

Preplanned Studies

Local Brand Smoking Among Adult Smokers: Findings from the Wave 5 International Tobacco Control China Survey — China, 2015

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Summary

What is already known about this topic?

Branding of cigarettes may play a role in shaping the smoking behaviors of Chinese smokers, and local brand (LB) cigarettes may reflect this influence because of greater tax and non-tax incentives compared to non-LB. Some of these brands are regional flagships that market to smokers using local landmarks or icons.

What is added by this report?

LB brands were significantly more likely to be the usual brand of smokers residing in provincial-level administrative divisions (PLADs) that produced their own LB cigarettes [adjusted odds ratio (AOR): 30.95; 95% confidence interval (CI): 26.36–36.49] compared to those residing in PLADs that had non-local ventures with non-LB cigarettes. Further, smokers residing in urban areas were found to be less likely to smoke LB cigarettes (AOR: 0.79; 95% CI: 0.67–0.93) compared to those in rural areas.

What are the implications for public health practice?

These findings suggest that LB smoking may be a result of industry-driven incentives to boost LB sales, fueled by such as supply-side strategies to boost LB sales or targeted cultural/social marketing that appeals to certain demographic groups. Although addressing these incentives to support LBs would be challenging given the nature of China's tobacco industry, doing so would have potential to reduce cigarette smoking and ultimately the health burden of smoking in China.

Nearly one-third of all smokers in the world or over 300 million smokers reside in China, consuming an estimated 2.3 trillion cigarettes every year (1). According to the China Global Adult Tobacco Survey (GATS) in 2018, the prevalence of current smoking among Chinese aged 15 or older was 2.1% in women and 50.5% in men (2). The high prevalence of smoking in Chinese men might be due to the

persistent normalization of smoking within Chinese culture, where cigarettes were commonly used as a form of sharing or gift-giving for interpersonal relationships and magnanimity during festivals and weddings, and as business favors (3).

Branding of cigarettes may play a unique role in affecting the smoking behaviors of Chinese smokers due to the abundance of Chinese cigarette brands and their varieties. This was largely due to a brand consolidation strategy by the China National Tobacco Corporation (CNTC), which has a monopoly over China's cigarette market, accounting for 98% of domestic sales (4). From 1990 to 2013, the CNTC reduced the 2,000 cigarette brands to 90 brands (4). The CNTC includes several major local/regional subsidiaries that manufacture flagship cigarette brands. These local brands (LB) often are packaged and advertised through the use of symbols and pictures that represent regions and local landmarks. Smokers may use cigarette brands as symbols of their home regions, suggesting that they prefer their home region's cigarettes over others (5). An example of this local branding can be seen in Figure 1, where the CNTC local subsidiary, China Tobacco Hubei Industrial Co. Ltd, uses the Yellow Crane Tower (Huanghelou) as its brand name, with its photo on the packaging, thus linking its brand to this famous landmark, which has been the object of several famous poems (6).

Cigarette brands have often been linked to symbols of China — both national and local, and the presence of these symbols on the packs of many cigarette brands, such as the image of the Forbidden City on packs of Chunghwa cigarettes (whose brand name is literally the name of the country), has been cited by China as a reason for not implementing graphic warnings as recommended by Article 11 of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) — that graphic images of disease would not be appropriate when appearing next to these national symbols.



FIGURE 1. Cultural landmarks and the eponymous cigarette brands.

Left to right: Yellow Crane Tower Cigarettes, Yellow Crane Tower (Wuhan, China).

Source: cig88.com, tripadvisor.com, accessed March 18, 2019 (7–8).

Thus, LBs may affect smokers because of the positive branding strategies that reflect their local origins. But in addition, under the China tobacco taxation system where most tobacco taxes are collected at the producer and wholesale levels and shared with local governments, there is an incentive that the CNTC pushes for the production and sale of local brands locally so that tobacco producing provincial-level administrative divisions (PLADs) and lower-level governments can count on the tobacco tax revenues for their expenditures, a phenomenon called “tobacco finance” in China.

To our knowledge, this study is the first to conduct an empirical analysis of local brands in China. The objective of this study was to assess the percentage of LB smoking among adult smokers in a diversity of cities in China and to identify factors associated with LB smoking including demographic characteristics and patterns of smoking such as cigarettes per day.

This project analyzed data from the Wave 5 International Tobacco Control (ITC) China Survey that was conducted between November 2013 and July 2015 (9–10). The ITC China Survey is a longitudinal cohort survey of smoking behavior and knowledge, beliefs, opinions, and attitudes about cigarette smoking and tobacco use among adults aged 18 and older in China. The Wave 5 Survey was conducted in 10 locations, including urban residents in 5 large cities (Beijing, Guangzhou, Kunming, Shanghai, and Shenyang) and residents in 5 rural areas (Changzhi, Huzhou, Tongren, Yichun, and Xining). The 10 locations were selected based on size, geographical

representations, and levels of economic development (11–12).

Kunming, Guangzhou, Shanghai, Huzhou, Tongren, and Beijing have LBs and local cigarette manufacturing facilities; all of these locations were therefore labeled as local ventures (LVs) in this study excluding Beijing, which entered into a venture with a non-local company (Shanghai Tobacco Group) and a local cigarette factory and was labelled a non-local venture (NLV). Changzhi does not have LBs but has manufacturing facilities in its province and was labeled as NLV; Shenyang and Yichun have few LBs produced by subsidiaries of non-local parent companies and local cigarette factories and were also labelled NLVs. Xining has neither LBs nor local manufacturing facilities and was excluded. A multistage cluster sampling method was used to create a representative sample of adults aged 18 and older; more detail is provided in the Supplementary Material (available in <https://weekly.chinacdc.cn/>). More information on sampling methodology and sampling weights can be found in the ITC technical documentation (10).

The outcome variable in this study was LB smoking status, which was determined by the following question: “In the last 30 days, what brand of cigarettes did you smoke more than any other?” (12), and the information regarding provincial subsidiary manufacturer for each brand collected in the ITC China Survey. The answer to this question was defined as the smoker’s primary brand. If the province (or PLAD) of manufacture for a smoker’s primary brand was the smoker’s province of residence, this smoker was defined as an LB smoker; otherwise, they were defined as a non-local-brand (NLB) smoker. For example, if a smoker from Kunming City of Yunnan Province listed Red Pagoda Hill (Hong Ta Shan) as their primary brand and the Yunnan Tobacco Company is the provincial subsidiary manufacturer, then this smoker was categorized as an LB smoker. Those who refused to answer or reported unknown status were coded as missing and excluded from our sample.

The covariates considered in this study included sociodemographic characteristics, an indicator for rural/urban area type, an indicator for NLVs/LVs, city of residence, and smoking behaviors. Sociodemographic characteristics included sex (female and male), age groups (18–24, 25–39, 40–54, and 55+), ethnicity (non-Han and Han), monthly household income [high income ($\geq 3,000$ CNY, 482 USD of 2015 exchange rate (13)), medium income

(1,000–2,999 CNY, 161–482 USD), low income (<1,000 CNY, 160 USD), and unknown, education high (at least some college), medium (senior high school), and low (less than senior high school), and marital status (married or living with a partner, divorced or separated, widowed, and single). Participants who did not report income (995 of 6,642) were not excluded but were classified in the “unknown” group because data on income might not be missing at random. Smoking behaviors included smoking frequency (daily and non-daily), smoking intensity (heavy: ≥ 10 cigarettes per day; and light: 0–10 cigarettes per day), and time to smoke the first cigarette after waking (0–30 min and ≥ 30 min).

A total of 9,880 adults participated in the survey, including 7,583 current smokers, 234 former smokers, and 2,063 never smokers. This study focused on current smokers, defined as those who have smoked at least 100 cigarettes in their lifetime and currently smoking cigarettes at least once a week (11). After excluding those with missing data on LB smoking status, the sample size for analyzing the percentage of the LB smoking included 6,642 current smokers. For the multiple logistic regression described below, participants that had missing values for age, ethnicity, education, marital status, and smoking intensity were excluded and resulted in a final study sample of 6,419

participants.

The weighted percentage of LB smoking was estimated for all current smokers and for subgroups stratified by each covariate using sampling weights provided by the Wave 5 ITC China Survey, further details can be found in the Technical Report (10). The bivariate analysis chi-square test was conducted to determine if there was any statistically significant difference in the percentage of LB smoking across all subgroups of each covariate. A multiple logistic regression model was used to estimate the propensity of LB smoking among current smokers, adjusting for all the covariates except employment status and city of residence because employment status was highly correlated with age, and city of residence was highly correlated with the rural/urban area type. The model used the sampling weights. The association between each covariate and LB smoking was determined by an estimated adjusted odds ratio (AOR). All analyses were conducted in R (version 4.1.1., R Core Team, Vienna, Austria). Estimates were considered to be statistically significant if the two-tailed *p*-value was <0.05.

Table 1 shows that among 6,642 current smokers, most participants were men (96.2%), aged 40–54 (41.9%), of Han ethnicity (87.4%), had high income (59.7%), had medium education (62.7%), were married or living with a partner (86.6%), resided in an

TABLE 1. Distribution of the study sample and the percentage of local brand smoking by sociodemographic characteristics and smoking behaviors among current smokers in Wave 5 of the International Tobacco Control China Survey (n=6,642).

Characteristic	Number-total	Percentage-subgroup (%)	Number-LB smokers	Percentage-LB smokers (%)	Chi-square	<i>p</i> -value
Total	6,642		3,173	47.6		
Sex					17.07	<0.001
Female	288	3.8	100	34.8		
Male	6,354	96.2	3,073	48.1		
Age group (years)					47.09	<0.001
18–24	148	2.7	83	56.9		
25–39	1,165	18.8	631	55.3		
40–54	2,885	41.9	1,359	46.4		
55+	2,439	36.5	1,099	44.4		
NA	5		1			
Ethnicity					290.34	<0.001
Non-Han	852	12.6	658	75.2		
Han	5,775	87.4	2,510	43.7		
NA	15		5			
Income					46.01	<0.001
High ($\geq 3,000$ CNY)	3,935	59.7	1,974	50.6		
Medium (1,000–2,999 CNY)	1,310	20.8	524	40.7		
Low (<1,000 CNY)	402	5.8	178	41.4		
Unknown	995	13.8	497	48.1		

TABLE 1. (Continued)

Characteristic	Number-total	Percentage-subgroup (%)	Number-LB smokers	Percentage-LB smokers (%)	Chi-square	p-value
Education group*					30.75	<0.001
High	1,047	15.5	567	54.2		
Medium	4,158	62.7	1,889	45.2		
Low	1,412	21.8	708	50.0		
NA	25	23.7	9			
Marital status					30.28	<0.001
Married or living with a partner	5,813	86.6	2,758	47.3		
Divorced or separated	315	5.0	146	42.2		
Widowed	161	2.6	67	42.2		
Single	338	5.8	195	60.1		
NA	15		7			
Rural/urban area type†					21.01	<0.001
Rural area	3,207	48.6	1,438	44.8		
Urban area	3,435	51.4	1,735	50.4		
NLVs/LVs‡					2825.58	<0.001
NLV	2,901	43.5	322	10.5		
LV	3,741	56.5	2,851	76.2		
City of residence					3172.81	<0.001
Beijing¶	661	10.1	102	11.1		
Shenyang¶	636	9.1	17	2.5		
Shanghai¶	730	11.1	441	61.5		
Guangzhou¶	664	9.9	460	70.7		
Kunming¶	744	11.1	715	96.0		
Changzhi**	804	12.2	0	0.0		
Yichun**	800	12.1	203	26.7		
Huzhou**	799	12.1	552	70.2		
Tongren**	804	12.2	683	82.1		
Smoking frequency					12.39	<0.001
Daily	6,128	92.4	2,959	48.3		
Non-daily	514	7.6	214	40.1		
Smoking intensity					19.30	<0.001
Heavy	3,987	60.0	1,988	49.9		
Light	2,628	40.0	1,172	44.4		
NA	27		13			
Time to smoke the first cigarette after waking					0.93	0.334
0–30 min	3,794	58.2	1,820	48.1		
≥30 min	2,750	41.8	1,307	46.9		
NA	98		46			

Note: p-values are calculated from the weighted bivariate analysis chi-square tests.

Abbreviations: LB=local brand; NA=not applicable; NLV=non-local venture; LV=local venture.

* Education was categorized as high education (more than senior high school), medium education (senior high school), and low education (less than senior high school).

† Rural areas consisted of Changzhi, Yichun, Tongren, and Huzhou. Urban areas consisted of Beijing, Shenyang, Guangzhou, Shanghai, and Kunming.

‡ This indicator variable consisted of areas with NLVs (non-local brands using local cigarette factories including Beijing, Shenyang, Changzhi, and Yichun) or LVs (local brands using local cigarette factories including Kunming, Guangzhou, Shanghai, Huzhou, and Tongren).

¶ These are cities.

** These are rural areas.

urban area (51.4%), resided in areas with a LV (56.5%), were daily (92.4%) or heavy smokers (60.0%), and smoked their first cigarette 0–30 min after waking (58.2%).

Table 1 also shows that the percentage of LB smoking was 47.6% among all current smokers. The bivariate analysis results indicated that the percentage of LB smoking was significantly different by sex (34.8% for female and 48.1% for male), age, ethnicity (75.2% for non-Han ethnicity and 43.7% for Han), income, education, marital status, area type (44.8% for rural area and 50.4% for urban area), NLVs (10.5%) *vs.* LVs (76.2%), smoking frequency (48.3% for daily smokers and 40.1% for non-daily smokers), and smoking intensity (49.9% for heavy smokers and 44.4% for light smokers), but was not statistically different by time to smoke the first cigarette after waking. As shown in Figure 2, among the 9 locations, the percentage of LB smoking was high for areas with LVs (Kunming at 96.20% and Tongren at 84.85%) and low for areas with NLVs (Changzhi at 0.00%). The percentage of LB smoking in Shenyang was 2.7%, which was due to a limitation in defining LB smoking — these LB smokers smoked Ren Min Da Hui Tang that are produced locally by an NLV.

Table 2 shows that after controlling for covariates, the odds of LB smoking were significantly higher among those aged 25–39 (AOR: 1.65; 95% CI: 1.35–2.03) and 40–54 (AOR: 1.35; 95% CI: 1.16–1.57) compared to those aged ≥ 55 ; those with

medium income (AOR: 1.29; 95% CI: 1.07–1.55) compared to those with high income; and those residing in areas with a LV (AOR: 30.95; 95% CI: 26.36–36.49) compared to those residing in areas with NLVs. The odds of LB smoking were significantly lower among those with medium education (AOR: 0.67; 95% CI: 0.55–0.83) and low education (AOR: 0.53; 95% CI: 0.41–0.69) compared to those of high education, and among those residing in urban areas (AOR: 0.79; 95% CI: 0.67–0.93) compared to those residing in rural areas.

DISCUSSION

This study showed evidence that smokers residing in provinces that produced LB cigarettes were significantly more likely to smoke LB cigarettes than those residing in provinces that relied on NLVs. This is likely due to the current tobacco excise tax system that rewards local governments relying on tobacco finance to enact protectionist measures to protect production and sales of local brands (14). Some of the measures that were used included inspections and fines on the sale of non-local cigarettes and provincial tobacco corporations requiring their subordinate companies to sell designated quantities of LB cigarettes (14). These results were similar to a previous study by Yang et al., which found increased odds of being a current smoker for individuals living in provinces that produced cigarettes (15). This study found that among the nine

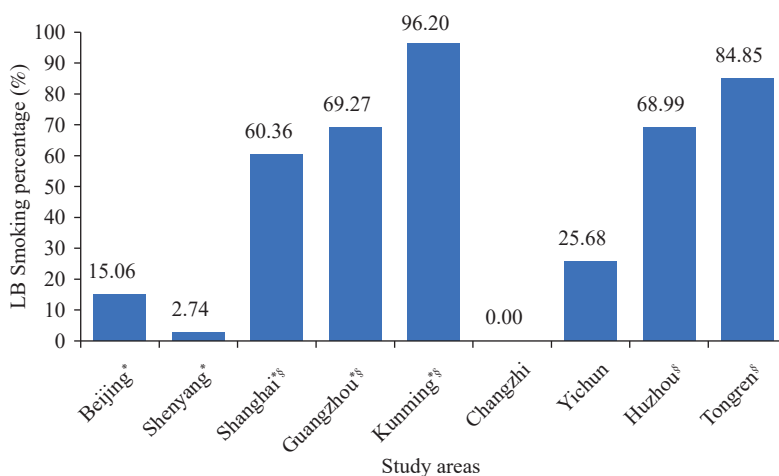


FIGURE 2. Percentage of LB smoking in each of the 9 study areas (city/rural areas) included in Wave 5 of the ITC China Survey.

Abbreviations: LB=local brand; ITC=International Tobacco Control.

* designated urban cities; unmarked locations were rural areas.

§ designated areas with local ventures (LVs; local brands using local cigarette factories); unmarked locations did not have local ventures.

TABLE 2. Estimated multivariate logistic regression model for local brand smoking in current smokers in Wave 5 of the International Tobacco Control China Survey (n=6,419).

Item	Sample size of adults	Sample size of LB smokers	AOR	95% CI	p-value
Intercept			0.22	0.13–0.37	<0.001
Sex					
Female	276	97	Reference		
Male	6,143	2,979	0.72	0.50–1.05	0.087
Age group, years					
18–24	142	79	1.52	0.95–2.46	0.086
25–39	1,121	610	1.65	1.35–2.03	<0.001
40–54	2,798	1,319	1.35	1.16–1.57	<0.001
55+	2,358	1,068	Reference		
Ethnicity					
Non-Han	817	632	Reference		
Han	5,602	2,444	0.82	0.66–1.01	0.061
Income					
High (≥3,000 CNY)	3,842	1,933	Reference		
Medium (1,000–2,999 CNY)	1,280	513	1.29	1.07–1.55	0.008
Low (<1,000 CNY)	379	170	1.26	0.91–1.74	0.161
Unknown	918	460	0.89	0.73–1.10	0.284
Education [†]					
High	1,017	556	Reference		
Medium	4,045	1,840	0.67	0.55–0.83	<0.001
Low	1,357	680	0.53	0.41–0.69	<0.001
Marital status					
Married or living with a partner	5,634	2,675	Reference		
Divorced or separated	307	146	0.74	0.55–1.01	0.054
Widowed	154	65	0.75	0.50–1.13	0.167
Single	324	190	0.95	0.69–1.31	0.749
Rural/urban area type [‡]					
Rural area	3,072	1,385	Reference		
Urban area	3,347	1,691	0.79	0.67–0.93	0.005
NLV/LV [§]					
NLV	2,796	1,385	Reference		
LV	3,623	1,691	30.95	26.36–36.49	<0.001
Smoking frequency					
Daily	5,960	2,886	1.04	0.79–1.38	0.765
Non-daily	459	190	Reference		
Smoking intensity					
Heavy	3,886	1,946	1.04	0.90–1.20	0.637
Light	2,533	1,130	Reference		

Note: p-values are calculated from the weighted bivariate analysis chi-square tests.

Abbreviations: LB=local brand; AOR=adjusted odds ratio; CI=confidence interval; NLV=non-local venture; LV=local venture.

[†] Education was categorized as high education (more than senior high school), medium education (senior high school), and low education (less than senior high school).

[‡] Rural areas consisted of Changzhi, Yichun, Tongren, and Huzhou. Urban areas consisted of Beijing, Shenyang, Guangzhou, Shanghai, and Kunming.

[§] This indicator variable consisted of areas with non-local ventures (NLVs; non-local brands using local cigarette factories including Beijing, Shenyang, Changzhi, and Yichun) or local ventures (LVs; local brands using local cigarette factories including Kunming, Guangzhou, Shanghai, Huzhou, and Tongren).

cities/rural areas, Kunming and Tongren have the highest LB percentages and they both are famous for their provincially-produced cigarette brands, such as Hong Ta Shan from Yunnan and Yun Yan from Guizhou, respectively.

Furthermore, smokers residing in urban areas were less likely to smoke LB cigarettes than smokers residing in rural areas, which may suggest the existence of supply-side factors reducing the number of available brands to rural smokers that may, in turn, increase LB smoking. This uneven geographical distribution of LB cigarette smoking is concerning because the overall smoking prevalence is also higher in rural areas than in urban areas in China (2).

Though some sociodemographic factors (i.e., age, income, and education) were identified to have significant odds of LB smoking, the associations of these factors with LB smoking were likely mediated by price and affordability. As shown by Xu et al., the CNTC's "premiumization" strategy first reduced the number of brands to consolidate product appeal. Over a 5-year period from 2010–2015, newly released cigarette brand variants were mostly premium-branded cigarettes. From 2012 to the first half of 2017, 510 of 615 new brand variants were premium brands (4). The sociodemographic factors of age, income, and education were found to have significantly different odds of smoking premium-branded, mid-price branded, and discount-branded cigarettes (4) and, therefore, might not be directly linked to LB smoking. This should be explored in future research.

This study was subject to some limitations. First, this study lacked analysis on particular brands of cigarettes and their characteristics, such as brand names and packaging. Some brands of cigarettes may have clear direct marketing that targeted local sentiments, i.e., being named after a local landmark or icon. Second, cigarette pricing and associated taxes are also an important predictor for cigarette consumption behavior as many Chinese smokers tend to switch to cheaper brands in response to increased taxes (16). Third, the cities and rural areas included in this analysis were likely differentially impacted by the availability of LB cigarettes. Inclusion of other areas may help to provide a more complete understanding of LB smoking in China.

In summary, our study found that LB smoking significantly varied in smokers by several sociodemographic characteristics and by smoking intensity. There was a wide variation in the percentage of LB smoking across cities and rural areas, which may

suggest external factors such as supply-side policies to ensure LB sales or targeted cultural marketing that appeals more to certain demographics. Tobacco control policies that restrict marketing strategies using LB-related names and icons could have the potential to reduce cigarette smoking and ultimately the health burden of smoking in China.

Conflicts of interest: Geoffrey T. Fong has been an expert witness or consultant on behalf of governments in litigation involving the tobacco industry. All other authors have no conflicts of interests to declare.

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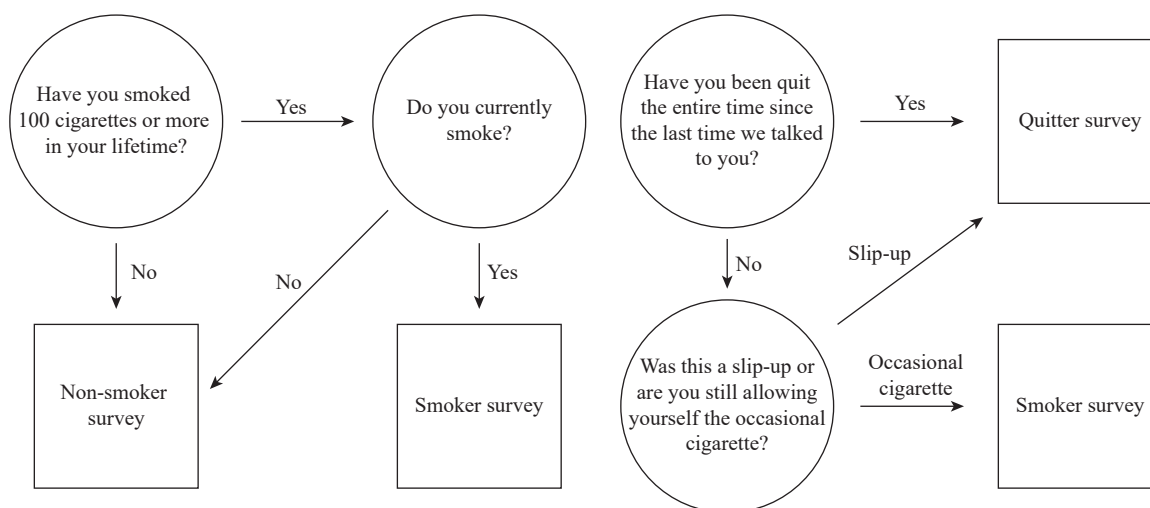
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Supplementary Material

The ITC China Survey is part of the ITC Policy Evaluation Project of 31 countries in the WHO FCTC (1). The ITC China Survey is a longitudinal survey which has been conducted in 5 waves from 2006 to 2015. The ITC China data contains almost 200 self-reported variables including smoking history, frequency, consumption behavior, dependence, quitting attempts, beliefs, brand usage, gifting, etc. (2). This project was a cross-sectional study that will seek to categorize smokers in Wave 5 of the survey as local-brand smokers and non-local brand smokers.

Smokers were defined by the ITC as having smoked more than 100 cigarettes in their lifetime and currently smoking cigarettes at least once a week. Quitters were defined as being included in the ITC study as a smoker in a previous wave but quit smoking in subsequent waves. Supplementary Figure S1 shows a flowchart of screening questions the ITC used to sample smokers, non-smokers, and quitters (3).



SUPPLEMENTARY FIGURE S1. The ITC survey screening questions for smokers, non-smokers, and quitters.

Notes: The diagram on the left is for new participants. The diagram on the right is for participants who identified themselves as quitters.

Source: ITC China Survey (3).

The ITC China Survey first team selected 10 street districts (*jiedao*) with the probability of selection being proportional to the population of each street district among each of the 5 urban cities. In each of these street districts, 2 residential blocks were then selected. A sample of 300 household addresses was drawn using simple random sampling without replacement. These addresses were then randomly ordered and surveyed until a designated quota of 40 adult smokers and 10 adult non-smokers was reached. Each city contributed a sample of approximately 800 current smokers and 200 non-smokers. The same technique was used for rural areas with 10 village districts among each of the 5 rural areas, weighted by population, being selected, 2 villages from each village district, and 300 households chosen from each village. The ITC China Survey team provided sampling weights for the dataset to better represent the population (3). The methods for determining the sampling weights can be found in the ITC China Survey Wave 5 Technical Report (4).

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