, 吸LLT卷烟的体验可以强化它们对呼吸道刺激更小的观点, 因为在大多数情况下它们确实刺激更小。然而, LLT卷烟刺激更小的观点还可以通过包装设计(如颜色更浅)以及“柔和”、“温和”等描述词语传递出来。可能通过营销手段暗示出的低刺激性同实际吸烟体验有所不同。此外, “淡味”和“低焦油”卷烟也只是最近才引进市场的, 这也是导致出现这个结果的另一个因素。此外, 调查对象当前使用的卷烟品牌焦油含量和认为LLT卷烟危害更小的观点之间不存在交互作用。需要指出的是, 无论这种交互作用是什么性质的, 低刺激观点和低危害观点之间的联系对两组都是十分显著的。

## 局限性

本文报道的结果来自六个中国城市。然而，我们完全有理由相信这些结果也可以适用于中国其它城市，因为我们此次研究当中所涉及的城市具有很大的经济和社会条件跨度。同时，我们也有合理理由认为，中国农村地区的研究结果可能存在差异，因为在这些地区“淡味”能够得到推广的就会更小，同时这些地区存在的品牌也相对比较有限。不过，有了53的比值比作为起点，我们相信结论中有力的关联性是能够在整个中国各个地方站得住脚的。

与任何调查研究一样，我们也总是担心调查不应答和某些人群代表性不足等问题。我们的解决办法是对每个城市进行加权分析。虽然我们在最小年龄组（18-24岁）当中确实调查对象数量十分有限，但是这种情况同中国1996年的全国流行率调查样本是一致的。<sup>22</sup>

## 研究贡献

中国是全球最大的烟草消费国，本研究首次探讨了中国吸烟者关于“淡味”和“低焦油”卷烟的观点。认为“淡味”和/或“低焦油”卷烟对呼吸道刺激更小的观点与认为这类卷烟危害更小的观点之间存在非常强的联系。本次研究结果指出，未来的控烟政策应当不仅取缔推广“淡味”和“低焦油”卷烟的标识和营销行为（《公约》第11条的核心），而且同时还需要禁止强化“淡味”和“低焦油”卷烟危害更小观点的产品特征（如添加剂、过滤嘴等）（《公约》第9条及第10条）。

## 意义

2006年1月，中国正式禁止了卷烟包装和插入材料中使用“淡味”、“超淡味”、“柔和”、“中/低焦油”、“低焦油含量”等词汇。不过，烟草企业得到了一段宽限期，可以使用至2006年4月。此外，国内消息也指出，尽管中文的“淡味”等词汇已经被取缔了，但是这些描述词的英文版并没有纳入禁令之中，依然出现在卷烟包装上。由于我们的调查开始于2006年4月，因此我们无法对禁令的初始影响力进行评价，不过我们预计这一禁令本身也不会产生任何立竿见影的影响，任何变化都尚需时日。在对这一吸烟者人群的随访调查中，我们将可以测量随着该禁令的推行，对于相应品牌的认识是否发生了变化。现在我们知道的是，大多数中国吸烟者都持有一个错误的认识，即LLT卷烟比传统的高焦卷烟危害更小。同世界上其他所有国家的吸烟者一样，对中国吸烟者需要进行教育，告诉他们所有的燃烧型烟草产品都是有害的，无论营销说辞如何暗示，现在都没有任何明确证据指出各种烟草产品之间在健康风险方面存在显著的差别。

本次研究的结果表明，中国有必要同时考虑禁止某些卷烟比另一些危害更小观点的广告，有必要取缔卷烟包装上的焦油含量数据。中国已经与其他一些国家一样（如泰国、澳大利亚和英国），禁止了卷烟包装上的“淡味”和“柔和”等描述词。但是，结果显示，禁止这些词汇的使用在短期内并不足以改变关于“淡味”卷烟相对危害性的观点。<sup>25</sup>我们的研究发现明确指出“淡味”和“低焦油”卷烟对呼吸道刺激更小的观点和认为此类卷烟危害相对较小的观点之间存在的重要联系。禁用“淡味”和“低焦油”等描述词对于切断“淡味”、“低焦油”卷烟更加柔和低刺激的感觉与假定低危害之间的联系

不会起到任何作用。诚然，使用这类卷烟的身体感觉和它们的相对危害程度之间的关系确实可以通过包装设计、广告和描述词汇而产生，但我们的研究结果却同时指出这些产品本身可以直接向吸烟者传递貌似真实的错误信息，直接导致吸烟者错误的认为某些品牌比其它品牌危害更小。

除此之外，《公约》第9条和第10条针对的是烟草产品的管制，而我们的研究结果指出，有必要对烟草产品进行管制，禁止使用可以让这些产品在感觉上更加柔和低刺激的设计特点。这一做法可以减少对于低危害的错误认识，可以成为提高戒烟动机的一个关键性因素。

**致谢：**本文作者感谢中国疾病预防控制中心及各地CDC代表在数据收集工作中的贡献。同时还要感谢三位审阅者和编辑对本文文稿的修改。

**资金来源：**中国疾病控制预防中心、加拿大卫生研究院（79551）、美国国家癌症研究院（Ro1 CA125116 o1A1）、美国国家癌症研究院/罗斯韦尔帕克跨学科烟草使用研究中心（TTURC P50 CA111236）、美国国家癌症研究院、加拿大卫生研究院加拿大研究生奖学金硕士奖、加拿大卫生研究院博士研究奖，以及加拿大卫生研究院烟草研究战略培训项目。中国疾病控制预防中心负责数据收集。各出资方对研究设计，数据收集、分析和解读，报告撰写，以及本文的投稿决定不产生任何影响。

**竞争利益：**无。

**伦理批准：**批准单位：滑铁卢大学（加拿大滑铁卢）研究伦理办公室，罗斯韦尔帕克癌症学会（美国布法罗）、维多利亚癌症委员会（澳大利亚墨尔本）、中国疾病预防控制中心（中国北京）。

**来及同行评价：**未开展；经外部同行评价。

## 参考文献

1. World Health Organization. *Towards a tobacco-free China*. Geneva: WHO, 2007: available at: <http://www.wpro.who.int/china/sites/tfi/> (accessed 15 August 2007).
2. World Health Organization. *Report on the global tobacco epidemic, 2008: the MPOWER package*. Geneva: WHO, 2008: available at: [http://www.who.int/tobacco/mpower/mpower\\_report\\_full\\_2008.pdf](http://www.who.int/tobacco/mpower/mpower_report_full_2008.pdf) (accessed 20 June 2008).
3. Murray CJL, Lopez AD. Alternative projections of mortality and disability by cause 1990–2020: global burden of disease study. *Lancet* 1997;349:1498–1504.
4. Anderson SJ, Pollay RW, Ling PM. Taking advantage of lax advertising regulation in the USA and Canada: reassuring and distracting health-concerned smokers. *Soc Sci Med* 2006;63:1973–1985.
5. Pollay RW, Dewhurst T. The dark side of marketing seemingly “light” cigarettes: successful images and failed fact. *Tob Control* 2002;11(suppl 1):i18–31.
6. Pollay RW. Targeting youth and concerned smokers: evidence from Canadian tobacco industry documents. *Tob Control* 2000;9:136–47.
7. Shiffman S, Pillitteri JL, Burton SL, et al. Smokers’ beliefs about “light” and “ultra light” cigarettes. *Tob Control* 2001;10(suppl 1): i17–23.
8. Borland R, Yong HH, King B, et al. Use of and beliefs about light cigarettes in four countries: Findings from the International Tobacco Control Policy Evaluation Survey. *Nicotine Tob Res* 2004;6 (suppl 3):S311–21.
9. Kropp RY, Halpern-Felsher BL. Adolescents’ beliefs about the risks involved in smoking “light” cigarettes. *Pediatrics* 2004;114: e445–e451.

10. **Kozlowski LT**, Goldberg ME, Yost BA, et al. Smokers' misperceptions of light and ultra-light cigarettes may keep them smoking. *Am J Prev Med* 1998;15:9–16.
11. **Gilpin EA**, Emery S, White MM, et al. Does tobacco industry marketing of “light” cigarettes give smokers a rationale for postponing quitting? *Nicotine Tob Res* 2002;4(suppl 2):S147–55.
12. **Hyland A**, Hughes JR, Farrelly M, et al. Switching to lower tar cigarettes does not increase or decrease the likelihood of future quit attempts or cessation. *Nicotine Tob Res* 2003;5:665–71.
13. **Hammond D**, Fong GT, Cummings KM, et al. Smoking topography, brand switching, and nicotine delivery: results from an in vivo study. *Cancer Epidemiol Biomarkers Prev* 2005;14:1370–5.
14. **Kozlowski LT**, O'Connor RJ, Sweeney CT. Cigarette design. In: *Risks associated with smoking cigarettes with low machine-measured tar and nicotine yields*. NCI Smoking and Tobacco Control Monograph No 13. Bethesda, MD: National Cancer Institute, 2001:13–38.
15. **Benowitz NL**. Compensatory smoking of low-yield cigarettes. In: *Risks associated with smoking cigarettes with low machine-measured tar and nicotine yields*. NCI Smoking and Tobacco Control Monograph No 13. Bethesda, MD: National Cancer Institute, 2001:39–63.
16. **Hammond D**, Collishaw NE, Callard C. Secret science: tobacco industry research on smoking behaviour and cigarette toxicity. *Lancet* 2006;367:781–7.
17. **Hecht SS**, Murphy SE, Carmella SG, et al. Similar uptake of lung carcinogens by smokers of regular, light, and ultralight cigarettes. *Cancer Epidemiol Biomarkers Prev* 2005;14:639–98.
18. **Thun MJ**, Burns DM. Health impact of “reduced yield” cigarettes: a critical assessment of the epidemiological evidence. *Tob Control* 2001;10(suppl 1):i4–i11.
19. **Philip Morris**. [People's Republic of China 920000-940000 plan]. 1992. Philip Morris. Bates No. 2504007962 <http://legacy.library.ucsf.edu/tid/rcq19e00>
20. **Euromonitor International**. *The world market for tobacco*. March 2006; available at: [http://www.euromonitor.com/The\\_World\\_Market\\_for\\_Tobacco](http://www.euromonitor.com/The_World_Market_for_Tobacco) (purchase required) (accessed 9 August 2007).
21. **Yang G**, Fan L, Tan J, et al. Smoking in China: findings of the 1996 National Prevalence Survey. *JAMA* 1999;282:1247–53.
22. **Yang G**, Ma J, Chen A, et al. Smoking cessation in China: findings from the 1996 national prevalence survey. *Tob Control* 2001;10:170–4.
23. **Shiffman S**, Pillitteri JL, Burton SL, et al. Effect of health messages about “light” and “ultra light” cigarettes on beliefs and quitting intent. *Tob Control* 2001;10(suppl 1):i24–i32.
24. **Borland R**, Fong GT, Yong HH, et al. What happened to smokers' beliefs about light cigarettes when “light/mild” brand descriptors were banned in the UK? Findings from the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2008;17:256–62.
25. **Binson D**, Canchola JA, Catania JA. Random selection in a national telephone survey: a comparison of the Kish, next-birthday, and last-birthday methods. *J Off Stat* 2000;16:53–60.
26. **Wave 1 ITC China Technical Report**. Waterloo, Canada: International Tobacco Control China Survey Team, June 2008. Available at: <http://www.itcproject.org/library/countries/itccchina/reports/finalitcc> (accessed 17 June 2009).
27. **National Bureau of Statistics of China**. China Statistical Yearbook 2008. Available at: <http://www.itcproject.org/library/countries/itccchina/reports/cn1techrpptrevjul2010.pdf> (accessed 22 Sep 2010).
28. **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.
29. **World Health Organization**. Framework Convention on Tobacco Control. Geneva: World Health Organization, 2005. Available at: [http://www.who.int/tobacco/framework/WHO\\_FCTC\\_english.pdf](http://www.who.int/tobacco/framework/WHO_FCTC_english.pdf) (accessed 6 February 2008).