

Audit of tobacco retail outlets in Hangzhou, China

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ABSTRACT

Objective To determine the prevalence of tobacco advertisements and warning messages at points of sale as well as to examine the density of tobacco retail outlets in neighbourhoods and around schools in Hangzhou, China.

Method Tobacco retail outlets (n=1639) in all food and tobacco specialty stores were observed objectively by trained students. Tobacco advertisements and warning messages were assessed with an audit, and stores' addresses were recorded with Global Positioning System coordinates. The distances (1) between all pairs of tobacco retail outlets (2) between each tobacco retail outlet and 15 middle schools were calculated to assess the density of tobacco retail outlets in neighbourhoods and around schools.

Results Among the 1639 tobacco retail outlets, <1% had 'no sales to minors' signs, 1.5% had tobacco warning messages, 28% had signs indicating tobacco sale and 12.4% had tobacco advertisements. For 48.7% of tobacco retail outlets, the nearest distances to other tobacco retail outlets were <50 m. For 80% of schools, there was at least one tobacco retail outlets within a 100 m radius.

Conclusion Tobacco advertisement in retail outlets is prevalent and the density of tobacco retail outlets is high in Hangzhou, China. Signs indicating 'no sales to minors' and tobacco warning signs are almost non-existent. These findings point to an urgent need for the enforcement of regulations on display of 'no sales to minors' and a new density standard for tobacco retail outlets based on protecting the public's health.

INTRODUCTION

Regulation of the tobacco retail environment has historically been overlooked as a tobacco control strategy and is scarcely mentioned in WHO Framework Convention on Tobacco Control (FCTC).¹ As part of the information environment in stores where tobacco products are sold, the display of promotional messages as well as public health warning messages have effects on in-store shopping behaviours.²⁻⁵ As the variety of channels for tobacco advertising (eg, television, outdoor billboards and magazines) has become increasingly restricted, tobacco companies have turned more to point-of-sale advertising as an avenue for growing positive brand user imagery.⁴ To date, researchers have found that tobacco point-of-sale advertising (1) increases susceptibility to smoking uptake, (2) increases smoking relapse among former smokers, (3) decreases smoking cessation and (4) raises the likelihood of impulse purchasing.³ Retail tobacco marketing is also associated with perceived ease of obtaining tobacco and smoking initiation among adolescents.⁵⁻⁶ In short, the current literature

provides justification for a ban on point-of-sale marketing. Additionally, many countries have yet to implement legislation requiring tobacco retail outlets to post messages reminding customers that no tobacco can be purchased by minors. However, many of these countries do not reinforce the posted warnings with routine inspections and sanctions that increase their efficacy (US studies have also shown that such messages have limited effect unless enforced through inspections and sanctions).⁷

Meanwhile, an emerging focus of attention in tobacco control is regulating the location of tobacco retail outlets within communities.⁸ A growing evidence base suggests that neighbourhood characteristics—including the local retail environment—affect residents' health behaviours, including cigarette smoking.⁹ Features of the neighbourhood-based tobacco retail environment that are potentially amenable to regulation include the density of outlets within a certain area, the distance between outlets and the nearest local schools as well as the store types that are permitted by law to sell tobacco products (eg, pharmacies, restaurants).¹ Studies suggest that the neighbourhood tobacco retail environment does influence smoking behaviours. For example, residents in areas characterised by higher tobacco outlet density are more likely to smoke.¹⁰ Higher concentrations of convenience stores selling tobacco are associated with greater risk of smoking.¹¹ The regulatory instruments already exist to influence the neighbourhood tobacco retail environment. Thus, zoning ordinances can be used to limit the location and density of tobacco retail outlets, while the retail licensing process can be used to restrict the store types permitted to sell tobacco products.¹

In China, there is no specific law related to tobacco advertisements and warning messages in retail outlets. The *Advertising Laws of the People's Republic of China* bans tobacco advertising on the radio or television, as well as in journals and magazines.¹² But so far, it does not restrict advertisements in tobacco retail outlets.

A survey examining advertisements in Shanghai during 2010 Shanghai Expo shows that >95% of tobacco retail outlets (eg, supermarkets, kiosks and convenience stores) had tobacco advertisements.¹³ The Tobacco Monopoly Bureau directs tobacco retail outlets that they display a sign stating 'no sales to minors' near point-of-sale counters.¹⁴ The Tobacco Monopoly Bureau is responsible for enforcement of their directive, but no detailed provisions are documented regarding inspections or sanctions.

The Tobacco Monopoly Bureau also issues government licenses for the sale of tobacco.

Tobacco retail outlets operating without a license can have all profits as well as 20%–50% of their incomes seized.¹⁵ Any type of store or business (including tobacco specialist stores, food stores, restaurants, hotels, etc) can apply to sell tobacco. Retail outlets located near schools are not allowed. In most big cities, no retail outlets are permitted to sell tobacco within a 100 m radius of a school. Additionally, the locations of tobacco retail outlets are supposed to conform to local urban planning standards. For most cities, two standards are applied regarding the permissible density of tobacco retail outlets: (1) the maximum number of tobacco retail outlets per resident (eg, in the city of Hangzhou, the limit is no more than 3.5 stores per 1000 people) and (2) the minimum distances between the two closest tobacco retail outlets (eg, in Hangzhou, it is 50 m).¹⁶ The local branches of the Tobacco Monopoly Bureau list a number of exceptions to their rules in some big cities. For example, in Hangzhou, supermarkets (>500 m²), markets (>200 m²), restaurants (>800 m²) and hotels (>100 beds) are not required to conform to the density requirement.¹⁶ As far as we are aware, no official statistics have been released on the national compliance rate or enforcement rate. But a few reports from local branches of the Tobacco Monopoly Bureau indicate that tobacco retail outlets without licenses are prevalent, for example, 13.9% in Liuzhou, a middle-sized city in western China.¹⁷ Additionally, one study in Beijing examining the implementation of the ‘no tobacco retail outlets near school’ rule found that there were on average two tobacco retail outlets around schools.¹⁸

After ratifying the FCTC, China made a pledge that all tobacco advertising, promotion and sponsorship should be banned in 5 years (ie, by 9 January 2011). However, to date, there have been few reports on the prevalence of tobacco advertisements across retail outlets. Additionally, there have been few studies on the spatial distribution of tobacco retail outlets and whether it meets the government specifications. The aim of our study was to conduct an audit to determine the prevalence of tobacco advertisements and warning messages at points of sale as well as to examine the density and location of tobacco retail outlets in the city of Hangzhou.

METHODS

Measurement

This research is part of the Community Interventions for Health (CIH) programme in Hangzhou, China. The CIH is a multinational collaboration programme of the Oxford Health Alliance.¹⁹ The research area for the study consisted of three contiguous urban districts (Xiacheng, Gongshu and Xihu) in the city of Hangzhou. The city has a population of 6.37 million in the urban region with 11.4% below 15 years of age and 9.02% above 65 years.²⁰ The Gross Domestic Product per capital calculated by registered residents was US\$10 103 in 2010, based on the average exchange rate published by China. This made its comprehensive economic strength rank eighth of all large and medium size cities in China.²⁰ There were 134 neighbourhoods and a registered population of 0.69 million in the research area in 2007.

To measure the tobacco retail environment, eight trained undergraduate students (as observers) walked separately through every community and street with pre-scheduled routes in the research area from 09:00 to 18:00 daily during January and February 2010 (21 days in total). All tobacco specialties (stores that only or mainly sell tobacco) and food stores (including kiosks, convenient stores, groceries, supermarkets, vegetable and fruits stores, markets, grain stores, candy stores, bakeries, etc) were observed and recorded. The GPS (Global Positioning

System) coordinates of stores addresses were recorded using the Garmin GPS60 device. All GPS measurements were done at the front doors or windows. The observers visited and assessed every open store and an audit on tobacco sales was conducted. The audit included five items: (1) Sell tobacco (Yes/No—screening question; continue to additional questions only if the response to the screener is ‘yes’), (2) ‘No sales to minors’ signs near point-of-sale counters (Yes/No), (3) Signs indicating sale of tobacco (eg, “this store sells tobacco/cigarettes,” “you can find tobacco here,” etc) (Yes/No), (4) Tobacco advertisements near point-of-sale counters (eg, slogans, brochures, posters, flyers) (Yes/No and number) and (5) Tobacco warning message near point-of-sale counters (eg, “smoking is harmful to health,” “cherish life and stay away from tobacco”; but excluding warning messages on tobacco packages) (Yes/No and number). Each advertisement and warning message seen inside was counted separately, no matter whether they were identical or different.

Data on the GPS coordinates of school main entrances were drawn from the CIH baseline, which was carried out in March 2009. There were 21 schools (all public schools) from the research area enrolled in the CIH. Six of them were very close to their respective research area boundary, which meant that tobacco outlet density could not be calculated as data were not collected on tobacco outlets outside the research area. Thus, we included the remaining 15 schools with a 400 m radius contained entirely within the research area. There were 16724 students in these schools. The average percentage of male students for each school was 51.5% and the average age was 14.2 (range 11–16 years).

Statistics

All GPS data were inputted into ArcGIS 9.3. The point distance tool was used to calculate (1) the distances from each tobacco retail outlet to the next nearest tobacco retail outlet and the numbers of other tobacco retail outlets within the 50, 100, 200 and 400 m radius of each outlet and (2) distances from each school to the nearest tobacco retail outlet as well as the numbers of tobacco retail outlets within a 50, 100, 200 and 400 m radius of each school. Proportions and average numbers of tobacco signage by store type were calculated. We also used χ^2 test and analysis of variance to (1) test the differences in tobacco signage between tobacco specialty stores and all other stores as a group (2) assess the relationships between outlets’ characteristics (store type and tobacco signage) and the radius (below 200 vs above 200) around schools and (3) compare outlets’ characteristics (store type and tobacco signage) between tobacco retail outlets violating the density standard (within 100 m of the schools) and those not. All statistics were calculated by SPSS V.18.0.

RESULTS

There were 454 specialist tobacco outlets and 2522 food stores located within the research area. Of these, 450 (99.1%) specialist tobacco stores and 2500 (99.1%) food stores were open during the study period and were included in the sample.

Almost half of food stores sold tobacco (table 1). Tobacco could be found in all types of food stores. The percentages of food stores selling tobacco in any given store type varied greatly, from 6% of vegetable and fruit stores to 90% of convenience stores. Among all tobacco retail outlets (tobacco specialists and food stores that sold tobacco) in the research area, kiosks were the most common type of store, followed by tobacco specialists and convenience stores.

Table 1 Proportion of food stores selling tobacco

	All food stores		Food stores with tobacco		
	n	Column %	n	Row %	Column %
Kiosk	838	33.5	720	85.9	60.6
Convenience store	372	14.9	336	90.3	28.3
Grocery	53	2.1	47	88.7	4.0
Mega supermarket	15	0.6	7	46.7	0.6
Market	46	1.8	5	10.9	0.4
Vegetable and fruit store	534	21.4	30	5.6	2.5
Grain store	78	3.1	9	11.5	0.8
Other food store*	564	22.6	35	6.2	2.9
Total	2500	100.0	1189	47.6	100.0

*Other food stores included bakery, candy stores, seafood stores, tea shops, etc.

Advertisements and warning messages in tobacco outlets

Less than 1% of tobacco retail outlets exhibited signage indicating 'no sales to minors'. However, nearly 30% of tobacco retail outlets displayed signs indicating that the store sold tobacco and almost half (47.5%) of the tobacco retail outlets with those signs were food stores. While very few (1.5%) of tobacco retail outlets posted warning signs with average number of 1.8, 12% displayed tobacco ads with average number of 3.5. Among stores with advertisements, 83.7% were tobacco specialty stores. Table 2 presents tobacco signage by store type. None of tobacco specialty stores had 'no sales to minors' signs. Compared with all other stores as a group, tobacco specialty stores had higher percentages in displaying signs indicating the sale of tobacco, posting advertisements and exhibiting warning messages. The average number of advertisements was lower than that in all other stores. These differences in tobacco signage, except those in warning messages and average number of advertisements, between tobacco specialty stores and other stores as a group had statistical significance.

Density of tobacco retail outlets in neighbourhoods

Based on the registered population (0.69 million in 134 neighbourhoods) in the research area in 2007, the average numbers of tobacco retail outlets were 12.2 per neighbourhood and the average density was 2.4 per 1000 residents (below the standard of 3.5 per 1000 residents).

The average distance between each tobacco retail outlet and its nearest neighbour was 64.9 m (range 1.1–552.9 m). Table 3

shows nearly half (48.7%) of all tobacco retail outlets were <50 m from its nearest neighbour; the average number of tobacco retail outlets within a 400 m radius was 18 (17 plus the reference tobacco retail outlet). Because supermarkets and markets are exceptions to the density standard (the minimum distances between the two closest tobacco retail outlets is 50 m in Hangzhou), six of them were removed from calculation and 792 (48.3%) left had neighbouring tobacco retail outlets within 50 m.

Tobacco retail environment around schools

The average distance between a school and the closest tobacco retail outlet was 67.7 m (range 15.1–151.7 m). For 12 (80%) schools, the distance to the nearest tobacco retail outlet was <100 m. In addition, nearly half (46.7%) of schools were found <50 m distance from the closest tobacco retail outlet. None of 20 tobacco retail outlets closer than 100 m to the nearest schools had the 'no sales to minors' signs or warning messages, but 30% of them had signs indicating sale of tobacco. There were no statistically significant differences between outlets within 100 m of the schools and those out of 100 m (see table 4). Table 4 also shows kiosks were more clustered within 200 m of the schools than out of 200 m, and the difference is statistically significant. However, the differences in tobacco signage between outlets within 200 m of schools and those farther away from schools was not statistically significant.

DISCUSSION

Our audit study suggests that there is widespread lack of compliance with specific point-of-purchase directives concerning the sale of tobacco products (eg, 'no sales to minors' signs) as well as government regulations concerning the location of tobacco retail outlets.

Tobacco advertising was prevalent, in contrast to warning messages that were few. Although the impact of warning messages in the retail environment has not been evaluated in China, we recommend that every advertisement displayed in-store should be accompanied by a government warning—as is the case with cigarette packaging.

The big discrepancy in prevalence between advertisements and warning messages is because the distribution and updates of advertisements from national tobacco companies is far more regular and frequent than the distribution of warning messages

Table 2 Tobacco signage by store type

	n	Having 'no sales to minors' signs (%*)	Having signs indicating sale of tobacco (%*)	Advertisements		Warning messages	
				n (%*)	Mean (SD)†	n (%*)	Mean (SD)†
Tobacco specialty	450	0 (0.0)	241 (53.6)	170 (37.8)	3.5 (0.2)	9 (2.0)	2.3 (0.4)
Kiosk	720	4 (0.6)	136 (18.9)	23 (3.2)	4.0 (1.4)	2 (0.3)	1.0 (0.0)‡
Convenience store	336	10 (3.0)	42 (12.5)	4 (1.2)	5.5 (2.4)	12 (3.6)	1.6 (0.1)
Grocery	47	0 (0.0)	2 (4.3)	0 (0.0)	—	0 (0.0)	—
Mega Supermarket	7	0 (0.0)	1 (14.3)	1 (14.3)	7.0 (—)	1 (14.3)	1.0 (—)
Market	5	0 (0.0)	0 (0.0)	0 (0.0)	—	0 (0.0)	—
Vegetable and fruit store	30	0 (0.0)	8 (26.7)	3 (10.0)	1.3 (0.3)	0 (0.0)	—
Grain store	9	0 (0.0)	2 (22.2)	0 (0.0)	—	0 (0.0)	—
Other store	35	0 (0.0)	27 (77.1)	2 (5.7)	1.0 (0.0)‡	1 (2.9)	1.0 (—)
Total	1639	14 (0.9)	459 (28.0)	203 (12.4)	3.5 (3.5)	25 (1.5)	1.8 (0.9)
p Value§		0.046	<0.001	<0.001	0.717	0.335	—¶

*Row percentages.

†The calculation was based on the stores with advertisements or warning messages.

‡No variation of numbers of messages/advertisements in two stores (both of them have one message/advertisement).

§Testing the differences between tobacco specialty stores and all other stores as a group with χ^2 tests and analysis of variance.

¶The number of stores to compare the numbers of warning messages is very small.

Table 3 Clustering of tobacco retail outlets

N = 1639*	No. of tobacco retail outlets having at least one other tobacco retail outlets (%)	No. of other tobacco retail outlets	
		Mean (SD)†	Range‡
Within a 50 m radius	798 (48.7)	0.7 (0.9)	0–4
Within a 100 m radius	1324 (80.8)	2.0 (1.8)	0–11
Within a 200 m radius	1583 (96.6)	5.7 (3.9)	0–24
Within a 400 m radius	1634 (99.7)	17.0 (7.7)	0–43

*This table shows the actual clustering of tobacco retail outlets, so supermarkets and markets, which are exceptions of the density standard (50 m is the minimal distance between two closest stores), were included into the calculation.

†The calculation was based on all 1639 tobacco retail outlets.

from local Center of Disease Control Prevention or other tobacco control organisations (most are non-government organisations). In the absence of a public health directive, tobacco retail outlets would have no interest (or even a conflict of interest) in posting health warnings. We also found tobacco advertisements in Hangzhou mostly appeared in specialist tobacco outlets. This differs from the situation in the USA, Canada and other countries, where the greatest exposure to tobacco point-of-sale advertising occurs in convenience stores.^{21 22} Patrons of specialist tobacco outlets could be said to have a definite intention for purchasing tobacco. A high percentage of food stores displayed signs indicating customers that tobacco could be bought there. These signs are likely to increase the likelihood of impulse purchases by customers. The result also showed few retail outlets obeying the law about displaying ‘no sales to minors’ signs. The implication is that the laws on the books need to be monitored, enforced and appropriate sanctions applied, especially given that 90% of adolescences report being able to easily buy tobacco in China.¹⁸

The density of tobacco retail outlets in neighbourhoods and near schools was high. Our findings show that there are an average of 12.2 tobacco retail outlets in neighbourhoods, average of 18.0 (17 stores plus the reference store) tobacco retail outlets within 400 m buffers and average of 20.6 tobacco retail outlets within a 400 m radius of schools. In the USA, the corresponding figures have been reported to be an average of 1.5 tobacco retail outlets in 500 m buffers in neighbourhoods and an average of 11.1 tobacco retail outlets found within a 1-mile (1609 m) radius of schools.^{23 24} In Canada, an average of 6.3 tobacco retail outlets were found within a six-blocks-distance radius.²⁵ Considering the compact distribution of tobacco retail outlets and commuting patterns (mainly on foot and riding bicycles),

people in Hangzhou, especially students, are likely to be exposed to more tobacco retail outlets than those in Western countries where people often drive.

The high density of outlets in Hangzhou is partly due to the high threshold set by the Tobacco Monopoly Bureau. When issuing retail licenses, the Tobacco Monopoly Bureau mostly considers meeting the local level of demand, with little regard to public health protection. Even so, nearly half of the retail outlets appeared to be out of compliance with the Tobacco Bureau’s density limit (the minimum distances between the two closest tobacco retail outlets should be 50 m). Since the owners of the retail outlets in our audit were not asked to show their tobacco licenses, we cannot say which stores were out of compliance with the density law. Compared with the mild penalty, however, it is likely that the profits from selling tobacco outweigh the costs of complying with the law. In China, the Tobacco Monopoly Bureau is responsible for monitoring compliance and enforcing the law, but unfortunately, the Bureau does not release official statistics on a regular basis. Considering that the compliance rates are important to evaluate the enforcement of the law, we recommend the Tobacco Monopoly Bureau should begin publishing regular reports of compliance rates by locality. We also recommend that some agency other than the Tobacco Monopoly Bureau should govern the monitoring and enforcement of laws related to tobacco retail outlet density.

Additionally, even though the distance criteria were out of compliance, the 2.4 outlets per 1000 registered population did not exceed the standard of 3.5 per 1000. The discrepancy between these two findings is likely due to the high population density in Hangzhou where urban people mostly live in high-rise apartment buildings with large numbers of residents per city block. The discrepancy between the two measures of tobacco availability suggests that distance should be more strongly considered than the number of outlets per 1000 registered population in cases of high population density (or crowding). Besides zoning, it is also important to reinforce inspection, especially on tobacco sale at kiosks. Considering their large number and proximity, kiosks might be one of the main places for people to buy cigarettes; also since they are likely to be run individually by each owner and have relative small profit margin, they may be more likely to sell tobacco without licenses.

Our study has strengths and limitations. By using trained observers, we assessed objectively the advertisements and warning messages in tobacco retail outlets and estimated the distances between retail outlets (as well as between retail outlets

Table 4 Store type and tobacco signage of tobacco retail outlets with radius (1) below 100 m and above 100 m and (2) below 200 m and above 200 m

	Within 100 m of schools			Within 200 m of schools		
	Yes	No	p Value	Yes	No	p Value
Total number	20	282		82	220	
Tobacco specialties (%)	15.0	30.9	0.134	25.6	31.4	0.331
Kiosks (%)	55.0	40.4	0.201	51.2	37.7	0.034
Convenience stores (%)	30.0	17.7	0.286	17.1	19.1	0.688
Retail outlets with ‘no sales to minors’ signs (%)	0.0	0.4	1.000	0	0.5	1.000
Retail outlets with signs indicating sale of tobacco (%)	30.0	24.5	0.782	22.5	25.8	0.559
Retail outlets with advertisements (%)	5.0	12.1	0.554	12.2	11.4	0.841
Average advertisements*	2.0	5.2	0.585	4.9	5.24	0.877
Retail outlets with warning messages (%)	0.0	2.1	1.000	1.2	2.3	0.905
Average warning messages*	0.0	2.5	–	3.0	2.4	–†

*The calculation was based on the stores with advertisements or warning messages.

†The number of stores to compare the numbers of warning messages is small.

What this paper adds

Tobacco point-of-sale advertising and the density of tobacco retail outlets have been found to influence smoking behaviours. In China, (1) there are no comprehensive bans related to tobacco advertisements; (2) the Tobacco Monopoly Bureau directs tobacco retail outlets to display a sign stating 'no sales to minors' near point-of-sale counters, but no detailed provisions are documented regarding inspections or sanctions and (3) standard of tobacco retail outlets' density is based on local urban planning. The results of this study show that (1) tobacco point-of-sale advertising is prevalent, (2) warning messages (including 'no sales to minors' signs) are almost non-existent and (3) the density of tobacco retail outlets is high. China needs to enforce the regulations on display of 'no sales to minors' and establish a new density standard for tobacco retail outlets based on protecting the public health.

and schools) using GPS coordinates. Due to limited resources, we did not check tobacco sales in other places (eg, hotels, non-food stores and restaurants) or formally assess the inter-rater reliability of our audit (although during the training phase of the study, we checked that there was good inter-rater agreement in a sample of 20 outlets that were visited by two independent team). When calculating distances, we did not have GIS data to evaluate walking distances and therefore only analysed straight-line distances. Schools in the study were chosen to participate in CIH and were a subset of all middle schools in the research area.

Tobacco advertisement in retail outlets is prevalent, and the density of tobacco retail outlets is very high in Hangzhou, China. In contrast, signs indicating 'no sales to minors' as well as tobacco warning signs are almost non-existent. These findings point to an urgent need for enforcement of regulations on display of 'no sales to minors' and a new density standard for tobacco retail outlets based on protecting the public's health. To support the establishment of a comprehensive ban on tobacco advertising, research is needed to evaluate the influence of tobacco signage on smoking behaviours in China. In addition, further study is warranted to examine changes in the prevalence of tobacco advertisements in retail outlets after 9 January 2011 (ie, the Chinese government's self-imposed deadline for complying with FCTC regulations).

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