Retail Environment Features that Affect Smoking Behavior in Changsha, China

Dissertation

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By

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Abstract

Background: Tobacco use causes more than one million deaths each year in China, and this number is expected to reach 3.5 million by 2030 if the current trends continue. Retail environment features are connected with health behaviors such as cigarette smoking. A high density of tobacco retail stores and a high prevalence of marketing practices at the point-of-sale have a profound impact on tobacco smoking especially among youth. In contrast, the availability of smoking cessation medications and services in pharmacies is related to their utilization among smokers and therefore, possibly also related to quit rates. However, little is known about these features of the retail environment in China.

Objectives: The objectives of this study were to (1) measure retailers’ compliance with the zoning regulation of banning tobacco retail sales near schools and to examine the density and characteristics of tobacco retail outlets around schools and in neighborhoods, (2) estimate the prevalence and characteristics of tobacco marketing at the point-of-sale, and, (3) examine the availability and characteristics of smoking cessation medications and the sales of tobacco products in pharmacies in China.

Methods: We audited tobacco retail stores within 200 meters of 36 schools and in 36 residential neighborhoods in the city of Changsha, China. The audit form included items about store location, demographics, availability and characteristics of tobacco products,
tobacco advertising, promotion, and tobacco product displays as well as tobacco control signs. We also performed in-pharmacy visits with a standard checklist, which include items on the availability of cessation medication and advertisements for medication, cessation treatment services, tobacco control signs, and tobacco products in pharmacies.

**Results:** There were many strong pro-tobacco features in the retail environment, and they included: (1) a high density of tobacco retail stores near schools and in neighborhoods, indicating low compliance with the regulation of prohibiting tobacco retail sales within 100 meters of schools; (2) new tobacco products are emerging, especially those targeting youth and females, such as menthol cigarettes, female-targeted cigarettes, and e-cigarettes; (3) low compliance with the regulation that requires tobacco retail stores to place a visible ‘no sales to minors’ sign; (4) a high prevalence of tobacco marketing practices, especially those targeting youth, such as displaying tobacco products within 3 feet of the floor and within 12 inches of toys, candy, and ice cream; and, (5) emerging tobacco sales in pharmacies. Whereas, the anti-tobacco features we assessed were weak, and they included: (1) low availability of smoking cessation medications in pharmacies; (2) few pharmacies had cessation medication advertisements; (3) no pharmacy provided any smoking cessation services or self-help materials; and, (4) the cost of smoking cessation medication is high and it has not been covered by health insurance.

**Conclusions:** The retail environment in the city of Changsha has strong pro-tobacco and weak anti-tobacco features. To better curb the tobacco epidemic in China, efforts are needed to improve the compliance with the regulations that protect youth, to counteract
pro-tobacco marketing, and to promote the availability of smoking cessation medications and services in pharmacies.
This dissertation is dedicated to my family and my adviser Dr. Amy K. Ferketich. This project would have been impossible without their support and encouragement.
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Chapter 1: Introduction

With about 350 million current smokers, China is the largest consumer and producer of tobacco in the world.[1-3] Tobacco use is the number one killer in China; it is currently responsible for about 1.2 million deaths each year and the number of deaths is expected to increase to 3.5 million by 2030.[3-6] Tobacco control in China was primarily research by health experts and basic health education prior to 2006. After the ratification of the World Health Organization Framework Convention on Tobacco control (WHO FCTC) in 2005, the government, media, research institutions and the public have acknowledged the need for tobacco control. However, tobacco control confronts daunting challenges in China.[7-8]

Retail environment features, such as tobacco availability, are connected with health behaviors, including cigarette smoking. Increased availability of a product in retail environments leads to increased consumption.[9] These connections were initially demonstrated by studies on alcohol consumption.[10-12] In recent decades, a number of studies also reported associations between retail environments and cigarette smoking. A high density of tobacco retail outlets and tobacco advertising and promotions at the point-of-sale have been found to: 1) increase tobacco use among youth;[13-23] 2) increase overall smoking prevalence;[24] 3) facilitate positive brand imagery;[25] 4) reduce successful quit attempts;[26] and, 5) worsen tobacco-related disparities in low socioeconomic and minority populations.[27] Display of tobacco products at the point-of-
sale has been found to increase smokers’ spontaneous purchases and decrease the rate of abstinence among those trying to quit.[28-29] Similarly, tobacco advertisements at the point-of-sale act as cues to smoke and increase impulse purchases.[30] For these reasons, tobacco sales around schools are prohibited in many large cities in China in an attempt to protect youth from tobacco. For example, in the capital city of Hunan province, Changsha, tobacco sales are not allowed within 100 meters of the front entrance of schools. This policy went into effect in August 2013.[31]

In addition to retail environment features that facilitate smoking behavior, other retail environment features can suppress tobacco use, such as smoking cessation medication sales in pharmacies. Article 14 of the WHO FCTC recommends each party ‘facilitate accessibility and affordability for treatment of tobacco dependence including pharmaceutical medicines, products used to administer medicines and diagnostics when appropriate.’[32] With the ratification of the WHO FCTC in 2005 in China, efforts have been made to facilitate smoking cessation, including establishing quit lines and opening smoking cessation clinics.[33-36] Yet as of July 2015, no official program exists to facilitate access to smoking cessation medications in pharmacies. Pharmacies serve as the major source for cessation medications. In high income countries such as the United States (U.S.), most pharmacies stock cessation medications, with availability and accessibility varying by pharmacy type and neighborhood income level.[37-39] In China, the availability and accessibility of these medications have not been assessed.

As some pharmacies sell tobacco products, pharmacies may also facilitate smoking. Tobacco sales in pharmacies not only increase tobacco use, but they may also convey a misleading message to customers that cigarettes are healthy products. The pharmacy is a
place where people seek health improvement products and health advice. In the U.S., banning tobacco sales in pharmacies has long been recommended by the American Pharmacists Association (APhA).[40-41] Some towns and cities in two U.S. states (California and Massachusetts) have adopted the recommendation and banned tobacco sales in pharmacies.[42] CVS Caremark, a large chain pharmacy in U.S., stopped selling tobacco products in September 2014.[43] Tobacco sales in Chinese pharmacies are a relatively new phenomenon that has emerged in recent years; to date, the prevalence of tobacco sales in pharmacies has not been examined.

The socio-contextual model was used as a framework to guide this study. The long-term goal is to gain a good understanding of tobacco retail and advertising and promotion at the point-of-sale near schools and in neighborhoods, and the availability and accessibility of smoking cessation medications in pharmacies. This helps to yield insights into tobacco control policies to better regulate tobacco retail environments and to improve the availability and accessibility of smoking cessation medications and resources.

1.1. The specific aims of the study are the following.

Aim 1: To examine the density and characteristics of tobacco retail outlets at the point-of-sale around schools and in neighborhoods.

1. To estimate and compare the density of tobacco retail stores within 100 meters of the front entrance of schools and in neighborhoods.

2. To compare the characteristics of tobacco retail stores, including types of tobacco products sold in the store, characteristics of the tobacco products, tobacco product
displays, and warning messages at the point-of-sale between areas around schools and in neighborhoods.

3. To compare stores around schools and in neighborhoods on the following items:
   1) the price of the cheapest cigarettes, 2) the proportion of stores that sell menthol cigarettes, 3) the proportion of stores that sell cigarettes targeted toward females, 4) the proportion of stores that sell e-cigarettes, 5) the proportion of stores that have a ‘no sales to minors’ sign, and, 6) the proportion of tobacco shops.

Hypotheses: a) We hypothesized that on average, the price of the cheapest cigarettes is lower in stores around schools than that in stores in neighborhoods.
   b) The proportion of stores selling menthol cigarettes is higher around schools from that in neighborhoods.
   c) The proportion of stores selling cigarettes that are targeted toward females is higher around schools than in neighborhoods.
   d) The proportion of stores that sell e-cigarettes around schools is different from that in neighborhoods.
   e) The proportion of stores have a ‘no sales to minors’ sign around schools is different from that in neighborhoods.
   f) The proportion of tobacco shops among all tobacco retail outlets around schools is lower than in neighborhoods.
   g) Tobacco point-of-sale around schools is more likely to display tobacco products within 3 feet of the floor and within 12 inches of candy, toys, and gum.
   h) The proportion of unlicensed tobacco retail outlets is higher around schools than in neighborhoods.

4. To identify the factors related to tobacco sales around schools, including store types, school size (the number of students), smoke free school policy, and distance to the nearest residential building.
Aim 2: To examine the characteristics of tobacco advertisements at the point-of-sale.

1. To determine the prevalence of tobacco advertising in and outside of tobacco retail outlets.

2. To describe the characteristics of tobacco advertising at the point-of-sale.

3. To test the differences in tobacco advertising between the stores around schools and in neighborhoods.

Hypotheses: Tobacco advertising prevalence is higher around schools from that in neighborhoods. Among the stores having tobacco advertisements, the store type is different between the stores around schools and the stores in neighborhoods.

Aim 3: To assess the availability and accessibility of smoking cessation medications and tobacco products, as well as the corresponding advertisements, in pharmacies.

1. To assess availability and accessibility of smoking cessation medications and tobacco products in pharmacies.

2. To examine advertising strategies that pharmacies used to market smoking cessation medications and/or tobacco products.

3. To test the differences in the availability and accessibility of smoking cessation medications, the proportion of pharmacies that have smoking cessation medication advertisements, and the proportion of pharmacies that have a smoke free signs, in urban and rural areas, and in chain and non-chain stores.
Hypotheses: a) Smoking cessation medications are more likely to be sold in stores in urban areas than rural areas, and in chain stores than non-chain stores. b) A higher proportion of pharmacies have smoking cessation medication advertisements in urban areas than rural areas, and in chain pharmacies than non-chain pharmacies. c) A higher proportion of pharmacies have a smoke free sign in urban areas than rural areas, and in chain pharmacies than non-chain pharmacies.
Chapter 2: Literature Review

2.1. Overview

The study addresses the critical need for evidence on the density and characteristics of tobacco retail outlets around schools and in neighborhoods, the prevalence and characteristics of tobacco marketing at the point-of-sale, and the prevalence and characteristics of smoking cessation medication sales and tobacco sales in pharmacies in China.

China is the largest consumer and producer of tobacco in the world.[1-3] The China National Tobacco Corporation has the largest tobacco industry in the world, accounting for almost 40% of the world’s cigarette production and sales.[44] It is a state-owned company that enjoys a virtual monopoly in the country. There are 350 million adult current smokers in the country, causing about one million premature deaths annually and the annual death toll is projected to reach 2 million by 2020.[45] Tobacco control is become increasingly urgent in the country.

2.2. Tobacco control in China

In 2003, the WHO developed the FCTC to control the global tobacco epidemic.[32] The FCTC became effective in February 2005.[32] It is an evidence-based treaty aimed to assist its parties to protect people from secondhand smoke; to offer help for tobacco cessation; to warn about the dangers of tobacco; to enforce comprehensive
bans on tobacco advertising, promotion, and sponsorship; and to raise taxes on tobacco products.[32] As of July 2015, there were 180 FCTC parties covering nearly 90% of the world’s population.[46-47]

China signed and ratified the FCTC in 2003 and 2005, respectively. Since the FCTC went into effect, the production of tobacco increased by 32% from 2004 to 2011 and the smoking prevalence has not been reduced at all.[1] The implementation of the FCTC has largely failed in China. In 2010, the average score for the implementation of FCTC policies was only 37.3 out of 100 points in China, which lags far behind other developing countries in the transfer of FCTC policies.[48] The barriers of implementing the FCTC policies in China are deeply rooted in the political and social environment in the country.[49]

2.2.1 Political barriers to implement the FCTC policies in China.

After China ratified the FCTC in 2005, the National Development and Reform Commission (NDRC), an agency in charge of national macroeconomic development policy making, took the led to implement the FCTC policies. The three departments under the NDRC related to tobacco control include: the Ministry of Health (MOH), the State Tobacco Monopoly Administration (STMA), and the Ministry of Foreign Affairs (MFA).[49]

In general, tobacco control should solely fall under the jurisdiction of the MOH. However, this is not the case in China. The STMA, which is the government agency in charge of China’s tobacco industry and is essentially the same entity as the China National Tobacco Corporation (CNTC), shares the same management staff with the
NDRC; therefore, it has become the agency that is responsible for tobacco control policies in the country and it is so powerful that it has monopolized tobacco policy making; the MOH, which is the only agency genuinely pursing tobacco control and health promotion, has the weakest power to implement the FCTC policies and was marginalized in the tobacco control policy making.\[49\]

As the key force of the pro-tobacco forces, the STMA/CNTC has taken a series of actions to counter tobacco control. For example, before ratification of the FCTC, the STMA/CNTC wrote to the vice premier of the State Council to defend the interests of the tobacco industry and to pledge that China should not ratify the FCTC. During the negotiation of the FCTC,\[50\] a CNTC official criticized the MOH for harming China due to lack of tobacco control.\[51\] After the ratification of the FCTC, a research team of more than seventy experts from the tobacco industry was formed to counteract the FCTC, and they developed a report “Counter proposal and Countermeasure Scheme against WHO FCTC” which aimed to neutralize the FCTC in China, to modify the Chinese version of the framework to make it less anti-tobacco, to deny the scientific evidence on the health hazards of smoking, to abuse public powers of government to counteract tobacco control, and to encourage tobacco consumption through advertising and sponsorship.\[52\]

In addition to the aforementioned actions, the pro-tobacco forces also defined the tobacco industry as an economic pillar for China because of its ability to act as a revenue generator, and they repeatedly emphasized that any decline in tobacco production and consumption would jeopardize China’s economy by reducing tax revenue and employment.\[49\ 53\] Economic growth has been a priority of the Chinese government in
recent decades. The government’s goal is to increase GDP growth and therefore it would be hard to give up the portion of the GDP generated by the tobacco industry. In many developed countries, in addition to receiving benefit from the tobacco industry, the government also has to pay the costs of treating tobacco-related diseases. However, the Chinese government has little responsibility to pay for medical bills, except for those who work for the government. Smokers suffering from tobacco-related diseases have to pay their medical bills on their own. Therefore, the Chinese government has been spoiled by the huge economic benefit from the tobacco industry, and it has little pressure from smoking victims to pass effective tobacco control policies.

The pro-tobacco forces also defined tobacco control as a threat to social stability. In the last few decades, social stability has been an important goal for the Chinese Community Party. The deputy chief of the STMA, Zhang Baozhen, stressed that “smoking harms people’s health, but restricting smoking jeopardizes social stability; smokers rioted when the former Soviet Union collapsed because they had no access to cigarettes; the lesson is also true to China; China’s stability could be threatened if the government tried to curb smoking”. The local STMA in Shanghai claimed that tobacco control policies specified in the FCTC, such as increasing tobacco taxes, would only increase the economic burden on smokers and impair social stability.

Furthermore, tobacco control has also been defined as a technical issue instead of tobacco issue. The chief of science and technology for the STMA claimed that the tobacco industries’ technical innovation, such as lowering the tar in cigarettes, is a practical and effective approach to fulfill the FCTC obligations. This may reduce the government’s commitment to practice effective tobacco control policies. However,
there are public health concerns that the public will be fooled into thinking that low or light tar means less harm due to the limited access to sufficient information about the harm of tobacco.

China’s tobacco industry has adopted a system of monopolized operation. The STMA is responsible for centralized management of the country’s tobacco industry. As mentioned above, the STMA is also the agency which is responsible for the enforcement of tobacco control policies, which creates a conflict of interest and makes the implementation of the FCTC policies extremely difficult in the country.

2.2.2 Unfavorable social factors for tobacco control.

Social factors are crucial independent variables related to tobacco control. The major two social factors that hinder China’s tobacco control are widespread social acceptability of tobacco use and high smoking prevalence.[61-62]

The social norm that smoking is an unhealthy behavior has facilitated tobacco control and smoking cessation in many countries.[63] However, it is the opposite in China. Smoking is considered to be appropriate and acceptable in China.[61 64] Offering cigarettes and cigarette gifting are ways to show respect to others.[64] It has become an important part of social activity and a way for people to win social approval.[65] For example, cigarettes are important symbols in ceremonies, such as wedding and funerals. Cigarette gifting and sharing practices encourage smoking initiation and discourage smoking cessation, coupled with the low awareness of health hazards of tobacco smoking, make tobacco control extraordinarily difficult in China.
China’s high smoking prevalence further makes smoking become a normalized behavior. Studies have shown that the lower the smoking prevalence, the more willing policy makers are to introduce effective tobacco control.\[66\] China is the home of 350 million smokers, tobacco consumption is closely tied to the local and national government revenue, and the Chinese government has little responsibility for the adverse consequences caused by tobacco. Therefore, more tobacco consumption means more profit for the government, which results in the phenomenon that the Chinese government pushes the tobacco industry to constantly increase tobacco production and sales instead of practicing effective tobacco control policies.

The FCTC is only a ‘soft law’ and the WHO has weak coercive power to impose FCTC policies on its parties.\[67\] Coupled with the extremely unfavorable domestic political and social factors, the transfers of the FCTC policies become unusually difficult in China.

2.3. Articles of the FCTC related to this study

Our study is related to three FCTC Articles: Article 13, Article 14 and Article 16. Article 16 of the FCTC states that ‘Each Party shall adopt and implement effective legislative, executive, administrative or other measures at the appropriate government level to prohibit the sales of tobacco products to persons under the age set by domestic law, national law or eighteen’.\[32\] Even though tobacco sales around schools and to minors have been prohibited in recent years in China, adolescents are still having easy access to tobacco products through tobacco outlets around schools and in other places.\[68\]
Tobacco advertising at the point-of-sale is allowed in China, though Article 13 of the FCTC recommends that each party shall implement a comprehensive ban of all tobacco advertising, promotion and sponsorship.[32] As a party of the FCTC, China promised to implement a comprehensive tobacco advertising, promotion and sponsorship ban in 2011; however, to date, the current Advertising Law is still the one which went into effect in 1995 and only prohibits tobacco advertising in movies, radio, television, newspapers, journals, magazines, waiting rooms, cinemas, theaters, conference halls, stadiums, and gyms.[69] In recent years, tobacco control advocates have been calling for a comprehensive ban on tobacco advertising, promotion and sponsorship. Revisions to the China Advertising Law were first proposed in 2000; however, little progress was made until recent years. In February 2014, a draft of the revised Advertising Law was posted online to collect opinions and suggestions; unfortunately, due to the intense lobbying by the powerful state tobacco monopoly, the proposed comprehensive advertising ban turned out to be a partial ban and it will take effect on September 1, 2015. The revised Advertising Law further bans online media promotions and outdoor advertisements of tobacco. However, tobacco marketing at the point-of-sale remains unregulated. Lessons learned from countries such as Australia and the U.S. suggest that tobacco companies will turn to the point-of-sale advertising when tobacco advertising laws became stricter. The prevalence of tobacco advertising at the point-of-sale has not been studied to a great extent in China and thus the question of whether tobacco advertising is turning more to the point-of-sale remains unknown.

Article 14 of the FCTC is focused on promoting effective measures for tobacco cessation and treatments for tobacco dependence.[32] Progress has been made to promote
smoking cessation in China, including establishing quit lines and smoking cessation clinics.[33 35] However, to date, there is no official program to facilitate access to smoking cessation medications in pharmacies. Pharmacies are the major source for cessation medications. In high income countries, such as the U.S., most pharmacies stock cessation medications, with availability and accessibility varying by pharmacy type and neighborhood income level.[37-39 70] In China, the availability and accessibility of these medications have not been assessed. News in China has reported that tobacco products are showing up in pharmacies in recent years.[71] However, it has not been studied thoroughly.

These next few sections demonstrate the significance of the study and the gaps that the study fills in the literature.

2.4. Tobacco retail outlets around schools and in neighborhoods

2.4.1 Tobacco retail outlets around schools.

Tobacco use among Chinese youth has been increasing in the last decades. A study in Beijing found that the percentages of elementary and middle school students who had experimented with smoking in the past year increased from 7% to 17% between 2005 and 2009.[72] In 2008, the Beijing Centers for Disease Control and Prevention surveyed 40,000 elementary and middle school students and reported that the percentages of students who ever tried to smoke during their lifetime were 23% among boys and 11% among girls, which was much higher than the prevalence in 2005 (11% of boys and 3% of girls).[72] The 2014 GYTS showed that 30% of boys and 9% of girls in middle school reported ever using tobacco, which translates into 9.4 million middle
school students in China; and one-third of them are already current smokers.[68]

The density of tobacco retail outlets near schools has been found to be associated with adolescent smoking, as the adolescent smoking prevalence is higher in schools that reside in areas with a higher tobacco retail outlet density.[26 73-74] A study in Beijing evaluated the enforcement of the policy banning tobacco retail outlets around schools and found that there were on average two tobacco retail outlets around schools.[75] Gong et al. audited tobacco retail outlets in Hangzhou near schools and found that 80% of schools had at least one tobacco retail outlet within 100 meters of the school.[76] Studies also suggested that the higher the density of tobacco retail outlets around a school, the more likely the smoking students will purchase their own cigarettes rather than have someone make the purchase for them.[21]

In China, youth perceive having easy access to tobacco products around schools. According to the 2014 GYTS, two-thirds of current tobacco users in middle school reported being able to purchase tobacco products in the stores near schools and over 80% reported that a retailer had never refused to sell them tobacco products. [68] Moreover, over half of middle school tobacco users reported usually obtaining their tobacco products by purchasing them in retail stores.[68]

Restricting youth access to tobacco sales has been shown to effectively reduce adolescent smoking. Article 14 of the FCTC requires that each party prohibit the sale of tobacco products to youth. As a party, tobacco sales within 100 meters of schools are prohibited in most of the large cities in China. Thus, having easy access to tobacco products near schools among adolescents is contradictory to the current tobacco retail
regulations in cities where tobacco retail outlets near schools have been banned. This questions the enforcement of the regulation.

To date, no official statistics have been released by STMA on the enforcement of the regulation that bans tobacco sales within 100 meters of schools; and few studies reported the compliance rate of the regulation. Therefore, our study fills this gap in the literature.

2.4.2 Tobacco retail outlets in neighborhoods.

The density of tobacco retail outlets in neighborhoods is positively related to smoking prevalence among both youth and adults. A study in the U.S. showed that the prevalence of adolescent smoking is over 3 percent higher in schools located in neighborhoods with a high density of tobacco outlets than in neighborhoods with no tobacco outlets.[18] In addition, tobacco retail outlets are a key marketing channel for tobacco products. The availability of tobacco products itself acts as a cue to smoke, coupled with tobacco advertising, adults and youth in such neighborhoods will be exposed to multiple environmental cues designed to encourage tobacco use.[77]

The density of tobacco retail outlets in neighborhoods has also been reported to fuel tobacco-related disparities in communities. A growing body of literature suggests that the density of tobacco retail outlets tends to be higher in socioeconomically disadvantaged neighborhoods,[78-80] and neighborhoods with a higher concentration of minority populations.

In China, the location of tobacco retail outlets is supposed to conform to local tobacco retail density regulation. For most cities, two primary standards are applied
regarding the allowable density of tobacco retail outlets:[31] 1) the minimum distances between the two closest tobacco retail outlets (e.g., in Changsha, it is 20 meters on busy streets in urban areas, 50 meters on other streets in urban areas of the city; in counties, the limit is 30 meters on busy streets, and 50 meters on other streets and areas); 2) the maximum number of tobacco retail outlets per resident/household (e.g., in the city of Changsha, in urban residential areas, the limit is no more than 1 store per 200 households; in areas of universities, prisons, factories, or large companies, the limit is one store per 2000 people).[31]

Gong et al. studied tobacco outlet density in neighborhoods in Hangzhou, China, and found that the density of tobacco outlets in neighborhoods was lower than the standards set up by the SMTA. This may provide evidence for the fact that these standards were set up by the STMA to maximize tobacco companies’ capability to meet market demand without consideration for public health.

Tobacco retail outlet density in neighborhoods has been neglected by tobacco control policies, even the WHO FCTC overlooked the regulation of tobacco retail density in neighborhoods.[32] In the U.S., both the Institute of Medicine and the U.S. Surgeon General have recommended that communities take actions to limit the number and location of tobacco retailers.[77] To date, little attention has been paid on this topic in China. To our knowledge, only one study conducted in Hangzhou by Gong et al. examined the density of tobacco sales in neighborhoods from a public health perspective in China.[76] Studying the density and characteristics of tobacco retail outlets in neighborhoods in China will provide evidence for regulating tobacco retail in neighborhoods in the future.
**2.4.3 Tobacco marketing at the point-of-sale.**

Tobacco point-of-sale marketing is becoming an increasingly important channel for tobacco product marketing worldwide, especially in countries with increasing regulation of tobacco industry marketing practices.[81]

Tobacco advertising, promotion and sponsorship are widespread in China. The Global Adult Tobacco Survey asked respondents about their awareness of tobacco marketing during the last 30 days; the results showed that about 20% of Chinese aged 15 years and older reported noticing tobacco marketing during the last 30 days, and over 4% reported noticing tobacco marketing in stores.[82] A study that compared reported awareness of tobacco marketing among smokers across countries showed that the reported awareness was significantly higher in China compared to other countries such as Thailand and Australia; about 30% of smokers reported noticing the advertising in stores.[83] Another study that examined tobacco advertising in Hangzhou showed that about 12% of tobacco retail outlets had tobacco advertisements.[76]

Tobacco companies have a long history of targeted marketing toward youth.[84] Studies in the U.S. have found significantly more tobacco advertising in stores within 300 meters of schools compared to stores farther away from schools.[50 85] Youth are three times as sensitive to tobacco advertising as adults, and they are more likely to be influenced by cigarette marketing than by peer pressure; moreover, about one third of youth experimentation with smoking is attributable to tobacco advertising and promotion.[86]

Unfortunately, Chinese youth have high exposure of tobacco advertising, promotion and sponsorship at the point-of-sale. In 2014, about half of young people
aged 13 to 15 years reported regular exposure to some form of tobacco advertising, promotion and sponsorship during the last 30 days, and over 40% of young people aged 13 to 15 years reported noticing some form of tobacco marketing at the point-of-sale in the past 30 days.[68]

In countries such as the U.S. and Australia, tobacco companies have focused their efforts on point-of-sale advertising, as rules on other tobacco advertising channels have become increasingly strict.[26 87-88] Chinese tobacco companies may also adopt this strategy. There are already signs that Chinese tobacco companies are paying more attention to tobacco advertising at the point-of-sale. For example, in recent years, tobacco companies in many cities in China have started to adopt a ‘Pyramid’ retail business model to enhance tobacco retail.[89-90] The model has three levels of tobacco retail: the top level on the ‘Pyramid’ is the chain tobacco retail stores owned by tobacco companies and these serve as an example for other tobacco retail stores; the second level is some convenience stores which are certified by tobacco companies; the third (lowest) level is any other tobacco retail outlet. For the second level retail stores, tobacco companies identify them based on certain criteria and train the store management on how to display and advertise tobacco products to improve tobacco sales. The stores get certified after they complete the training and meet the requirements set by tobacco companies. At these stores, a sign which is around 1 meter tall and as wide as the store is displayed over the entrance and a certification is displayed on tobacco display counter to inform customers that these stores are trustworthy and there are no counterfeit tobacco products in the store.[91] A study conducted by Gong et al. in Hangzhou reported that about one-third of tobacco retail outlets displayed signs indicating that the store sold tobacco.[76]
Tobacco advertising, promotion and sponsorship at the point-of-sale is related to smoking prevalence, which 1) encourages youth smoking update;[27] 2) increases total tobacco consumption;[24 27] 3) misleads youth perceptions about the availability, use and popularity of cigarettes;[27] 4) enhances positive brand imagery;[25] 5) undermines quit attempts;[26] and, 6) increases tobacco--related disparities, as tobacco companies have a long history of targeted marketing toward low income and minority populations.[84]

Banning advertising, promotion and sponsorship are among the most effective approaches to reduce tobacco consumption.[92] Countries which have already introduced bans showed an average of 7% reduction in tobacco consumption.[92]

Article 13 of the FCTC requires each party to implement a comprehensive ban on all tobacco advertising, promotion and sponsorship.[32] Such a comprehensive ban has been estimated to reduce tobacco consumption by 10% and smoking initiation by 12%, and increase smoking cessation by 6% in China; and by 2050, this would reduce over 2 million tobacco related deaths in the country.[93]

To date, tobacco marketing at the point-of-sale has rarely been studied in China. In addition, as advertising laws become stricter on other tobacco advertising channels, Chinese tobacco companies may turn more to the point-of-sale advertising, similar to what happened in Australia and the U.S..

2.5. Smoking cessation medication sales and tobacco sales in pharmacy

2.5.1 Smoking cessation medication sales in pharmacy.
As part of the general retail environment, sales of smoking cessation medications may not only meet the market demand but also act as a cue to quit smoking. In the U.S., most pharmacies stock smoking cessation medications. It has been reported that over 90% of pharmacies in New York City, nearly 80% of pharmacies in San Francisco, and 95% of pharmacies in Indiana stock smoking cessation medications.[94] In Thailand, 74% of pharmacies have smoking cessation medications.[95] In Guatemala, only about 23% of pharmacies stock cessation medications.[70] The literature also shows that the availability and accessibility of smoking cessation medications varies by pharmacy type, neighborhood socioeconomic status, and country.[39 70 95]

Article 14 of the FCTC requires each party to take effective measures to promote cessation of tobacco use and to provide adequate treatment for tobacco dependence.[32] After the ratification of the WHO FCTC in 2005, smoking cessation services and resources such as smoking cessation pharmacotherapy have begun to emerge in China.[35]

However, Chinese smokers rarely use such services and resources in quitting. According to the 2010 Global Adult Tobacco Survey (GATS), over 90% of ever smokers who tried to quit in the past 12 months did not use any quitting assistance.[82] A variety of factors may be related to the low use of smoking cessation pharmacotherapies among Chinese smokers, such as the availability and accessibility of pharmacotherapies.[96]

To date, the accessibility and availability of smoking cessation pharmacotherapy in pharmacies has not been assessed in China. Because pharmacies are fundamental in providing smokers with cessation pharmacotherapy, it is important to understand the role pharmacies play in facilitating smoking cessation.
2.5.2 Tobacco sales in pharmacies.

Tobacco sales in pharmacies may increase smoking prevalence by increasing the density of tobacco retail outlets and the availability of tobacco products in communities. Solid evidence has shown that tobacco products in retail environments act as cues to smoke. Moreover, youth and recent quitters are more vulnerable to these cues as tobacco companies have long been targeting vulnerable populations to market tobacco products at the point-of-sale. Furthermore, tobacco sales in pharmacies may also convey a misleading message to customers that cigarettes are healthy products, as the pharmacy is a place where people seek health-related products and health advice.

In the U.S., banning tobacco sales in pharmacies has long been recommended by the APhA.[40-41] In recent years, some cities in two U.S. states (California and Massachusetts) have adopted the recommendation and banned tobacco sales in pharmacies. CVS Caremark, which is a large chain pharmacy, stopped selling tobacco products in September 2014.[43]

In China, tobacco sales in pharmacy is a relatively new phenomenon that has emerged in the past decade; to date, tobacco sales in pharmacies have not been studied.

2.6. Theoretical Framework.

The theoretical framework for this study is the Socio-Contextual Model (SCM).[97] This model provides a useful framework to understand and explain how multilevel factors affect each other in facilitating or inhibiting personal behavior or behavior change. The multiple levels of factors include individual, interpersonal, organizational, neighborhood and community, and larger societal factors.
The literature has identified factors related to tobacco use from all levels of this model. At the individual level, individual characteristics such as age, education and personal attitudes toward smoking are closely related to tobacco use.[98] At the interpersonal level, peer pressure, and influence of family members, partner and friends are related to tobacco smoking behavior.[99-100] The organizational factors include workplace environment and organizational support. At neighborhood/community level, the factors related to smoking behavior include neighborhood/community social economic status and the availability of tobacco sales and advertising.[101-102] The societal factors will include local or national policies related to tobacco sales, tobacco advertising, tobacco smoking behavior, etc.[101-102] Figure 1 shows the structure and more details about the socio-contextual model.[101-102]

Figure 1. Socio-contextual Model for tobacco control[101-102]
The FCTC measures cover determinants of tobacco use at all levels of the socio-contextual model. The determinants will be studied in this study are those from neighborhood/community and environmental/societal level of the socio-contextual model, as this study aimed to examine the factors in neighborhood/community retail environment that facilitate or inhibit tobacco smoke among both youth and adults as well as to evaluate the implementation of the ban of no tobacco sales near schools. This model will guide us to examine and to better understand the factors in the retail environment related to tobacco smoking behavior, including tobacco advertising, availability of tobacco, and availability of cessation resources, as well as tobacco control regulations and policies.
Chapter 3: Research Design and Methods

3. 1. Overview

To address the aims, tobacco point-of-sale auditing was performed to examine the density of tobacco retail outlets, the characteristics of the point-of-sale and the corresponding advertising around schools and in neighborhoods. In-person pharmacy visits were conducted to assess the availability and accessibility of smoking cessation medications and tobacco products in pharmacies.

3.2. Study Setting

The setting for this study is Changsha city of Hunan province in China. Each year, over one million tobacco related deaths occur in China. It is projected to reach 3 million by 2050. The death rate of lung cancer in China has increased five-fold in the past 30 years, which exceeds the death rate of liver cancer and became the first leading cause of cancer deaths in China in 2008. This trend is projected to accelerate if no action is taken to curb it.

Hunan province is the second largest cigarette-producing state in China. In 2008, the Hunan Tobacco Company produced about 156 billion cigarettes, which is about 7.4% of the total cigarettes produced in China over the year.[89] Between 2006 and 2010, the revenue of China Tobacco Hunan Changsha Cigarette Factory increased by 14.1% each year, from 25.3 billion to 42.9 billion RMB.[103]
Cigarette Factory owns several most competitive cigarette brands. For example, Baisha has been the most popular cigarette brand in China, and it is the fifth most popular brand in the world.[103]

Changsha is the capital city of Hunan province which is located in south-central China. The city’s municipality covers an area of 11,819 square kilometers (4,563 square miles), with a population of 7,044,118 according to the 2010 Census.[104] It has five districts and four counties (see Figure 2). The five districts are largely urban, and the four counties are mostly rural. Young et al. studied the awareness of tobacco advertising and promotion in the past 30 days among adults in six cities in China, and their results showed that smokers in the city of Changsha had were more likely to notice tobacco advertisements or promotion than other cities.[105] According to the 2014 Global Youth Tobacco Survey, over 50% of middle school students in Hunan province were aware of tobacco advertising or promotion by any channel in the past 30 day, which is relatively high in China.[68]

Figure 2 Hunan province and Changsha city
3.3. Research Design

3.3.1. Tobacco sales and advertising at the point-of-sale around schools and in neighborhoods (Specific Aim 1 and Specific Aim 2).

The goal was to examine the density and the characteristics of tobacco point-of-sale and the corresponding advertising around schools and in neighborhoods. To achieve this goal, random sampling was performed to obtain representative samples of schools and neighborhoods; in-store audits were performed with an audit form to collect the data of interest at tobacco retail outlets in the study area.

3.3.2. Sales of tobacco products and smoking cessation medications in pharmacies (Specific Aim 3).

The goal was to assess the availability and accessibility of tobacco products and smoking cessation medications in pharmacies in Changsha, China. Stratified random sampling was performed to obtain a representative sample of pharmacies. In-person pharmacy visits were performed with a checklist to collect the data of interest.

3.4. Sampling plan and Data Collection: tobacco sales and advertising at the point-of-sale around schools and in neighborhoods (Specific Aim 1 and Specific Aim 2)

3.4.1. Sampling Plan: Schools.

The target study population was all tobacco retail outlets located within 100 meters of schools. A complete list of the schools in Changsha urban areas was obtained from the local government website (http://www.changsha.gov.cn). In total, there are 344 schools in the city, including elementary and middle/high schools. Some schools are
single program schools which only have elementary, middle, or a high school program, some of them have both middle and high school programs, and the others have all programs covering through first grade to twelfth grade.

Multistage sampling was performed to randomly select the schools. First, two districts that cover the majority of the city center were selected and one of the three surrounding districts was randomly selected. Second, systematic random sampling was performed to select the desired number of schools from the schools in the three selected districts. Before the sampling was performed, the schools in the three districts were sorted by school type to make sure that both elementary and middle/high schools were selected.

All stores, including those that sell and do not sell tobacco products within 100 meters of the selected schools, were counted and only the ones sell tobacco products were audited. The total number of tobacco retail stores in the study area for each selected school was unknown before field auditing.

3.4.2. Sample size calculation: Schools.

During the summer in 2014, preliminary data were collected from tobacco retail outlets located within 300 meters of 10 schools in Changsha. Before going into the field for auditing, Baidu maps were used to determine the 100, 200, and 300 meters radius of the schools. Data were collected in tobacco retail outlets with an auditing instrument. The items in the instrument included: store demographics, tobacco advertisements in and outside of the store, tobacco promotions, types of tobacco products, and tobacco display. On average, there were three tobacco retail outlets within 100 meters of the school
entrance. Tobacco retail is prevalent near schools in the city. During preliminary data
collection, only tobacco retail outlets were audited and counted.

Based on our preliminary data, we calculated the sample size with a margin of
error of 0.5. Since we expect that the sample size will be relatively small (less than 50)
and the distribution of the outcome is more close to a t distribution instead of normal
distribution, therefore, t statistics are used to calculate the sample size. As the eligible
area for each school varies, sample size calculation was based on ratio estimation.

**Sample size calculation with ratio estimation.**

\( y_i \): the number of stores around each school

\( x_i \): the study area within 200 meters for each school

\( N \): total number of schools

\( n \): sample size

Variance of density: \( V = \frac{(N-n)}{N} \frac{1}{\frac{\sum y_i}{x_i}^2} \)

Where \( s_r^2 = \frac{1}{n-1} \sum_{i=1}^{n} (y_i - nx_i)^2 \), \( r = \frac{\sum y_i}{\sum x_i} \), \( u_x = E(x) \)

**Sample size formula:**

\[ V = \frac{(N-n)}{N} \frac{1}{\frac{\sum y_i}{x_i}^2} \]

\[ V \times N \times u_x^2 \times n = (N-n) \times s_r^2 \]

\[ n = \frac{s_r^2 \times N}{N = u_x^2 + V + s_r^2} \]

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Sample size calculation:

\[ N = 344 \]

\[ s_{xx} = \frac{1}{n-1} \sum_{i=1}^{n} (y_i - \bar{x})^2 = 4.9765 \]

\[ u_x \approx \bar{x} = 1.4392 \]

Margin of error = 0.5

\[ t_{\alpha/2} = 2.009 \]

\[ 0.5 = 2.009 \times SE \]

\[ V = SE^2 = (0.5/2.009)^2 = 0.0619 \]

\[ n = \frac{s_{xx}^2 + N}{N^2 u_x^2 + V + s_{xx}^2} = \frac{344 + 4.9765}{344 + 1.4392^2 + 0.0619 + 4.9765} = 34.9 \]

In order to sample 12 schools per district, we selected 36 schools in total.

3.4.3. Sampling Plan: Neighborhoods.

The target study population was tobacco retail outlets in residential neighborhoods. Residential neighborhood in this study was defined as a residential area where the residential buildings were built in similar style by the same construction company and were under the same property management. It could be gated or non-gated residential neighborhoods. A list of residential neighborhoods in the city of Changsha was obtained from the largest and most comprehensive Chinese property information website (http://www1.fang.com/). Two stage random sampling was performed. Three
districts were selected (which are the same districts as the ones for the study around schools) from the five districts in the city. The average price of properties in a neighborhood was used as a rough proxy of social economic status of the residents in the neighborhood, and it was classified into low, medium, and high levels of average property price. The low average property price was defined per square meter as those lower than 5,000 RMB (≈806 U.S. Dollars), the medium average property price was defined as those was 5,000-8,000 RMB (≈806-1290 U.S. Dollars) per square meter, and the high average property price was defined as those greater than 8,000 RMB (≈1290 U.S. Dollars) per square meter. In order to allow comparisons across low, medium and high average property price neighborhoods, neighborhoods were stratified by the three levels of average property price in each district, and then systematic random sampling was performed in each stratum to randomly select 4 neighborhoods in the three districts that were selected for school sampling. Therefore, in total, we obtained a sample size of 36 neighborhoods. Tobacco retail outlets within 200 meters of the entrance of the selected neighborhoods were included in this study.

3.4.4. Sampling plan: validation survey.

A sub-sample of 6 locations (school or neighborhood) from the 72 selected locations was randomly selected for validation of the audit process. The validation study was conducted by another researcher who did not engage in other data collection activities for this study. Training was provided to this researcher on how to perform in-store audits.
3.5. Sampling plan and Data Collection: pharmacy study (Specific Aim 3)

3.5.1. Sampling Plan.

The target population of this study included pharmacies located in Changsha, China, except those located in villages. We excluded pharmacies in villages in rural area for travel considerations. The pharmacies in villages are fairly spread out and the public transportation does not cover many villages in rural areas, which greatly increases difficulties in travel for pharmacy visits. However, there are many small towns scattered in rural areas, which supply living materials and many services (e.g., health care, recreational services, public transportation) for nearby populations including those in villages; populations in villages usually have good access to township pharmacies in a nearby town. Therefore, we believe that excluding pharmacies in villages did not have much of an effect on our results since township pharmacies were included.

The study population included the pharmacies in Furong district, Yuelu District, and Liuyang County. Furong and Yuelu districts were randomly selected from the five districts in Changsha. The number of pharmacies in these two districts averages 403 (Furong district: 370; Yuelu district: 476) among the five districts (Table 1). Furong district is located in the center of the city, which is the smallest district with the highest population density in Changsha. While Yuelu district is located on the edge of the city, it is the largest district in Changsha and has relatively low population density (the 4th in the five districts).

For travel considerations, Liuyang County was selected from the four counties. Liuyang is the largest county with the largest population (lowest population density) in
Changsha, and the majority of this county is rural/suburban. The number of pharmacies (673) in this county is the largest among the four counties in Changsha.

A completed pharmacy list (including 2687 pharmacies) in Changsha, Hunan, China, was obtained from the local government websites and from Changsha Food and Drug Administration. A two-stage sampling plan was used to select the pharmacies for inclusion into the study. At the first stage, two of the five urban districts and one of the four counties were selected. At the second stage, systematic random sampling was used to select pharmacies.

A chain pharmacy was defined as any pharmacy with more than one store. The chain pharmacies tend to be more similar to each other than non-chain pharmacies; therefore, we first stratified pharmacies by area (district and county), and then stratified pharmacies by chain/non-chain pharmacies within each district/county. Any pharmacy with more than one store was defined as chain pharmacy. Systematic sampling was used to randomly select the pharmacies from our sampling frame. In each stratum, the list of pharmacies was sorted by chain number to make sure that pharmacies in each chain have a chance to be selected. We assigned each chain a number which is the chain number for pharmacies in the chain. For non-chain pharmacies, we assigned a number 999 to them for sorting purpose. The total number of pharmacies in each stratum was divided by the calculated sample size for the stratum to determine the interval that was used to select samples from the pharmacy list in the stratum. A random number was selected for the starting point.
Table 1. Total number of pharmacies in each selected district/county, and the calculated sample size for each selected district/county

<table>
<thead>
<tr>
<th>District</th>
<th>Total # of Pharmacy</th>
<th>Sample Size Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furong District</td>
<td>370</td>
<td>92</td>
</tr>
<tr>
<td>Yuelu District</td>
<td>475</td>
<td>90</td>
</tr>
<tr>
<td>Liuyang District</td>
<td>673</td>
<td>99</td>
</tr>
<tr>
<td>Total</td>
<td>1518</td>
<td>281</td>
</tr>
</tbody>
</table>

3.5.2. Sample Size Calculation.

The formula used to calculate the sample size is:

\[ V(p) = \sum_{h=1}^{H} (1 - \frac{n_h}{N_h}) \left(\frac{N_h}{N}\right)^2 \frac{p_h \times (1 - p_h)}{n_h - 1} \]

For districts with a similar numbers of chain and non-chain pharmacies, we assumed equal sample sizes in each stratum \((n_1=n_2)\), where \(n_1\) represents the sample size of chain pharmacies and \(n_2\) is the sample size for non-chain pharmacies. For districts/counties with very different numbers of chain and non-chain pharmacies, we used \(n_2=f \times n_1\), where \(f\) is a parameters to indicate the unequal sample size for chain and non-chain pharmacies in the district/county. In our sample size calculation, margin of error was 0.05. The proportion of pharmacies that sell smoking cessation pharmacotherapy in Changsha is unavailable. To be conservative, we assumed that the proportion \((p_h)\) of pharmacies that sell pharmacotherapy in Changsha was 0.5. In addition, we inflated our sample size by 8% to control for the pharmacies which might be closed, unable to locate, or moved.

Urban districts: There were a total of 370 pharmacies in Furong district (69 were non-chain and 301 were chain pharmacies). With margin of error equal to 0.05 and \(f\)
equals to 4, we needed 18 chain pharmacies and 70 non-chain pharmacies in Furong district. In Yuelu district, there were 475 pharmacies (112 non-chain and 363 chain pharmacies). In total, about 92 pharmacies were needed in this district (chain: 69, non-chain: 23).

*Rural/suburban:* Liuyang city has 673 pharmacies (207 chain pharmacies and 466 non-chain pharmacies). According to the sample size calculation with margin of error equals to 0.05 and f equals to 3, 25 chain pharmacies and 74 non-chain pharmacies were needed.

3.6. Data collection

3.6.1. Data Collection: Tobacco Retail Outlets (Specific Aim 1 and Aim 2).

In-store audits were performed in tobacco retail outlets around the selected schools and in neighborhoods. We used a validated audit tool adapted from other studies to collect data of interest.[106-108]

This study determined the prevalence and the characteristics of tobacco retail outlets and tobacco products sold in the outlets and tobacco advertising and promotion in and outside of tobacco retail outlets around schools and in neighborhoods, with the goal of testing the differences between tobacco retail outlets around schools and in neighborhoods. Therefore, our audit form had five sections: 1) store demographics: four questions are included in this section to collect information on store name, store type, whether it is on the first floor of apartments; 2) exterior tobacco marketing: five questions are designed to collect information on the presence of tobacco advertisements in front of a store, brand name of the tobacco products advertised and/or promoted, the number of
advertisements in small, medium and large sizes, and the overall impression of the exterior advertisements (a. No ads b. Discreet c. Moderate d. “Obvious”); 3) interior tobacco products: sixteen questions are designed to collect data on the types of tobacco products sold in a store and how tobacco products are displayed; 4) interior tobacco marketing: seven questions are included to collect information on presence of tobacco branded shelving units, branded signs, branded displays, tobacco promotions, the advertised price for Baisha and Furongwang, and price of the cheapest cigarette pack in a store. (See the audit form in Appendix A).

Most of the audit process only involves observations in and outside of the tobacco retail outlets; the interviewer did not need to introduce themselves to the clerk in the store unless asked by a clerk; the store owner or the clerk was not informed that the interviewer was collecting data there. Therefore, to count as available, items such as tobacco products, tobacco advertisements and tobacco retail license had to be clearly visible in the store excepting the price of Baisha and Furongwang, and the cheapest cigarette pack in the store. When cigarette price was not clearly advertised in a store, the researcher asked an employee in the store for price information.

The data were collected using an iPhone with an iSurvey application. The iSurvey application was from the website “HAVESTYOURDATA”. This mobile application has been used to collect data since 2009, and it has been used in various fields such as healthcare providers, market research professionals, universities, airlines, museums.[109] The application is designed to be able to work offline and to sync data automatically when the device is connected to the internet. It is easy to use and time saving for data
collection. The audit in each store took about 5 minutes (one minute or less outside a store and 4 minutes or less inside of a store).

**3.6.2. Data Collection: Pharmacy Study (Specific Aim 3).**

In-person pharmacy visits were conducted using a standardized checklist to collect data. The items on the checklist included: 1) smoking cessation medications; 2) smokeless tobacco; 3) cigarettes; 4) smoking cessation treatment programs; 5) advertisements for smoking cessation medications or programs; 6) smoking cessation self-help materials; and 7) smoke-free environment sign (See Appendix B). A smoking cessation medication was defined as any medication marketed as a drug to help smokers quit. The interviewers (one graduate student at Central South University in China and Ling) used a standard script to guide interviews on how to communicate with the clerks in pharmacies and how to collect the data of interest (See Appendix C and D).

**3.7. Data Analysis: Tobacco Retail Outlets (Specific Aim 1 and Aim 2)**

Descriptive analyses were performed to estimate the density of tobacco retail outlets, the characteristics of tobacco products and tobacco display, and the prevalence and characteristics of tobacco advertising in the point-of-sale around schools and in neighborhoods.

T-test and chi-square tests were performed to test the differences in the following items between the stores around schools and the stores in neighborhoods: 1) the price of the cheapest cigarettes, 2) the proportion of stores selling menthol cigarettes, 3) the proportion of stores selling cigarettes targeted toward females, 4) the proportion of stores
selling e-cigarettes, 5) the proportion of stores that have a ‘no sales to minors’ sign, and, 6) store type.

3.8. Data Analysis: Pharmacy Study (Specific Aim 3)

The data were entered by two students. Inconsistencies in the two data sets were verified by a third researcher. The proportions of stores selling tobacco products and smoking cessation medications were estimated. The survey design and survey weights were taken into account in the analysis. Analyses on the characteristics of the smoking cessation medications sold in pharmacies were also performed. In addition, we also estimated the prevalence of smoking cessation medication advertising in pharmacies, and the proportion of pharmacies that had a smoke free sign displayed in the store. Wald tests and chi-square tests were performed to test whether there were significant differences between chain and non-chain pharmacies and between pharmacies in urban and rural areas, in terms of the prevalence of smoking cessation medication sales, the prevalence of smoking cessation medication advertisements in pharmacies, and the proportion of pharmacies having a smoke free sign displayed in the store. Weights were appropriately applied in the analysis for neighborhoods to account for the unequal sizes of the districts.
Chapter 4: Are Retailers Compliant with Zoning Regulations that Ban Tobacco Sales near Schools in Changsha, China?

4.1. Introduction

According to the 2014 Global Youth Tobacco Survey (GYTS), 30% of boys and 9% of girls in middle school (13-15 years old) reported ever using tobacco in China, which translates into 9.4 million middle school students, with one-third of them already current smokers.[68] Easy access to tobacco retail stores may be one of the major contributing factors to such a high prevalence of smoking among Chinese youth. In particular, Chinese youth perceive having easy access to tobacco products around schools. In the 2014 GYTS, two-thirds of current middle-school tobacco users reported being able to purchase tobacco products in stores near schools and over 80% reported that a retailer had never refused to sell them tobacco products.[68] Additionally, over half of middle-school tobacco users reported usually obtaining their tobacco products by purchasing them in retail stores.[68]

Early initiation of tobacco use in adolescents is related to an increased chance of becoming a regular smoker in adulthood.[110] Studies have shown that the majority of adult tobacco users tried their first cigarette before the age of 18.[110] In China, among 20-34 year-old ever daily smokers, about 53% started daily smoking before the age of 20.[17] This makes protecting youth from the tobacco retail environment a critical approach to ultimately reducing smoking rates among adults.
A high density of tobacco retail stores has been found to: 1) increase tobacco use among youth;[17] 2) increase overall smoking prevalence;[24] 3) facilitate positive brand imagery;[25] 4) reduce successful quit attempts;[17] and, 5) worsen tobacco-related disparities in low socioeconomic and minority populations.[17] The tobacco industry has a long history of targeting youth and tobacco retail stores may be used as a way to recruit new smokers.[17] However, regulations restricting tobacco sales have historically been overlooked as a tobacco control strategy. Recently, tobacco control advocates have recommended using zoning regulations to limit tobacco sales, particularly near schools, as a critical strategy to reduce tobacco use.[17] In the U.S., both the Institute of Medicine and the U.S. Surgeon General have recommended that communities take actions to limit the number and location of tobacco retailers.[77]

Article 16 of the WHO Framework Convention on Tobacco Control (FCTC) requires each party to adopt and implement effective legislative or other measures to prohibit the sale of tobacco products to youth.[32] China prohibits tobacco sales near schools in many large cities. The Tobacco Monopoly Bureau (TMB) in Changsha (capital city of Hunan province in south-central China) is responsible for the implementation and enforcement of tobacco regulations. In 2013, the TMB issued regulations that prohibit tobacco sales within 100 meters of the front entrance of schools and require tobacco retailers to place a ‘no sales to minors’ sign in their stores.[31] In addition, the Chinese Youth Protection Law prohibits selling tobacco products to people under the age of 18, and tobacco retailers are required to display a ‘no sales to minors’ sign that can easily be seen by customers.[111]
Even though regulations are available to protect youth from exposure to tobacco retail stores near schools, the implementation and enforcement of these regulations have rarely been assessed in China. In 2010, Gong et al. audited tobacco retail stores in Hangzhou, a capital city of Zhejiang province in east China, and found a high density of tobacco retail stores near schools and in neighborhoods as well as low compliance to regulation of the tobacco retail environment.[76] Other than the Gong et al. research, there is little literature available regarding assessment of the enforcement and implementation of zoning regulations that ban tobacco sales near schools in China.

Therefore, the primary objective of this study was to evaluate compliance with a tobacco retail zoning regulation that prohibits tobacco sales within 100 meters of the front entrance of schools by estimating the density of tobacco retail stores within 100 meters of the front entrance of schools and comparing the estimate to the density of stores within neighborhoods. We also examined the characteristics of tobacco retail stores, the types of tobacco products sold in the stores as well as the display of warning messages at retail stores around schools and in neighborhoods in Changsha, China.

4.2. Methods

Study setting

This study was conducted in the city of Changsha in December 2014 and January 2015. As the capital city of Hunan province in south-central China, Changsha is a typical medium-sized city in terms of municipality area, population size and economic development in China. According to the 2010 Census, it has a population of over 7 million residents with 3.6 million in the urban areas, ranking 14th among 28 capital cities.
in China. The municipality area of Changsha covers 11,819 square kilometers (4,563 square miles), ranking 13th among 28 capital cities in China.[112-114] With regard to economic development, the 2011 GDP in Changsha was 562 billion RMB (≈8.9 billion U.S. dollars), ranking 7th among capital cities in China.[115] One of the main industries in the city of Changsha is tobacco production, which earned 2.4 billion RMB (384 million U.S. dollars) and generated 60.2 billion RMB (9.6 billion U.S. dollars) in tax revenue in 2014, accounting for 42.3% of the tax revenues of Changsha city.[116-117]

Sample selection

Schools

A complete list of schools in Changsha urban areas was obtained from the local government website (http://www.changsha.gov.cn). In total, there were 344 schools, including elementary and middle/high schools. Some schools were single-program schools which only had an elementary, middle, or high school program, some of them had both middle and high school programs, and the others had programs covering first grade through twelfth grade. Two stage cluster sampling was performed to select the schools. First, two districts that cover the majority of the city center were selected and one of the three surrounding districts was randomly selected; then systematic random sampling was performed to select 12 schools from each of the three selected districts. Schools were first sorted by school type in each district to ensure a representative sample of both elementary and middle/high schools.
Residential neighborhoods

A residential neighborhood (‘xiaoqu’ or ‘lou pan’) in this study was defined as an area where the residential buildings were built in a similar style by the same construction company and were under the same property management, with or without gates to access the neighborhood. A list of residential neighborhoods in the city of Changsha was obtained from the largest and most comprehensive Chinese property information website (http://www1.fang.com/). The average neighborhood property price, which has been shown to be a good measure of socioeconomic status,[17] was used as a proxy of socioeconomic status of the residents in the neighborhood. In order to allow comparisons across low, medium and high socioeconomic status, neighborhoods were stratified by average price in each district, and then systematic random sampling was performed in each stratum to randomly select 4 neighborhoods in each of the same three districts that were selected for schools. Therefore, in total, 36 neighborhoods were sampled. Low average property price was defined as those lower than 5,000 RMB (≈806 US Dollars) per square meter, medium average property price was defined as those from 5,000- to 8,000 RMB (≈806 to 1290 US Dollars) per square meter, and high average property price was defined as those greater than 8,000 RMB (≈1290 US Dollars) per square meter.

The sampling was performed to avoid overlap between schools and neighborhoods. When there was a sampled neighborhood overlapping with a sampled school, the neighborhood was excluded and replaced by another neighborhood through random sampling.
Data collection protocol

Tobacco retail stores located within 200 meters from the front entrance of the selected schools or neighborhoods were audited. A 200 meter distance was selected to allow comparisons of the density of tobacco retailers around schools by distance to the front entrance of schools (0 to 100 meters vs. 101 to 200 meters), and the same distance (200 meters) was used for neighborhoods to allow comparisons between schools and neighborhoods. Printed maps with distance marks (101- and 200-meter radius marks) were used to assist the auditor in identifying the stores located within 200 meters of a school or a neighborhood. The auditor walked through all streets within the 200-meter radius of schools and neighborhoods between 9:00 to 18:00 during December 2014 and January 2015. All stores that sold tobacco products were observed and recorded using a validated audit tool on an iPhone with the iSurvey application.

Validation study

A sub-sample of 6 locations (school or neighborhood) from the 72 selected locations was randomly selected for validation of the audit process. The validation study was conducted by another researcher who did not engage in other data collection activities for this study. Training was provided to this researcher on how to perform in-store audits.

Measures

The audit form was designed to capture information on the following items: (1) store demographics (e.g. store name and store type); (2) availability and characteristics of
tobacco products; (3) presence of a display tobacco retail license; and, (4) tobacco control
signs (e.g. smoke-free sign and no sales to minors sign) posted in tobacco retail stores.

Store measures

Stores were classified into the following seven categories: (1) convenience store; (2) small supermarket; (3) supermarket; (4) tobacco and alcohol shop; (5) fruit store; (6) nuts, dried fruits, and seeds store; and, (7) other store types (including newsstands).

Availability and characteristics of tobacco products

The availability of tobacco products in a store was determined through in-store
observations. Types of tobacco products available in stores were recorded, including: (1) regular cigarettes; (2) menthol cigarettes; (3) female-targeted cigarettes; (4) cigarillos or little cigars; (5) large cigars; (6) e-cigarettes; and, (7) other tobacco products. We also collected information on whether the stores sold flavored tobacco products and/or single tobacco products. The female-targeted cigarettes were defined as those that had strong feminine characteristics such as being long and slim flavored to taste like fruit or roses, or contained other feminine design elements on the package. Based on our preliminary study on tobacco retail stores near schools in May 2015 in Changsha and online searches,[118] we identified 16 female-targeted cigarettes with clear and strong feminine characteristics.

Tobacco retail license and tobacco control signs

Data were also collected on whether a tobacco retail license and tobacco control
signs were visibly displayed in a store. Tobacco control signs include ‘smoke-free’ and ‘no sales to minor’s signs. The Chinese Youth Protection Law prohibits selling tobacco products to people under age of 18, and tobacco retailers are required to display a ‘no sales to minors’ sign that can easily be seen by customers.[112]

Tobacco retail store density

The density of tobacco retail stores around a school or a residential neighborhood was calculated by dividing the number of tobacco retail stores at a location (school or neighborhood) by the eligible study area at the location. For each school, the eligible study area was the area within 200 meters of the front entrance of a school but not covered by the school, because schools are usually gated areas and we did not have access to the inside. Additionally, we assumed that there was no tobacco retail store inside a school. Therefore, the eligible study area for a school was calculated by subtracting the area covered by the school within 200 meters from the front entrance, from the total area of the 200 meter radius. For residential neighborhoods, the eligible study area for each neighborhood was the area within 200 meters of the entrance of a neighborhood. As stores often exist both inside and outside of residential neighborhoods in Changsha, thus, the areas inside and outside of a neighborhood were counted as eligible.

Statistical Analyses

To test interrater reliability, Krippendorf’s alpha was computed for 5 key survey items, including the availability of menthol cigarettes, female-targeted cigarette, light/low
tar cigarettes, cigarillos/little cigars, and large cigars. Only the 52 stores that were audited in both the present study and the validation study were included in the interrater reliability analysis.

Descriptive analyses were performed to estimate the density of tobacco retail stores, availability of different types of tobacco products, and the display of tobacco retail license and tobacco control signs in tobacco retail stores around schools and in neighborhoods. T-tests and chi-square tests were performed to test variations in density of tobacco retail stores and other related tobacco retail characteristics by location type (school or neighborhood), by distance to school (0-100 meters vs. 101-200 meters from a school), and by average property price (low, medium and high) in neighborhoods.

Survey weights and design features were taken into account in the analyses. Survey design features included clustering and stratification. Survey weights were first calculated for each location (school or neighborhood) based on the sampling plan. As the school and neighborhood samples were randomly selected, we then assumed that tobacco retail stores within 200 meters of the selected schools and neighborhoods were representative of all the stores within 200 meters of schools and neighborhoods in the city. Therefore, we applied the weight of each location to each corresponding observed store. The analysis was performed using the SAS software, version 9.3 (SAS Institute, Inc., Cary, North Carolina).

4.3. Results

In total, 739 stores were audited, with 308 around schools and 431 in residential neighborhoods. The Krippendorf’s alpha statistic was above 0.65 for all items, except the
item assessing whether low/light tar cigarettes were sold in the tobacco retail store. Therefore, in this paper we will not report any results for low/light tar cigarettes.

Table 2 shows the total number of stores at each location, average number of stores per location, as well as the density of tobacco retail stores by location type (school or neighborhood). On average, about 3 tobacco retail stores were located within 100 meters of a school, and 6.7 tobacco retail stores within 100 to 200 meters of the front entrance of a school. The density of tobacco retail stores was 196.9 per km$^2$ within 100 meters of a school, which was significantly higher compared to 64.7 per km$^2$ in the area 101-200 meters away from a school (p=0.0406). In residential neighborhoods, there were 12.5 tobacco retail stores per neighborhood on average, and the density of tobacco retail stores was 99.7 per km$^2$. The density of tobacco retail stores was higher in neighborhoods with medium and high property price compared to those with a low property price, though the difference was not statistically significant. Compared to neighborhoods, the total number of tobacco retail stores (un-weighted) was significantly lower within 200 meters of the front entrance of schools (p=0.0013); however, the weighted average number of and the density of tobacco retail stores within 200 meters was not significantly different from that in residential neighborhoods.
The majority of tobacco retail stores were convenience stores, small supermarkets or supermarkets, and about 15% were tobacco shops (or tobacco and alcohol shops) (Table 3). The store type did not significantly differ by school and neighborhood.

<table>
<thead>
<tr>
<th>Store type</th>
<th>Overall (%)</th>
<th>School (%)</th>
<th>Neighborhood (%)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food store</td>
<td>59.0</td>
<td>67.5</td>
<td>58.4</td>
<td>0.0151</td>
</tr>
<tr>
<td>Tobacco shop</td>
<td>15.3</td>
<td>12.2</td>
<td>15.5</td>
<td>0.2486</td>
</tr>
<tr>
<td>Fruit store</td>
<td>8.0</td>
<td>7.1</td>
<td>8.1</td>
<td>0.5974</td>
</tr>
<tr>
<td>Kiosk</td>
<td>5.4</td>
<td>2.0</td>
<td>5.6</td>
<td>0.1823</td>
</tr>
<tr>
<td>Other</td>
<td>12.3</td>
<td>10.8</td>
<td>12.4</td>
<td>0.2988</td>
</tr>
</tbody>
</table>

Note: Food store include convenient stores, small markets, and supermarkets (the same below).  
*P-value for comparison between schools and neighborhoods.

Table 3. Tobacco retail stores by store type and location type
The types of tobacco products sold near schools were similar to those sold in residential neighborhoods (Table 4). Menthol cigarettes were available in over half of the tobacco retail stores around schools and in neighborhoods. Within 200 meters of a school, the availability of menthol cigarettes did not significantly differ by the distance to a school, and no significant variation was observed across neighborhoods in different levels of average property price. The availability and the patterns of female-targeted cigarettes were similar to that of menthol cigarettes. Cigarillo and little cigars were available in 26% of tobacco retail stores, with no significant variations by location type (school or neighborhood), distance to school, or the neighborhood average property price. The prevalence of selling large cigars was high (39.1%), and it was more prevalent in neighborhoods with medium property prices than neighborhoods with lower or higher property prices (p=0.0049); whereas around schools, the availability of large cigars did not vary by distance to a school. Few stores sold e-cigarettes (0.1%).

<table>
<thead>
<tr>
<th></th>
<th>Menthol cigarettes</th>
<th>Female targeted cigarettes</th>
<th>Cigarillo/little cigars</th>
<th>Large cigars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>54.4</td>
<td>54.3</td>
<td>26</td>
<td>39.1</td>
</tr>
<tr>
<td>Schools</td>
<td>51.1</td>
<td>47.6</td>
<td>20.8</td>
<td>31.6</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>54.6</td>
<td>54.7</td>
<td>26.3</td>
<td>39.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School (%)</th>
<th>Menthol cigarettes</th>
<th>Female targeted cigarettes</th>
<th>Cigarillo/little cigars</th>
<th>Large cigars</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100 meters</td>
<td>45</td>
<td>42.5</td>
<td>21.5</td>
<td>28.7</td>
</tr>
<tr>
<td>101–200 meters</td>
<td>54.2</td>
<td>50.5</td>
<td>20.8</td>
<td>32.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neighborhood (%)</th>
<th>Menthol cigarettes</th>
<th>Female targeted cigarettes</th>
<th>Cigarillo/little cigars</th>
<th>Large cigars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>42.6</td>
<td>48.6</td>
<td>17.3</td>
<td>31.7</td>
</tr>
<tr>
<td>Medium</td>
<td>55.5</td>
<td>54.8</td>
<td>27.2</td>
<td>41.4</td>
</tr>
<tr>
<td>High</td>
<td>55.2</td>
<td>57.3</td>
<td>24.9</td>
<td>31.3</td>
</tr>
</tbody>
</table>

Note: * P-value for comparison by locations (schools/neighborhoods), store types, or distance from a school, or average property price levels.

Table 4. Types of products sold within neighborhoods and around schools
Less than half of tobacco retail stores had a tobacco retail license visibly displayed in the store, and no significant difference was observed between the stores near schools and those in neighborhoods (Table 5). About one in five tobacco retail stores had a visible ‘smoke-free’ sign, with a significantly lower percentage of stores displaying such a sign around schools compared to those in neighborhoods (p=0.0026). In neighborhoods, tobacco shops and other types of stores had significantly lower rates of having a ‘smoke-free’ sign than food, fruit and nuts stores (p=0.0008). ‘No sales to minors’ signs were observed in 22.2% of the stores, with no significant difference between schools and neighborhoods. Around schools, tobacco shops had a significantly higher percentage of stores that had a ‘no sales to minors’ sign than other types of stores.

<table>
<thead>
<tr>
<th>Store type</th>
<th>Having a visible tobacco license %</th>
<th>p</th>
<th>Having a ‘smoke-free’ sign %</th>
<th>p</th>
<th>Having a ‘no sales to minors’ sign %</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>42.8</td>
<td>p</td>
<td>19.6</td>
<td>p</td>
<td>22.2</td>
<td>p</td>
</tr>
<tr>
<td>Schools</td>
<td>43.0</td>
<td>0.3174*</td>
<td>9.7</td>
<td>&lt;0.0001*</td>
<td>17.5</td>
<td>0.1626*</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>43.0</td>
<td></td>
<td>20.3</td>
<td></td>
<td>22.6</td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food store</td>
<td>43.7</td>
<td>0.2313§</td>
<td>10.7</td>
<td>0.2311§</td>
<td>16.1</td>
<td>0.0045§</td>
</tr>
<tr>
<td>Tobacco shop</td>
<td>46.5</td>
<td></td>
<td>14.0</td>
<td></td>
<td>30.1</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>14.3</td>
<td></td>
<td>0</td>
<td></td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-100 meters</td>
<td>39.6</td>
<td>0.7750§</td>
<td>13.1</td>
<td>&lt;0.0001§</td>
<td>20.4</td>
<td>0.5444§</td>
</tr>
<tr>
<td>101-200 meters</td>
<td>40.7</td>
<td>8.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighborhoods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food store</td>
<td>50.6</td>
<td>&lt;0.0001§</td>
<td>26.5</td>
<td>&lt;0.0001§</td>
<td>24.0</td>
<td>0.0215§</td>
</tr>
<tr>
<td>Tobacco shop</td>
<td>44.6</td>
<td>7.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>13.6</td>
<td>8.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighborhoods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>48.9</td>
<td>0.5505§</td>
<td>11.3</td>
<td>0.5918§</td>
<td>21.3</td>
<td>0.9238§</td>
</tr>
<tr>
<td>Medium</td>
<td>42.9</td>
<td>21.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>40.6</td>
<td>17.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Food stores include convenience stores, small supermarkets, supermarkets, fruit stores, and nuts stores.

* P-value for comparison between schools and neighborhoods.

§ P-value for comparison by store types, or distance from a school, or average property price levels.

Table 5. Display of tobacco retail license and tobacco control signs by location type and store type.
4.4. Discussion

This study observed a high density of tobacco retail stores within 100 meters of schools, even though tobacco retail sales in this area are prohibited. Over 98% of schools had at least one tobacco retail store within 100 meters of the front entrance of a school, and surprisingly, about 40% of tobacco retail stores located within 100 meters of a school had a visible tobacco retail license. These findings suggest low compliance and little enforcement of tobacco retail zoning regulation in Changsha, China.

Compared to what has been reported in Hangzhou China and in other countries, Changsha is likely to have a much higher tobacco retail store density near schools, although the measures of tobacco retail store density vary across studies. In 2010, Gong et al. conducted a study in the city of Hangzhou in east China and found an average of 20.6 tobacco retail stores within a 400-meter radius of schools and over 80% of schools had at least one tobacco retail store within a 100-meter radius.[76] In the U.S., studies reported an average of 11.1 tobacco retail stores in a 1-mile (1609 meter) radius of schools.[17] In Canada, an average of 2.68 tobacco retail stores within a 1-kilometer buffer of schools was reported.[22] In New Zealand, about half of all secondary schools had at least one tobacco retailer within a 500-meter walk.[119]

We also found a high density of tobacco retail stores in neighborhoods. On average, there were 12.5 tobacco retail stores within 200 meters of the front entrance of neighborhoods. These findings may be similar to the findings in a study conducted in Hangzhou, which reported an average of 12.2 tobacco retail stores per neighborhood.[76] though the definition of a neighborhood and the study area for each neighborhood was different from those used in our study. In Canada, an average of about 6 tobacco retail
stores was reported within a six-block radius.[21] In the US, a study reported an average of 1.5 tobacco retail stores in 500-meter buffers in neighborhoods.[23] These findings indicate that the density of tobacco retail stores is likely much higher in China compared to Western countries. Residential neighborhoods are important because, like schools, youth are most likely to be exposed to tobacco retail stores in residential neighborhoods.[120] Our findings suggest that Chinese youth have a high exposure to tobacco retail sales in neighborhoods. Zoning regulations should be considered in residential areas, in addition to the ones that are in place (but, not enforced) near schools.

Studies have shown that tobacco companies have a long history of targeting lower socioeconomic neighborhoods in countries such as the Australia.[121] However, we did not observe a significant variation in the density of tobacco retail stores by neighborhood-level average property price. This may be because of the extremely high population density in cities in China, and neighborhoods with different levels of average property price can be very close to each other and share the same nearby retail stores. In addition, all neighborhoods included in this study were located in an urban area of Changsha city; therefore, the characteristics of neighborhoods tended to be similar,[120] and so did the density of tobacco retail stores by neighborhood average property price. Furthermore, research has shown that how a neighborhood is defined influences measurements of youths’ access to tobacco retailers.[120] We defined neighborhood based on residential community (‘xiao qu’ or ‘lou pan’) where there is a group of similar residential buildings in a gated or un-gated area. Therefore, the neighborhoods we studied were large residential areas, and scattered housing units were excluded. In the literature, neighborhoods have been defined on the basis of census tracts, city blocks, or egocentric
buffers, which may include some non-residential areas.[120] Thus, neighborhoods in the present study may be more similar to each other than what has been defined in the literature.

The overall high density of tobacco retail stores both near schools and in neighborhoods may be partially due to widespread lack of enforcement of regulations and policies, as well as the high threshold set by the TMB. Gong et al. found that the density of tobacco retail stores in neighborhoods was lower than the standards set by local TMB in Hangzhou in 2010, and they mentioned that the standards set by TMB were too high for public health.[76] While the TMB is responsible for monitoring and enforcing these regulations, our findings indicate that the TMB has failed to do so. For example, 40% of tobacco retail stores located within 100 meters of the front entrance of schools was issued a tobacco retail license, though tobacco retail sales are prohibited in this area. Moreover, various types of stores can sell tobacco products in China, including convenience stores, grocery stores, fruit stores, stationary stores, hardware stores, kiosks, and construction material stores. This may greatly increase the density of tobacco retail sales as well.

A good licensing system enables effective and efficient monitoring of tobacco sales. Though retail stores are required to have a tobacco retail license to sell tobacco products in China, we found less than 50% had a license visibly displayed in the store. Given that a large proportion of stores did not have a tobacco retail license (or had one that was not exhibited), there is the suggestion of a lack of monitoring and inspection of tobacco retail stores. Similarly, even though all tobacco retail stores are required to post a sign indicating ‘no sales to minors’ visible to customers, Gong et al. found only 1% of tobacco retail stores exhibited such a sign in Hangzhou in 2010.[76] Though we found a
higher prevalence of stores that exhibited a visible ‘no sales to minors’ sign in Changsha, it was still low, which also suggests low implementation and enforcement of Article 16 of the FCTC, Chinese Youth Protection Law and the local regulation of tobacco retail environment.

The State Tobacco Monopoly Administration (STMA) takes the lead in implementing tobacco control policies in China and has responsibility for the China National Tobacco Corporation (CNTC), which creates a conflict of interest that could undermine tobacco control efforts.[122] Our findings support the recommendation to eradicate this fundamental and irreconcilable conflict between the tobacco industry’s interests and public health policy interests to allow better enforcement of tobacco control policies in China.

One limitation of this study is that data were collected by observation, which may result in an underestimate of some estimates. For example, to count as having a tobacco retail license, the store had to have a tobacco retail license visibly displayed in the store. However, due to little monitoring and inspection performed by the TMB, it is possible that some licensed stores did not display their license. This study is also limited by the fact that we did not have a complete list of tobacco retail stores in the city. Consequently, we had to identify tobacco retail stores by walking through all streets in the study area. Thus, we might have missed tobacco retail stores that were in some hidden places or temporarily closed.
4.5. Conclusion

Tobacco retail store density near schools is high in Changsha, suggesting low compliance and little enforcement of tobacco retail zoning regulation in Changsha, China. Since Chinese tobacco companies are focusing more on tobacco retail stores in recent years and capitalizing on increasing tobacco use among Chinese youth, it is critical to enforce regulations that protect youth from the risk associated with tobacco retail environments and to identify effective approaches to better regulate tobacco retail stores in Changsha, China.

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Chapter 5: Tobacco marketing at tobacco point-of-sale in Changsha, China

5.1. Introduction

Regulations on tobacco advertising have become stricter in many countries, especially on traditional media channels such as broadcasting, print and outdoor billboards.[115] In response to these restrictions, the tobacco industry has increasingly turned to tobacco point-of-sale to market their products in many countries such as the U.S. and Australia.[26 87-88] Similar to the tobacco industries in these countries, China Tobacco (also called ‘China National Tobacco Corporation’) has also been focusing more on point-of-sale advertising and marketing activities in recent years and enormous efforts have been made to enhance the tobacco retail environment.[90 123]

For instance, in 2004, China Tobacco Hunan Industrial Corporation started a tobacco retail chain called ‘Hunan 636 Retail Chain’ with goals to serve as an example for other tobacco retail stores.[90] In addition, starting in 2007, China Tobacco Hunan Industrial Corporation has been training managers of convenience stores and small supermarkets on how to display and advertise tobacco products within stores. After training, these stores receive the ‘Zijing Tobacco Retail Store’ certification, which requires them to display tobacco products in cabinets, designed by tobacco companies, inside the stores and to place ‘Zijing’ signs inside and outside of the stores.[124] As of April 2015, there were about 2700 Zijing tobacco retail stores in the city of Changsha.[125]
In China, both youth and adults report having a high awareness of tobacco advertising and promotion. In 2014, about half of middle school students aged 13 to 15 years reported regular exposure to some form of tobacco advertising, promotion, and sponsorship during the last 30 days, and over 40% of them reported noticing some form of tobacco advertising at the point-of-sale in the past 30 days.[126] According to the 2010 Global Adult Tobacco Survey (GTAS), about 4% of Chinese men and women aged 15 and older reported noticing tobacco advertising, promotions, or sponsorships in retail stores.[127] A study that compared smokers’ awareness of tobacco advertising in four countries showed that 30% of Chinese smokers reported noticing tobacco advertising in stores, and smokers’ awareness of tobacco advertising was significantly higher in China compared to other countries such as Thailand and Australia.

To date, the literature has shown that point-of-sale tobacco advertising, promotion, and sponsorship: 1) encourages youth smoking uptake,[17-18] 2) increases total tobacco consumption,[24 27] 3) misleads youth about the availability, use and popularity of cigarettes,[27] 4) enhances positive brand imagery,[25] 5) undermines quit attempts,[26] and, 6) increases tobacco-related disparities, as tobacco companies have a long history of targeted marketing toward low-income and minority populations.[121] Banning advertising, promotion, and sponsorship are among the most effective approaches to reduce tobacco consumption.[92] Countries that have introduced bans demonstrated a 7% population-wide reduction in tobacco consumption.[92] Similarly, point-of-sale tobacco displays have been shown to stimulate impulse purchases, play an important role in brand selection, tempt smokers who are trying to quit, and inflate the perceived prevalence of tobacco smoking and the belief that tobacco products are as
normal as other daily supplies.[128] In addition, a review on tobacco marketing restrictions reported that point-of-sale displays are the least-regulated marketing practice.[115] In China, point-of-sale tobacco displays have not yet been studied. One study that audited tobacco retail stores in Hangzhou (east China) reported that 12.4% of tobacco retail outlets had tobacco advertisements; however, they did not assess tobacco promotions and displays in tobacco retail stores.

The 2015 Chinese Tobacco Advertisement Law provides a wider ban on tobacco marketing than the 1995 advertising law, but point-of-sale tobacco marketing practices are still not restricted.[129] This provides the tobacco industry with an opportunity to pursue more tobacco marketing practices in tobacco retail stores. In order to support regulation of point-of-sale marketing practices in China, evidence on how prevalent and extensive these tobacco marketing practices is needed. The objective of this study was to examine tobacco advertising, promotion, and tobacco display as well as cigarette price in tobacco retail stores near schools and in neighborhoods in Changsha, China.

5.2. Methods

Study setting

We conducted this study in the city of Changsha in December 2014 and January 2015. As the capital city of Hunan province in south-central China, Changsha is a typical mid-sized city in terms of municipality area, population size and economic development in China. According to the 2010 Census, it has a population of over 7 million residents with 3.6 million in the urban areas, ranking 14th among 28 capital cities in China.[130] The municipality area of Changsha covers 11,819 square kilometers (4,563 square miles),
ranking 13th among 28 capital cities in China.[130-131] In 2011, Changsha generated a GDP of 562 billion RMB (≈8.9 billion U.S. dollars), ranking 7th among capital cities in China.[112] One of the main industries in the city of Changsha is tobacco production, which earned 2.4 billion RMB (384 million U.S. dollars) and generated 60.2 billion RMB (9.6 billion U.S. dollars) in tax revenue in 2014, accounting for 42.3% of the tax revenues of Changsha city.[117]

Sample selection

Schools

A list of 344 schools, including elementary and middle/high schools, in Changsha urban areas was obtained from the local government website (http://www.changsha.gov.cn). We sampled schools using a two stage cluster random sampling method. We selected two districts that cover the majority of the city center and one of the remaining three surrounding districts was randomly selected in the city of Changsha, and then 12 schools from each of the selected districts were sampled using systematic random sampling. In order to ensure the inclusion of both elementary and middle/high school, schools were sorted by school type (elementary or middle/high school) in each district before the second stage sampling.

Residential neighborhoods

For each district in the city, a list of residential neighborhoods was obtained from the largest and most comprehensive Chinese property information website (http://www1.fang.com/). We defined a residential neighborhood as an area where the residential buildings were built in a similar style by the same construction company and
were under the same property management, with or without gates to access the neighborhood. The average neighborhood property price was used as a proxy of socioeconomic status of the residents in the neighborhood, and it was classified into low, medium, and high levels of average property price. The low average property price was defined per square meter as those lower than 5,000 RMB (≈806 U.S. dollars), the medium average property price was defined as those was 5,000-8,000 RMB (≈806-1290 U.S. dollars) per square meter, and the high average property price was defined as those greater than 8,000 RMB (≈1290 U.S. dollars) per square meter. In order to allow comparisons across low, medium and high average property price neighborhoods, neighborhoods were stratified by average price in each district, and then systematic random sampling was performed in each stratum to randomly select 4 neighborhoods in the three districts that were selected for school sampling. Thus, a total of 36 neighborhoods were sampled from the three districts. Because all tobacco retail stores within 200 meters of the sampled schools/neighborhoods would be audited, the sampling was performed to avoid overlap between the 200 meter radius of a sampled school and the 200 meter radius of a sampled neighborhood. When there was a sampled neighborhood overlapping with a school sample, the neighborhood was excluded and replaced by another neighborhood through random sampling.

**Data collection protocol**

All tobacco retail stores within a 200 meter radius of the selected schools or entrance to neighborhoods were audited. The trained auditor walked through all streets to identify tobacco retail stores located within the 200 meter radius of schools/neighborhoods using printed maps with distance marks (101 and 200 meter
radius marks). A validated audit tool on an iPhone with the iSurvey application was used to collect data of interest. This audit tool was adapted from the audit forms used by Rose et al. and Klein et al.[106 108]

**Validation study**

Six locations (school/neighborhood) from the 72 sample locations were randomly selected for a validation study. The validation study was conducted by a different researcher who was also trained on how to perform in-store audits; and a standard script was used to make sure that the audit was conducted consistently.

**Measures**

The validated audit form included information on type of store, tobacco product availability, presence of exterior and interior tobacco advertising and promotion, as well as tobacco product displays in the stores.

**Exterior tobacco advertising and promotion**

The presence of tobacco advertisements outside of a store was recorded. If there was one, information was further collected on whether the advertisement was a tobacco advertisement in general or one for certain tobacco brand. We also recorded the number of tobacco advertisements that were small size (< 1 meter in any dimensions) and large (>= 1 meter in any dimensions). In addition, the overall impression of exterior tobacco advertising was measured and classified into four categories: no ads, discreet, moderate, or obvious. ‘Discreet’ was defined as tobacco advertisements can barely be seen at first
glance outside of a store. ‘Moderate’ was defined as tobacco advertisements can easily be seen: (1) there is one advertisement greater than 0.3 meters in any dimension or (2) there are two advertisements and all of them are less than 1 meter in any dimension. ‘Obvious’ was defined as more than 1 tobacco advertisement and at least one of the advertisements is more than 1 meter in any dimension. We also measured the availability of tobacco promotions and types of the promotions (e.g., regular price advertised, special price on 1 product, and multi-buy) outside of tobacco retail stores.

Interior tobacco advertising and promotion

The presence of branded signs, branded shelving units, and branded displays was measured. If present, the brand advertised was recorded. Interior tobacco promotions were measured the same way as exterior tobacco promotions.

Tobacco product displays

The auditor first assessed overall displays of tobacco products in the store by examining where products were visible and where the majority of products were displayed. For both items, the response options included (select all that apply): 1) on, above, behind, or in a cabinet at a primary checkout counter; 2) on, above, behind, or in a cabinet at another counter; 3) on, above, or in a separate display cabinet in the front of the store; 4) visible from the outside of the store (tobacco displays in glass cabinet intended to be visible from the outside of the store); or 5) located elsewhere in the store.
For each type of tobacco product (e.g., cigarettes in general, menthol cigarettes, female-targeted cigarettes, and large cigars), we further measured whether the product was displayed within 1 meter of the floor and/or within 0.3 meters of toys, candy or gum, slushy/soda machines, or ice cream, and whether there were self-service displays.

Cigarette price

The price of the cheapest cigarette sold in the store and the price of Furongwang (Hard Blue) and Baisha cigarettes (the second generation of Fine Baisha) were collected by reading price tags or by asking clerks in the store. Furongwang and Baisha are the most popular local brands in Changsha, and they are also among the popular brands nationwide.[132-133]

Statistical Analyses

To assess interrater reliability, Krippendorf’s alpha statistic was computed for key survey items such as Zijing advertisement. Only the 52 stores that were audited in the validation study were included for interrater reliability test.

Descriptive analyses were performed to estimate the prevalence of exterior and interior tobacco advertisements and promotions, the prevalence of stores that displayed products at the primary checkout counter and the prevalence of displays of tobacco within 1 meter of the floor and within 0.3 meters of toys, candy, slushy/soda machines, and ice cream. T-tests and chi-square tests were performed to test for variations in the
measures by location type (school/neighborhood), by distance to school (0-100 meters vs. 101-200 meters from a school), and by average property price levels (low, medium and high) in neighborhoods.

Survey weights and design features were taken into account in the analyses. Survey design features included clustering and stratification. Survey weights were first calculated for each location (school/neighborhood) based on the sampling plan. As the school and neighborhood samples were randomly selected, we assumed that tobacco retail stores within a 200 meter radius of the selected schools and neighborhoods were representative of all the stores within a 200 meter radius of schools and neighborhood in the city. Therefore, we applied the weight for each location (school/neighborhood) to each corresponding observed store. The analysis was performed using the SAS software, version 9.3 (SAS Institute, Inc., Cary, North Carolina).

5.3. Results

A total of 739 tobacco retail stores were audited. All weighted total estimates were for areas near neighborhoods and schools only, and the total estimates were primarily driven by neighborhood estimates because neighborhoods carried heavier weights than schools. Table 6 shows the number of tobacco retail stores by location. The average number of stores per location did not significantly differ by location (school/neighborhood). The prevalence of outdoor tobacco advertising is reported in Table 7. About one in four tobacco retail stores had at least one outdoor tobacco advertisement, which was mainly a general advertisement versus one for a certain brand,
and outdoor advertisements were more prevalent in neighborhoods than near schools (p=0.0015). About 5% of tobacco stores were Zijing Tobacco Retail Store. With regard to size, 7.4% of tobacco retail stores had at least one exterior tobacco advertisement less than 1 meter in any dimension, and over 21% had at least one advertisement that was 1 meter or greater in any dimension. The overall impression of tobacco advertising outside of stores near schools was similar to that in neighborhoods. Over 10% of stores had an overall advertisement impression of ‘obvious’.

<table>
<thead>
<tr>
<th>Number of stores</th>
<th>Average number of stores per location</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>739</td>
<td>12.2</td>
</tr>
<tr>
<td>Schools</td>
<td>308</td>
<td>9.1</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>431</td>
<td>12.5</td>
</tr>
<tr>
<td>Schools</td>
<td>0-100 meters</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>101 - 200 meters</td>
<td>6.7</td>
</tr>
<tr>
<td>Neighborhood</td>
<td>Low</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>12.3</td>
</tr>
</tbody>
</table>

Note: Low -- low average property price of a neighborhood (<5000 RMB); Medium -- medium average property price of a neighborhood (5000 - 8000 RMB); High -- high average property price of a neighborhood (> 8000 RMB) (the same below).

a P-value for comparison between schools and neighborhoods
b P-value for comparison by distance from a school or average property price levels.
c un-weighted frequency
d weighted estimates

Table 6 Number of tobacco retail stores by location type
Table 7 Exterior tobacco advertising features, by location

<table>
<thead>
<tr>
<th></th>
<th>Total (%)</th>
<th>School (%)</th>
<th>Neighborhood (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertisement availability</td>
<td>25.2</td>
<td>23.2</td>
<td>25.3</td>
<td>0.4775</td>
</tr>
<tr>
<td>Tobacco ad in general</td>
<td>20.5</td>
<td>16.1</td>
<td>20.8</td>
<td>0.0015</td>
</tr>
<tr>
<td>Ad for certain cigarette brand</td>
<td>0.37</td>
<td>0.39</td>
<td>0.37</td>
<td>0.9698</td>
</tr>
<tr>
<td>Zijing ad</td>
<td>4.8</td>
<td>6.6</td>
<td>4.7</td>
<td>0.9698</td>
</tr>
<tr>
<td>Advertisement size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small (&lt;1 meter)</td>
<td>7.2</td>
<td>4.1</td>
<td>7.4</td>
<td>0.0454</td>
</tr>
<tr>
<td>Large (&gt;=1 meter)</td>
<td>21.2</td>
<td>20.0</td>
<td>21.3</td>
<td>0.7925</td>
</tr>
<tr>
<td>Overall ads Impression</td>
<td></td>
<td></td>
<td></td>
<td>0.5959</td>
</tr>
<tr>
<td>Discreet</td>
<td>3.5</td>
<td>4.9</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>10.3</td>
<td>6.3</td>
<td>10.6</td>
<td></td>
</tr>
<tr>
<td>‘Obvious’</td>
<td>10.1</td>
<td>11.2</td>
<td>10.0</td>
<td></td>
</tr>
</tbody>
</table>

Note: p-value for comparison between schools and neighborhoods.
‘Small’ advertisement was defined as tobacco advertisement that was less than 1 meter in any dimension. ‘Large’ advertisement was defined as tobacco advertisement that was greater than 1 meter in any dimension.

Table 8 Percentages of stores with interior tobacco advertising, by location

<table>
<thead>
<tr>
<th></th>
<th>Total (%)</th>
<th>Schools (%)</th>
<th>Neighborhood (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branded shelving units</td>
<td>2.0</td>
<td>3.2</td>
<td>1.9</td>
<td>0.5494</td>
</tr>
<tr>
<td>Branded signs</td>
<td>15.5</td>
<td>8.3</td>
<td>15.9</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Branded displays</td>
<td>0.17</td>
<td>0</td>
<td>0.18</td>
<td></td>
</tr>
</tbody>
</table>

Note: p-value for comparison between schools and neighborhoods.
"Small" advertisement was defined as tobacco advertisement that was less than 1 meter in any dimension. 'Large' advertisement was defined as tobacco advertisement that was greater than 1 meter in any dimension.
Table 7 Exterior tobacco advertising features, by location

Tobacco advertising inside of the stores was less prevalent than outdoor advertising. Almost 16% of tobacco retail stores had at least one tobacco advertisement (Table 8), and it was more prevalent in tobacco shops (62.5%) than other types of stores (e.g. 7.2% in food stores). The most commonly advertised cigarette brands in the stores were Furongwang (20.8%), Baisha (20.1%) and Hetianxia (23%), which are the most popular local brands in Changsha. Few stores had branded units or branded displays.
With regard to the location of tobacco product displays, over 70% of stores displayed tobacco products at the primary checkout counter, and almost half (44%) displayed products in a way that was visible from outside of the store (Table 9). Strategies tobacco companies often used to target children in retail stores included displaying tobacco products within 1 meter of the floor and within 0.3 meters of toys, candy, gum, soda machines, and ice cream etc. We found that these marketing strategies were extremely pervasive in Changsha where 83% of stores displayed cigarettes within 1 meter of the floor and almost 60% of stores displayed cigarettes within 12 inches of toys, candy, gum, and similar products (Table 10). Moreover, these strategies were more prevalent in stores near schools compared to those in neighborhoods. Furthermore, we also found that the display of cigarettes within 0.3 meters of toys, candy, gum, etc. was significantly more prevalent in stores within a 100-meter radius of schools compared to stores located in a 101- to 200-meter radius of the schools.

<table>
<thead>
<tr>
<th>Tobacco product display</th>
<th>Total (%)</th>
<th>Schools (%)</th>
<th>Neighborhoods (%)</th>
<th>(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At primary checkout counter</td>
<td>73.3</td>
<td>73.4</td>
<td>73.3</td>
<td>0.9221</td>
</tr>
<tr>
<td>At another counter</td>
<td>21.6</td>
<td>19.1</td>
<td>21.8</td>
<td>0.5280</td>
</tr>
<tr>
<td>Separate cabinet in the front</td>
<td>19.1</td>
<td>19.6</td>
<td>19.1</td>
<td>0.9108</td>
</tr>
<tr>
<td>Display visible from outside</td>
<td>43.6</td>
<td>45.2</td>
<td>43.5</td>
<td>0.6492</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Majority tobacco product display</th>
<th>Total (%)</th>
<th>Schools (%)</th>
<th>Neighborhoods (%)</th>
<th>(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At primary checkout counter</td>
<td>73.0</td>
<td>73.0</td>
<td>73.0</td>
<td>0.9956</td>
</tr>
<tr>
<td>At another counter</td>
<td>15.5</td>
<td>14.8</td>
<td>15.5</td>
<td>0.8447</td>
</tr>
<tr>
<td>Separate cabinet in the front</td>
<td>18.9</td>
<td>18.3</td>
<td>19.0</td>
<td>0.8719</td>
</tr>
<tr>
<td>Display visible from outside</td>
<td>41.9</td>
<td>43.2</td>
<td>41.8</td>
<td>0.7418</td>
</tr>
</tbody>
</table>

Note: \(p\)-value for comparison between schools and neighborhoods.

Table 9 Interior tobacco displays, by location.
Product displays varied by type of tobacco products. About 44% and 31% of stores displayed menthol cigarettes within 1 meter of the floor and within 0.3 meters of toys, candy, gum, etc., respectively, and no significant variation was observed by location (Table 10). Similar patterns were observed for female-targeted cigarettes. About 24% of stores displayed cigarillos/little cigars within 1 meter of the floor and 13% of the stores displayed such products within 0.3 meters of toys, candy, and gum. About 35% and 25% of stores displayed large cigars within 1 meter of the floor and within 0.3 meters of toys, candy and gum, respectively. No significant variations were observed in the displays of cigarillos/little cigars and large cigars by location (school/neighborhood). Tobacco product self-service displays were rarely found in tobacco retail stores.
## Table 10
Cigarette displays in tobacco retail stores, by cigarette type and location.

<table>
<thead>
<tr>
<th></th>
<th>Within 1 meter of the floor (%)</th>
<th>Within 0.3 meters of toys and candy etc. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarettes in general</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>82.9</td>
<td>58.9</td>
</tr>
<tr>
<td>Schools</td>
<td>88.2</td>
<td>69.6</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>82.6</td>
<td>58.2</td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-100 meters</td>
<td>91.3</td>
<td>75.0</td>
</tr>
<tr>
<td>101-200 meters</td>
<td>87.2</td>
<td>66.4</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>85.2</td>
<td>57.8</td>
</tr>
<tr>
<td>Medium</td>
<td>82.5</td>
<td>57.3</td>
</tr>
<tr>
<td>High</td>
<td>81.9</td>
<td>64.5</td>
</tr>
<tr>
<td>Menthol cigarettes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44.2</td>
<td>30.5</td>
</tr>
<tr>
<td>Schools</td>
<td>46.7</td>
<td>35.4</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>44.0</td>
<td>30.2</td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-100 meters</td>
<td>43.5</td>
<td>34.9</td>
</tr>
<tr>
<td>101-200 meters</td>
<td>47.9</td>
<td>34.4</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>36.4</td>
<td>21.2</td>
</tr>
<tr>
<td>Medium</td>
<td>44.5</td>
<td>30.0</td>
</tr>
<tr>
<td>High</td>
<td>44.7</td>
<td>36.3</td>
</tr>
<tr>
<td>Female targeted cigarettes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44.2</td>
<td>31.0</td>
</tr>
<tr>
<td>Schools</td>
<td>42.6</td>
<td>33.3</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>44.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-100 meters</td>
<td>39.7</td>
<td>32.3</td>
</tr>
<tr>
<td>101-200 meters</td>
<td>44.1</td>
<td>32.7</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>42.3</td>
<td>24.8</td>
</tr>
<tr>
<td>Medium</td>
<td>44.4</td>
<td>30.4</td>
</tr>
<tr>
<td>High</td>
<td>44.6</td>
<td>37.2</td>
</tr>
</tbody>
</table>

Note: * P-value for comparison between schools and neighborhoods.  
  b P-value for comparison by distance from a school or average property price levels.

Overall, the cigarette price was relatively stable across stores and locations. On average, the cheapest cigarette was about 4.2 RMB (≈70 cents in U.S. dollars) per pack.
We found no store had tobacco promotion inside or outside of the store.

5.4. Discussion

To our knowledge, this is the first study that has assessed tobacco promotions and displays in retail stores in China. We found that tobacco displays targeting children were pervasive, especially near schools. Although we observed no point-of-sale tobacco promotions, tobacco advertising, especially general tobacco advertisements, was common in the stores. These findings provide evidence that regulation of point-of-sale tobacco displays and tobacco advertising are urgently needed in Changsha, China.

Tobacco displays that targeted youth were prevalent, and they were more prominent near schools compared to neighborhoods. In addition, almost half (44%) of tobacco retail stores displayed tobacco products that were publicly visible from the outside of the store, which substantially increases the general public’s exposure to tobacco product displays. Point-of-sale tobacco display bans reduce exposure to tobacco marketing and impulse purchasing of cigarettes.[114-115] Australia and Canada have implemented such bans in recent years as studies found that extensive in-store tobacco displays alongside everyday items such as candy, soft drinks, and magazines helps to develop a sense of familiarity with tobacco products, reduce awareness of the serious health consequences of tobacco use, and increase perceived access to tobacco products among youth.[115] Regardless of whether Chinese tobacco companies intentionally target youth at the point-of-sale, the findings underscore the importance of implementing strategies to reduce the quantity and impact of tobacco displays to protect youth and
adults from such a high exposure to this marketing practice.

We found that the prevalence of tobacco advertising in tobacco retail stores was moderate in Changsha, with about one in four tobacco retail stores having outdoor advertisements and about 16% having branded signs inside the stores. This is similar to that which was reported in Hangzhou where 28% of tobacco retail stores displayed signs indicating that the store sold tobacco and 12.4% of the stores had branded tobacco advertisement.[76] Restricting point-of-sale advertising and promotion has been shown to reduce brand awareness among youth, smoking initiation, and smoking prevalence.[115] Therefore, many countries have adopted restrictions to limit point-of-sale advertising and promotion in the past few decades. For example, New Zealand banned point-of-sale tobacco advertising in 1998.[134] In the US, outdoor tobacco advertisements can be no more than 14 square feet (1.3 square meters) and are not allowed to include cartoons.[135] In the United Kingdom (UK), most forms of tobacco advertising and marketing at the point-of-sale were prohibited by the 2002 Tobacco Promotion and Advertising Act.[19] Unfortunately, as the largest tobacco consumer and producer in the world, China has no restriction on point-of-sale marketing practices. Given the substantial impact of point-of-sale advertising and promotion on smoking, restrictions should become part of efforts to protect youth from harmful exposures to tobacco marketing. This may lead to reduction in tobacco use in China.

One limitation of this study is that we did not have a complete list of tobacco retail stores in Changsha. Thus, we had to identify tobacco retail stores within 200 meters of schools/neighborhoods by walking through the streets in the area. Therefore, we might have missed some hidden or temporarily closed tobacco retail stores. In addition, we did
not have a device to measure the distance from a store to a school or neighborhood, therefore, the inclusion of stores on the border of the 200-meter radius was determined by the auditor based on printed maps with distance marks, which might result in over- or under-inclusion of tobacco retail stores.

5.5. Conclusion

Tobacco displays that target youth were extremely pervasive in tobacco retail stores in Changsha, China, especially near schools. Tobacco advertising at the point-of-sale was moderate; however, the concern is that it will increase since regulations on other channels of advertising have become stricter according to 2015 Chinese Advertising Law. More evidence is needed to highlight the extensive tobacco marketing practices targeting youth in tobacco retail stores in China. In addition, future studies should also focus on examining the impact of tobacco marketing strategies in tobacco retail stores on smoking behavior among Chinese youth and adults. Although this association has been well established in many countries in the world, similar research is scarce in China.
Chapter 6: The Availability of Smoking Cessation Medications and Tobacco Products in Pharmacies in Changsha, China

6.1. Introduction

China is the largest consumer and producer of tobacco in the world. The smoking rates among males age 15 and older was 52.8% in 2010.[136] Only 11.6% of smokers tried to quit in the past 12 months and over 90% of those who attempted to quit did so without assistance, which are both lower than most of the other developing countries.[136] A variety of factors, including the availability and accessibility of pharmacotherapies, may be related to the low use of smoking cessation pharmacotherapies among Chinese smokers.[96]

Article 14 of the WHO’s FCTC encourages each party to ‘facilitate accessibility and affordability for treatment of tobacco dependence including pharmaceutical medicines, products used to administer medicines and diagnostics when appropriate.’[32] With the ratification of the WHO FCTC in 2005 in China, efforts have been made to facilitate smoking cessation, including establishing quit lines and opening smoking cessation clinics.[33-36] Ten years after China’s ratification, no governmental program exists to facilitate access to smoking cessation medications in pharmacies.

Pharmacies serve as a major source of cessation medications. As part of the general retail environment, the availability of smoking cessation medications increases the utilization of these products and promotes quit rates among smokers.[137] In
developed countries, such as the U.S., most pharmacies stock smoking cessation medications. It has been reported that over 90% of pharmacies in New York City, nearly 80% of pharmacies in San Francisco, and 95% of pharmacies in Indiana stock smoking cessation medications.[37-38 94] However, in developing countries, fewer pharmacies stock smoking cessation medications. For example, 74% of pharmacies in Thailand have smoking cessation medications,[138] and in Guatemala, only about 23% of pharmacies stock cessation medications.[70] The literature also shows that the availability and accessibility of smoking cessation medications varies by pharmacy type (chain/non-chain), neighborhood socioeconomic status, and country.[39]

Tobacco sales in pharmacies may increase smoking prevalence by increasing the density of tobacco retail outlets and the availability of tobacco products in communities. Selling tobacco in pharmacies also conveys misleading messages that cigarettes are healthy products, as pharmacies are places where the general population obtains health care products and professional advice.[139] In the US, banning tobacco sales in pharmacies has long been recommended by the American Pharmacists Association (APhA).[42-43] Some cities and one large chain have adopted tobacco free pharmacy policies in recent years, and at least one study has shown that implementation of such policies was related to a reduction in retail outlet density.[140]

To date, the availability of cessation medication and its advertisement, cessation counseling services and tobacco products in pharmacies has not been assessed in China. As a party of the FCTC, China is in need of evaluating the implementation of Article 14, and as the world’s largest consumer of tobacco with low quit rates, it is critical to assess the availability of cessation medications in pharmacies as it has been proven that
cessation medications are effective to assist smokers quit and low availability of such medications limits the utilization. Thus, this study assessed the availability of cessation medications and services and advertisement for such products and services as well as cigarette availability in pharmacies in Changsha, China.

6.2. Methods

Study Setting

This study was conducted in the city of Changsha in June 2013. Changsha is the capital of Hunan province in south-central China, which is a typical mid-sized city with regard to the municipality area, population size and economic development in China. Its municipality covers an area of 11,819 square kilometers (4,563 square miles) and it has a population of over 7 million residents with 3.6 million in the urban areas according the 2010 Census, ranking 13th and 14th among 28 capital cities in China respectively.[113-114, 141] In 2011, the GDP was 562 billion RMB (≈8.9 billion U.S. dollars), ranking 7th among capital cities in China.[115] In 2013, Changsha ranked 8th among the top 20 most economically powerful capital cities and ranked 18th among the 50 most economically powerful cities in China.[141] Tobacco production is one of the main industries in Changsha. In 2014, the tobacco industry earned 2.4 billion RMB (384 million U.S. dollars) and generated 60.2 billion RMB (9.6 billion U.S. dollars) in tax revenue, accounting for 42.3% of the tax revenues of Changsha city.[117]
Sample Selection

A complete list of 2687 pharmacies was obtained from a local government website. Pharmacies located in remote villages in rural areas were excluded for travel considerations. Two-stage sampling was performed to select a sample of pharmacies. At the first stage, two of the five urban districts were randomly selected, and Liuyang County, which is the largest county among the four counties in the city, was selected based on travel considerations. At the second stage, pharmacies were first stratified by district/county, and then stratified by chain/non-chain pharmacy type within each district/county. In each stratum, systematic random sampling was performed to select pharmacies. In total, we obtained a sample of 281 pharmacies.

Measures

A standard script was used to guide two interviewers on how to communicate with the clerks in pharmacies and how to collect data consistently. Clerks in pharmacies were asked about whether they sold cessation medications currently and whether they did in the past. If they had sold pharmacotherapy in the past, they were asked why they discontinued the product. Data were captured using a standardized checklist, which included the following items: 1) availability and price of smoking cessation medications; 2) availability and price of e-cigarettes; 3) availability of cigarettes; 4) availability of smoking cessation treatment programs; 5) presence of advertisements for smoking cessation medications or programs; 6) availability of smoking cessation self-help materials; and 7) whether the pharmacy has a visible smoke-free sign in the store.

A smoking cessation medication was defined as any medication marketed as a drug
to help smokers quit, including FDA approved first-line medications and other medications. The first-line cessation medications are those FDA-approved pharmacotherapies for smoking cessation, such as bupropion, nicotine gum, nicotine inhaler, nicotine nasal spray, nicotine lozenge, nicotine patch, and varenicline.[142]

**Statistical Analyses**

Descriptive analyses were performed to estimate the prevalence of smoking cessation medications sold in pharmacies, the characteristics of the smoking cessation medications sold in pharmacies, the prevalence of smoking cessation medication advertisements in pharmacies, and the proportion of pharmacies that had a smoke free sign displayed in the store. Wald tests and chi-square tests were performed to test whether there were significant differences between chain and non-chain pharmacies and between pharmacies located in urban and rural areas. Results with p-values less than 0.05 were considered statistically significant.

Survey weights were calculated for each pharmacy and stratification was the only design feature. The survey weights and design features were taken into account in the analyses. The analyses were performed using SAS version 9.3 (SAS Institute, Inc., Cary, North Carolina).

**6.3. Results**

Complete data were collected for 217 pharmacies. The remaining 64 pharmacies were permanently closed, relocated, or unable to be located. Table 1 shows the number and percentage of pharmacies by pharmacy type (chain/non-chain). Pharmacies were
statistically different in type between those in urban areas and those in rural areas (Table 11). The majority of pharmacies in urban districts were chain pharmacies; in contrast, the majority of those in the county were non-chain pharmacies.

<table>
<thead>
<tr>
<th>Pharmacy Type</th>
<th>Urban #1</th>
<th>Urban #2</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Chain</td>
<td>54 (77.1)</td>
<td>58 (75.3)</td>
<td>10 (85.7)</td>
</tr>
<tr>
<td>Non-Chain</td>
<td>16 (22.9)</td>
<td>19 (24.7)</td>
<td>60 (14.3)</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>77</td>
<td>70</td>
</tr>
</tbody>
</table>

Note: Urban #1, Furong District; Urban #2, Yuelu District; Rural, Liuyang County. The difference between Furong and Yuelu districts was not statistically significant. Table 11 Type of pharmacy by selected district

Table 12 presents the availability of cessation medications, e-cigarettes and smoke-free signs by region and pharmacy type, as well as the percentage of pharmacies that sold cessation medications in the past. Only 4.1% of pharmacies sold any smoking cessation medications. Among these, no first-line smoking cessation pharmacotherapies were sold, although some pharmacies did in the past. The products sold were mainly traditional herbal medicine products and e-cigarettes. There was no significant difference in the availability of cessation medications in pharmacies between urban and rural areas (5.6% versus 2.9%), and availability was also similar between chain and non-chain pharmacies (4.6% versus 3.8%). The percentage of pharmacies that sold the medications in the past was higher than those that currently sold the medications (12.8% versus 4.1%). The
availability of e-cigarettes (3.8%) was similar to that of smoking cessation medications, and 2% of the pharmacies sold cigarettes.

<table>
<thead>
<tr>
<th></th>
<th>Cessation Medication</th>
<th>Sold the Med in the past</th>
<th>E-cigarette</th>
<th>Smoke-free Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Total (n=217)</td>
<td>4.1</td>
<td>12.8</td>
<td>3.8</td>
<td>25.1</td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>5.6</td>
<td>17.4</td>
<td>6.4</td>
<td>42.7</td>
</tr>
<tr>
<td>Rural</td>
<td>2.9</td>
<td>8.6</td>
<td>1.4</td>
<td>5.4</td>
</tr>
<tr>
<td>Pharmacy Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chain</td>
<td>3.8</td>
<td>15.2</td>
<td>6.3</td>
<td>34.3</td>
</tr>
<tr>
<td>Non-chain</td>
<td>4.6</td>
<td>10.9</td>
<td>1.8</td>
<td>17.3</td>
</tr>
</tbody>
</table>

Table 12: The availability of smoking cessation medications, smokeless tobacco products, smoking-free notice in pharmacies in Changsha Hunan, China.

No pharmacy offered a cessation program or self-help materials. One pharmacy had a cessation medication advertisement posted on the front door. We also found that 25.1% of the pharmacies had a visible ‘smoke-free’ sign. Only 5.4% of the rural pharmacies had a visible smoke-free sign in the store, while 42.7% of the urban pharmacies had one, and the difference was statistically significant (difference=37.3%, p<0.0001). Similarly, more chain pharmacies had a visible ‘smoke-free’ sign than non-chain pharmacies (difference=17.1%, p = 0.0059).
6.4. Discussion

To our knowledge this is the first study to document the availability of smoking cessation medications, tobacco products, and advertisements for cessation medications in pharmacies in China. Our findings suggest that first-line smoking cessation medications are not available in pharmacies and that currently available cessation medications are traditional herbal medicine or e-cigarettes. Although only a few pharmacies sold cigarettes, this is a relatively new phenomenon in China; concerns should be raised about a potential upward trend, as cigarette sales in pharmacies convey mixed messages to customers and are related to smoking behaviors.[143]

Smoking cessation medications first entered China’s market in 2004. Manufacturers saw China as a country with a large potential market and thus they tried to enter the market.[144] Unfortunately, they have not been very successful.[144] Pharmacies should be one of the major retail channels for smoking cessation medications; however, we found that none currently sold first-line medications, and only a few did in the past. The cost of first-line cessation medications may be a barrier that prevents pharmaceutical companies from being successful in selling pharmacotherapy. Studies have shown that pharmacotherapies are not cost effective tobacco control approaches in developing countries unless they can be sold for a price that is affordable.[145] This is certainly true in China, as the cost of a course of pharmacotherapy is about the average monthly per capital income in Changsha.[128] In developed countries such as the U.S. and UK, pharmacotherapies are relatively affordable and over 40% of current smokers use cessation medications during a quit attempt.[146] A study in the UK found that making pharmacotherapies reimbursable resulted in a significant increase in utilization.[147] In
New York, offering two weeks of free nicotine replacement therapy (NRT) increased calls to the quit-line.\[148\] Chinese tobacco control advocates and the Ministry of Health have been calling for health insurance coverage of smoking cessation medications for years.\[149\] However, to date, it is still not on the government’s agenda. Given that pharmacotherapy doubles the chance of quitting successfully,\[142\] full coverage of cessation medications may help more smokers quit.

Our results also showed that about 13\% of pharmacies sold smoking cessation medications in the past, and most of them stopped stocking cessation medications because of low sales volume, likely due to low demand. In 2010, only 16\% of current Chinese smokers planned to quit or thought about quitting in the next 12 months.\[82\] In addition, studies have reported that Chinese smokers do not seek medical assistance when making an attempt to quit because most of them do not acknowledge nicotine dependence as a medical problem.\[144\]

Cigarettes should not be available in pharmacies, as they are places where the general population obtains health care products and professional advice. Cigarette availability in pharmacies not only increases the density of tobacco retail outlets and thus the smoking rates,\[150\] but also provides an opportunity for the insured to misuse their health insurance benefits in China. Following health care system reform in recent years, China has achieved universal health insurance coverage.\[151\] Often insured individuals have a medical savings account which can only be used in pharmacies and health care facilities to pay for products or services.\[152\] However, since pharmacies have started to sell tobacco products in recent years, medical savings account can be used to purchase cigarettes in pharmacies, which is fundamentally in conflict with the goal of the medical
savings account. Although we found that only 2% of pharmacies sold cigarettes, this is an emerging phenomenon in recent years and news reports in many other Chinese cities have shown that increasing number of pharmacies have started to sell cigarettes. Tobacco control advocates should consider promoting tobacco-free pharmacy policies before this trend becomes more prevalent.

The availability of smoking cessation medications in pharmacies has been found to vary by pharmacy type and neighborhood socioeconomic status.[70] However, no significant variations by pharmacy type were observed in the present study, likely due to the extremely low prevalence we observed. Pharmacies are for-profit businesses, and the decision on whether to stock cessation medications primarily depends on economic reasons rather than health promotion considerations. In the past decade, chain pharmacies have proliferated, especially in urban areas.[153] In 2013, about 66% of pharmacies in urban areas were chain pharmacies (versus 21% in rural areas).[154] Studies have shown that chain pharmacies are much more likely to stock cessation medications than non-chain pharmacies.[70] Thus, this variation should be taken into account when any efforts are being made to promote the availability of cessation medications.

Smoking cessation interventions delivered by pharmacist can significantly improve abstinence rates among smokers.[155] Unfortunately, no pharmacies offered any smoking cessation counseling, treatment services, or resources such as self-help materials in this study. Pharmacists can be trained to deliver specialized smoking cessation counseling and treatment services, which are among the most effective approaches to help smokers quit.[142]

This study has limitations. The pharmacy list was not up to the date when the study
was conducted. It was last updated in October 2011, therefore, pharmacies that opened between November 2011 and June 2013 were not included, and those that closed or relocated during that time were also not excluded or updated on the list. In addition, we may have missed a small proportion of pharmacies that were actually open, but difficult to locate. However, the sample size was inflated by 8% to control these issues.

6.5. Conclusion

Our findings suggest pharmacies in Changsha did not stock smoking cessation medications and there was little advertising for cessation medications. Given the low rates of quit attempt among Chinese smokers, unless the government implements strong tobacco control policies and smokers are genuinely pursuing cessation, there will be no real market demand for smoking cessation medications. Therefore, to achieve the ultimate goal of reducing smoking rates, it is not only important to improve the availability and affordability of smoking cessation medications, but it is also critical to implement stronger tobacco control policies to motivate smokers quit.

Funding This work was supported by the Ohio State University College of Public Health Professional Development and Travel Awards.
Chapter 7: Discussion and Conclusions

This dissertation essentially assessed pro- and anti-tobacco retail environment features in China. The findings suggest that there are strong pro-tobacco features in the retail environment, and they include: (1) high density of tobacco retail stores near schools and in neighborhoods; (2) new tobacco products are emerging, especially those targeting youth and females, such as menthol cigarettes, female-targeted cigarettes, and e-cigarettes; (3) low compliance with the regulation that requires tobacco retail stores to place a visible ‘no sales to minor’s sign; (4) high prevalence of tobacco marketing practices, especially those targeting youth, such as displaying tobacco products within 3 feet of the floor and within 12 inches of toys, candy, and ice cream etc.; and, (5) emerging tobacco sales in pharmacies. We also found that the anti-tobacco features in the retail environment were weak, and they include: (1) low availability of smoking cessation medications in pharmacies; (2) few pharmacies had cessation medication advertisements; (3) no pharmacy provided any smoking cessation services or self-help materials; and, (4) the cost of smoking cessation medication is high and it has not been covered by health insurance.

Our findings showed that tobacco industry aggressively markets new tobacco products (e.g., menthol cigarettes, female-targeted cigarettes, and e-cigarettes) at the point-of-sale to expand the marketplace and to interest non-users. Menthol cigarettes are relatively new in China. We found that menthol cigarettes were sold in over half of the
tobacco retail stores both near schools and in neighborhoods. Even within 100 meters of the front entrance of the schools where tobacco sales are prohibited, 51% of the tobacco retail stores sold menthol cigarettes. Research have shown that menthol cigarettes increase smoking initiation and impede smoking cessation because menthol reduces the harshness of the cigarettes, making it more appealing, especially to youth and females who might otherwise be discouraged by irritation or an unpleasant taste.\[156\] In the U.S., menthol cigarettes are starter products for youth, females, and African Americans, and menthol cigarette smoking has been found to be higher among these populations.\[157\] Therefore, widespread availability of menthol cigarettes near schools and in neighborhoods may substantially increase smoking initiation among Chinese youth and females.

This study also found that female-targeted cigarettes were prevalent in tobacco retail stores both around schools and in neighborhoods. In China, one major type of female-targeted cigarettes is long slim cigarette, which is a relatively new type of cigarette that has emerged in recent years in China. According to 2014 annual report of the tobacco industry, sales of long slim cigarettes have been increased by 66.4% compared to 2013.\[158\] The soaring sales of female-targeted cigarettes may be one of the major contributing factors to the dramatic rise in smoking rates among Chinese females. Research conducted by CTR Market Research group showed that smoking rates among Chinese females have been tripped between 2011 and 2014, and more young, well-educated, and high-income females smoke.\[159\] Although the smoking rate among females is still relatively low in China (3.3%), it has increased by a worrisome rate and
deserves close attention, and tobacco control advocates should find ways to prevent this upward trend.

Although we found few tobacco retail stores that sold e-cigarettes in Changsha, in January 2015, Linyi news reported that fruit flavored e-cigarettes in tobacco retail stores near schools were very popular, and it was sold out in many of the stores because of the high demand among the students in Linyi (a city in Shandong province in northeast China). Although our study found that few stores stocked e-cigarettes, more stores near schools stocked e-cigarettes compared to that in neighborhoods. The availability of e-cigarettes in retail stores has resulted in a substantial increase in e-cigarette use among youth in many countries. For example, in the U.S., e-cigarettes use tripled from 2013 to 2014. Currently, there is no regulation on e-cigarette production, sales or marketing. China Tobacco is considering a collaboration with e-cigarette manufactures to make the production, sales and marketing of e-cigarettes more efficient. Once China Tobacco starts to sale e-cigarettes, it can become widely available in short period of time because China Tobacco can deliver tobacco products to the certified tobacco retail stores (e.g. Zijing stores) regardless whether the retailers are willing to sell this products, which may lead to a quick and widespread increase in e-cigarette use especially among youth.

**Summary of Implications**

Based on the findings of this study, we highly recommend that following actions should be taken to counteract the tobacco industry’s vigorous tobacco marketing practices at the point-of-sale and to promote smoking cessation rates in China: (1) improve retailers’ compliance with the zoning regulation that prohibits tobacco retail
sales within 100 meters of the front entrance of schools; (2) restrict tobacco advertising and displays at the point-of-sale, especially those targeting youth; (3) ban the sales of flavored tobacco products, including menthol flavored cigarettes; (4) monitor the trends of and the impact of newly emerged tobacco products; (5) promote smoke-free pharmacies; (6) reduce or subsidize the cost of smoking cessation medications to make it affordable and then promote the availability of these products in pharmacies; (7) train pharmacists on how to effectively deliver brief smoking cessation counseling; and, (8) resolve the conflict of interest inhibiting the public health function of the STMA.

Limitations

For the audit of tobacco retail stores around schools and in neighborhoods, we did not have a complete list of tobacco retail stores in Changsha. Thus, we had to identify tobacco retail stores within 200 meters of schools or neighborhoods by walking through the streets in the area. Therefore, we might have missed some hidden or temporarily closed tobacco retail stores. In addition, we did not have a device to measure the distance from a store to a school or neighborhood, therefore, the inclusion of stores on the border of the 200 meter radius was determined by the auditor based on printed maps with distance marks, which might result in over- or under-inclusion of tobacco retail stores. Another limitation of this study is that data were collected by observation, which may result in an underestimate of some estimates. For example, to count as having a tobacco retail license, the store had to have a tobacco retail license visibly displayed in the store. However, due to little monitoring and inspection perform by the TMB, it is possible that some licensed stores did not display their license.
For the pharmacy survey, one of the limitations is that the pharmacy list was not up to the date when the study was conducted. It was last updated in October 2011, therefore, pharmacies that opened between November 2011 and June 2013 were not included, and those that closed or relocated during that time were also not excluded or updated on the list. In addition, we may have missed a small proportion of pharmacies that were actually open, but difficult to locate. However, the sample size was inflated by 8% to control these issues.

This study was conducted in the city of Changsha, which is a second tier city in the country; so that the results of this study may not be able to be applied in the first tier cities such as Beijing and Shanghai. But it should be able to represent most of the similar second tier cities in the country since the city of Changsha is a middle-sized city in terms of the population, geographical size, and the economic development among the capital cities in China.

Conclusion

In conclusion, we found that the retail environment in the city of Changsha is featured with a high density of tobacco retail stores near schools and in neighborhoods, pervasive point-of-sale tobacco marketing practices targeting youth, and low compliance with the tobacco control policies that protecting youth, as well as low availability of smoking cessation medications and cessation services in pharmacies. These are key factors related to smoking initiation and smoking cessation, and efforts are needed to tackle these issues in order to better control tobacco use in China.
Appendix A. Tobacco Point-of-sale Audit Form

Point-of-sale Audit Form (Neighborhood)

Date: ___________________________  Start Time: ___________________________

Auditor Initials: ___________________________  

District ID: ___________________________  

Sub-district name: ____________________________________________________________  

Community Name: ___________________________________________________________  

Square ID: ___________________________  

90
Point-of-sale Audit Form (School)

Date: __________________________      Start Time: __________________________

Auditor Initials: ___________________

District ID: ________________

School name: __________________________________________

School ID: ________________________________

School type:

☐ Elementary school

☐ Middle/high school

Smoke free sign at the entrance of the school:

☐ Yes

☐ No
Section I. Store Demographic

1. Store name: ______________________________________________

2. Store type

01. Convenient
02. Small market
03. Supermarket
04. Shopping mall
05. Tobacco and alcohol shop
06. Fruit store
07. Chaohuodian (Nuts, dried fruits, and seeds store)
08. Other, specify______________________________

3. Is it a Zijing juanyan retail store? (Note: Zijing juanyan retail store are certified convenient stores/small markets which are trained on tobacco sales)

01 Yes
02 No

4. The store is on the first floor of apartments

01 Yes
02 No
03 Unable to tell
5. [If this is a store around school], the distance from the store to the school is ___________ meters.

Section II Exterior Marketing

Is there tobacco product ad?

01 Yes

02 [Skip to 8] No

6. Which products are advertised outside the store?

01 Just tobacco advertisement in general

02 Specific to certain cigarette brand, specify cigarette brand_____________________

7. Is there exterior promotions?

01 Yes

02 [Skip to 10] No
8. [If yes to 8], then check all the options that apply:

01 Regular price advertised
02 Special price on 1 product (e.g. 0.5 yuan off a pack)
03 Special price on >1 product (e.g. 6 yuan per pack when you buy 3 packs)
04 Multi-buy (e.g. buy 1 pack, get 1 pack free)
05 Cross-product (e.g. buy 1 pack of cigarettes, get 1 tin of snus free)
06 Freebies (lighters, etc.) w/purchase
07 Mail-in coupon or points for merchandise
08 Other types of promotion: specify [product name, promotion]
_________________________________________  _______________________

9. Total number of ads by Size

01 Small <0.3 meter in all dimensions____________________
02 Medium (>0.3 and <1 meter) in any dimensions
__________________________________________
03 Large >1 meter in any dimensions
__________________________________________
10. Overall impression of ads

01 No ads

02 Discreet

03 Moderate

04 ‘Obvious’

Section III Exterior Audit Status:

Complete

01 Yes

02 No

Partially complete:

01 Hard refusal, cannot reattempt

02 Soft refusals, unable to reattempt due to logistical constraints

03 Will reattempt; specify the question on which you stopped: __________

Not able to complete:

01 Permanently out of business

02 Could not locate the school

03 Does not sell tobacco to consumers

04 Hard refusal, could not reattempt

05 Temporarily closed/ under construction, could not reattempt
06 Will reattempt (e.g. soft refusal before any data collected, temporarily closed but can go back)

07 Other (describe):______________________________

Section IV Interior Products:

11. Are any tobacco products sold here?

01 Yes

02 [Skip to audit status] No

12. Number of cash registers (If >5, enter >5)___________________

13. Where the tobacco products are visibly displayed in this store?

01 On, above, behind or in a cabinet at a primary checkout counter

02 On, above, behind or in a cabinet at another counter

03 On, above, or in a separate display cabinet in the front of the store.

04 Tobacco display is visible from outside

05 Elsewhere in the store

06 No tobacco products are visible to customers
14. Where the MAJORITY tobacco products are visibly displayed in this store?

   01 On, above, behind or in a cabinet at a primary checkout counter
   02 On, above, behind or in a cabinet at another counter
   03 On, above, or in a separate display cabinet in the front of the store
   04 Tobacco display is visible from outside
   05 Elsewhere in the store
   06 No tobacco products are visible to customers

15. Are cigarettes sold here?

   01 Yes
   02[Skip to 18] No

16. If cigarettes are sold here, please check all that apply:

   01 Product within 1 m of the floor?
   02 Product within 0.3 m of toys, candy or gum, slushly/soda machines, or ice cream?
   03 Flavored cigarettes?
   04 Self-service display?
   05 Single cigarettes sold here?
17. Are menthol cigarettes sold here?

01 Yes
02 [Skip to 20] No

18. If menthol cigarettes are sold here, please check all that apply:

01 Product within 1 m of the floor?
02 Product within 0.3 m of toys, candy or gum, slushly/soda machines, or ice cream?
03 Self-service display?

19. Are cigarettes specifically marketed toward females sold here? [Note: a list of cigarettes is attached at the end of the audit form.]

01 Yes
02 [Skip to 22] No

20. If cigarettes specifically marketed toward females are sold here, please check all that apply:

01 Product within 1 m of the floor?
02 Product within 0.3 m of toys, candy or gum, slushly/soda machines, or ice cream?
03 Flavored products?
04 Self-service displays?

21. Is any cigarettes sold with labeling indicating low/light tar (the amount of tar \( \leq 15 \) mg, e.g. ‘1mg’, ‘3mg’, ‘5mg’, ‘8mg’)?

01 Yes

02 [Skip to 24] No

23. If any cigarettes with labeling indicating low/light tar are sold here, please check all that apply:

01 Product ad within 1 m of the floor?

02 Product within 12 inches of toys, candy or gum, slushy/soda machines, or ice cream?

03 Flavored products?

04 Self-service displays?

24. Are cigarillos/little cigars sold here?

01 Yes

02 [Skip to 26] No
25. If cigarillos/little cigars are sold here, please check all that apply:

01 Product ad within 1 m of the floor?
02 Product within 0.3 m of toys, candy or gum, slushly/soda machines, or ice cream?
03 Flavored products?
04 Self-service display?
05 Single cigarillos/little cigars sold here?

26. Are large cigars sold here?

01 Yes

02 [Skip to 28] No

27. If large cigars are sold here, please check all that apply:

01 Product ad within 1 m of the floor?
02 Product within 0.3 m of toys, candy or gum, slushly/soda machines, or ice cream?
03 Flavored products?
04 Self-service display?
05 Single large cigars sold here?

28. Are E-cigarettes sold here?

01 Yes

02 [Skip to 30] No
29. If E-cigarettes are sold here, please check all that apply:

01 Product ad within 1 m of the floor?

02 Product within 0.3 m of toys, candy or gum, slushly/soda machines, or ice cream?

03 Flavored products?

04 Self-service display?

05 Refillable?

06 Disposables?

30. Are other tobacco products sold here?

01 Yes, specify____________________

02 [Skip to 32] No

31. If other tobacco products are sold here, please check all that apply:

01 Product ad within 1 m of the floor?

02 Product within 12 inches of toys, candy or gum, slushly/soda machines, or ice cream?

03 Flavored products?

04 Self-service display?
Section V Interior Marketing:

32. Are there branded shelving units in the store?

01 Yes
02 [Skip to 34] No

33. If yes to 32, then record the brands of products that are advertised on the header row of the shelving units present in the store:

01 Cigarette brands ____________________________
02 Non-cigarette brands ____________________________

34. Are there branded signs in the store?

01 Yes
02 [Skip to 36] No

35. If yes to 34, then record the brands of products that are advertised on the branded signs in the store:

01 Cigarette brands ____________________________
02 Non-cigarette brands ____________________________
36. Are there branded displays in the store?

01 Yes

02 [Skip to 38] No

37. If yes to 36, then record the brands of products that are advertised through branded displays in the store:

01 Cigarette brands ________________________________

02 Non-cigarette brands ________________________________

38. Interior promotion?

01 None

02 Regular price advertised

03 Special price on 1 product (e.g. 0.5 yuan off a pack)

04 Special price on >1 product

(e.g. 6 yuan per pack when you buy 3 packs)

05 Multi-buy (e.g. buy 1 pack, get 1 pack free)

06 Cross-product (e.g. buy 1 pack of cigarettes, get 1 tin of snus free)

07 Freebies (lighters, etc.) w/purchase

08 Mail-in coupon or points for merchandise

09 Other types of promotion: [product name, promotion]
39. Advertised price:

01 Baishia (Silver & Green [jinpin baisha])

02 Furongwang (Hard)

03 Cheapest cigarette pack in the store

37. Is there any tobacco control sign in the store?

01 Smoke-free

02 No sales to minors

03 Other, specify

38. Is the tobacco retail license visibly displayed in the store?

01 Yes

02 No

Section VI Interior Audit Status:

Complete:

01 Yes

02 No
Partially complete:

01 Hard refusal, cannot reattempt
02 Soft refusal, unable to reattempt due to logistical constraints
03 Will reattempt; specify the question on which you stopped: __________

Not able to complete:

01 Permanently out of business
02 Could not locate the school
03 Does not sell tobacco to consumers
04 Hard refusal, could not reattempt
05 Temporarily closed/ under construction, could not reattempt
06 Will reattempt (e.g. soft refusal before any data collected, temporarily closed but can go back)
07 Other (describe):
# Appendix B. Pharmacy Visit Checklist

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Pharmacy Name:</td>
<td>2. ID:</td>
</tr>
<tr>
<td>3. District:</td>
<td>4. Chain Number:</td>
</tr>
<tr>
<td>5. Address:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Is smoking cessation medication (not including smokeless tobacco products) available to customers in this pharmacy?

- [ ] Yes
- [ ] No, this pharmacy has never sold smoking cessation medication.
- [ ] No, but sold cessation medications in the past.

6a. [If ‘No, but sold cessation medications in the past.’ to item 6], why this pharmacy no longer sell smoking cessation medication?

- [ ] Sales volume is small.
- [ ] Few customers buy it.
- [ ] Do not know the reason
- [ ] Other: _________________
6b. [If yes to item 6] what type of smoking cessation medication is available in this pharmacy:

☐ NRT –Patch

   i.  *Imported:*

   Name_________________  ___________mg*patch  Price_______
   Name_________________  ___________mg*patch  Price_______

   ii.  *Domestic:*

   Name_________________  ___________mg*patch  Price_______
   Name_________________  ___________mg*patch  Price_______

☐ NRT –Gum

   i.  *Imported:*

   Name_________________  ___________mg*piece  Price_______
   Name_________________  ___________mg* piece  Price_______

   ii.  *Domestic:*

   Name_________________  ___________mg* piece  Price_______
   Name_________________  ___________mg* piece  Price_______

☐ NRT –Inhaler

   i.  *Imported:*

   Name_________________  ___________mg*patch  Price_______
   Name_________________  ___________mg*patch  Price_______
<table>
<thead>
<tr>
<th>Name_______________</th>
<th>___________mg* piece</th>
<th>Price_______</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name_______________</td>
<td>___________mg* piece</td>
<td>Price_______</td>
</tr>
</tbody>
</table>

**ii. Domestic:**

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>___________mg* piece</th>
<th>Price_______</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name_______________</td>
<td>___________mg* piece</td>
<td>Price_______</td>
</tr>
</tbody>
</table>

**NRT – nasal spray**

**i. Imported:**

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>___________mg* piece</th>
<th>Price_______</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name_______________</td>
<td>___________mg* piece</td>
<td>Price_______</td>
</tr>
</tbody>
</table>

**ii. Domestic:**

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>___________mg* piece</th>
<th>Price_______</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name_______________</td>
<td>___________mg* piece</td>
<td>Price_______</td>
</tr>
</tbody>
</table>

**NRT – mouth spray**

**i. Imported:**

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>___________mg* piece</th>
<th>Price_______</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name_______________</td>
<td>___________mg* piece</td>
<td>Price_______</td>
</tr>
</tbody>
</table>

**ii. Domestic:**

<p>| Name_______________ | ____<em><strong><strong><strong>mg* piece | Price</strong></strong></strong></em> |</p>
<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg* piece</th>
<th>Price_______</th>
</tr>
</thead>
</table>

**NRT – tablets/lozenges**

*i. Imported:*

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg*tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg* tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

**ii. Domestic:***

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg* tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg* tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

**Bupropion**

*i. Imported:*

<table>
<thead>
<tr>
<th>Name___________</th>
<th>_________mg* tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg* tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

**ii. Domestic:***

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg* tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg* tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

**Varenicline**

*i. Imported:*

<table>
<thead>
<tr>
<th>Name_______________</th>
<th>_________mg* tablet</th>
<th>Price_______</th>
</tr>
</thead>
</table>

109
<table>
<thead>
<tr>
<th>Name</th>
<th>___________mg* tablet</th>
<th>Price</th>
</tr>
</thead>
</table>

ii. Domestic:

<table>
<thead>
<tr>
<th>Name</th>
<th>___________mg* tablet</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>___________mg* tablet</td>
<td>Price</td>
</tr>
</tbody>
</table>

□ Cytisine

i. Imported:

<table>
<thead>
<tr>
<th>Name</th>
<th>___________mg* tablet</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>___________mg* tablet</td>
<td>Price</td>
</tr>
</tbody>
</table>

ii. Domestic:

<table>
<thead>
<tr>
<th>Name</th>
<th>___________mg* tablet</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>___________mg* tablet</td>
<td>Price</td>
</tr>
</tbody>
</table>

□ Other Specify:_______

i. Imported:

<table>
<thead>
<tr>
<th>Name</th>
<th>___________mg* tablet</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>___________mg* tablet</td>
<td>Price</td>
</tr>
</tbody>
</table>

ii. Domestic:

<table>
<thead>
<tr>
<th>Name</th>
<th>___________mg* tablet</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>___________mg* tablet</td>
<td>Price</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>___________mg* tablet</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>___________mg* tablet</td>
<td>Price</td>
</tr>
</tbody>
</table>
7. Is smokeless tobacco product available in this pharmacy?
   □ Yes    □ NO

7a. [If yes to item 7] What smokeless tobacco products are available in this pharmacy?
   □ E-cigarettes
   □ Snuff
   □ Snus
   □ Chewing Tobacco
   □ Dissolvable Tobacco
   □ Other, specify____________________

8. [If ‘E-cigarettes’ to item 7a] in total, how many types of E-cigarettes products are available in this pharmacy?

   Number of types of E-cigarettes____________________

   Price range for one piece of E-cigarette: ______

9. Are cigarettes or other tobacco products [not including smokeless tobacco products] available in this pharmacy?

   □ Yes    □ NO
10. Is smoking cessation treatment available to customers in this pharmacy?

- [ ] Yes
- [ ] NO

10a. [If yes to item 10] What type of the treatment is available in this pharmacy?

- [ ] Individual Counseling
- [ ] Group Counseling
- [ ] Acupuncture
- [ ] Pharmacotherapy
- [ ] Traditional medicine
- [ ] Other, specify________________________

11. Are there advertisements for smoking cessation services in this pharmacy:

- [ ] Yes, the advertised cessation services are available in this pharmacy
- [ ] Yes, the advertised services are available elsewhere.
- [ ] NO

11a. [if yes to item 11] What smoking cessation services are advertised?

- [ ] Individual cessation counseling
- [ ] Group cessation counseling
- [ ] Self-help materials
- [ ] Quitline
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acupuncture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional medicine or treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation campaign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation club/organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, specify</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Are there advertisements for smoking cessation medication in this pharmacy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes/No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12a. [if yes to item 14] What smoking cessation medication is advertised?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication Name:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is self-help smoking cessation material available in this pharmacy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes/No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there smoke free notice on the door/wall [anywhere in this pharmacy]?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes/No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C. Pharmacy Visit Standard Script

[Interviewer walks into a pharmacy, if no clerk comes to talk with the interviewer, the interviewer complete item 13, 13a and 14 by observation; then look for a clerk in the pharmacy and communicate with him/her to complete item 6 to 12. If there is a clerk come to talk with the interviewer when the interviewer enters the pharmacy, the interviewer can talk with the clerk to finish item 6 to 12 first, then complete item 13, 13a and 14.]

Script for talking to a clerk in pharmacy to collect pharmacy data

**Interviewer:** Hi, ***, I would like to know whether smoking cessation medications are available in your pharmacy.

1) If the clerk answered ‘Yes,’ then the interviewer should ask: What types of these medications are available in your pharmacy? Can I have a look at those medications? (Would you please show me where are they?) Is MEDICATION NAME imported or domestic product? How much is it?

2) If the clerk answered ‘No,’ the interviewer then asks: did this pharmacy ever sell smoking cessation medications?]
Interviewer: Is smokeless tobacco available in your pharmacy? Products like E-cigarettes, snuff, snus, chewing tobacco, dissolvable tobacco and so on.

1) If E-cigarettes are available in this pharmacy, the interviewer should ask: In total, how many types of E-cigarette products do you have? What is the lowest and what is the highest price for one E-cigarette?

Interviewer: Does your pharmacy sell cigarettes or other tobacco products like cigars (not including smokeless tobacco)?

Interviewer: I would also like to know whether smoking cessation treatment / assistance available in your pharmacy?

1) If the clerk says yes, then the interviewer asks: what types of the treatment/assistance are available in your pharmacy?

Interviewer: Do you pharmacy have self-help smoking cessation materials for customers?
Appendix D. Pharmacy Survey Instructions

Below are the detailed instructions on collecting and entering data for each item in the pharmacy survey checklist. **Before going to pharmacy, item 1 to 5 should be completed.**

**Instructions on data entering:**

**Item 1.** Pharmacy Name: enter the full name of the pharmacy

**Item 2.** ID: enter the pharmacy ID

**Item 3.** District: enter the district in which the pharmacy is located.

**Item 4.** Chain number: enter the chain number of the pharmacy.

**Item 5.** Address: enter the accurate address of the pharmacy.

**Item 6.** Check ‘Yes’ if the pharmacy sale any kind of smoking cessation medication; or check ‘No, this pharmacy has never sold smoking cessation medication’ if the pharmacy has never sold smoking cessation medication; or check ‘No, but sold cessation medications in the past.’ If this pharmacy sold smoking cessation medications in the past, but it no longer sells these medications.
**Item 6a.** Identify whether the NRT product is imported/foreign brand or domestic product by reading information on the package, or by asking the clerk whether it is imported or domestic product. If the interviewer is going to ask the clerk, the question should be asked is ‘are these (is this) medication(s) imported or domestic products? Are they (Is it) a foreign brand? ’ If it is foreign brand, enter this medication under imported.

To enter medication name, the name should include brand name and product name.

To enter information for __mg*patch, enter the dosage of each patch and the number of patches in each pack. For example, if 21 mg each patch and a total of 14 patches in each pack, enter 21*14.

Similarly, for __mg*pieces and __mg*tablets, enter the data the same way as for __mg*patch.

Price: enter the price for each pack of the medication in RMB.

**Item 7.** Check ‘Yes’ if smokeless tobacco product is available in this pharmacy, or check ‘No’ if smokeless tobacco product is not available in this pharmacy. Smokeless tobacco products include snuff, snus, chewing tobacco, dissolvable tobacco, and E-cigarettes. For those not listed in the options, check ‘Other’ and specify the product name.

**Item 7a.** Check the type of the smokeless tobacco products that are available in this pharmacy.

**Item 8.** To count types of E-cigarettes which are available in this pharmacy, interviewers should count types of E-cigarettes by different dosage, brand, flavor, or the design of the E-cigarette, etc. For price range, enter the lowest price and the highest price per piece of
E-cigarette in the pharmacy. Note: interviewers should **not enter** the price of a pack of E-cigarettes [unless only one E-cigarette per pack].

**Item 9.** Check ‘Yes’ if cigarettes or other tobacco products [including pipe and cigars, but not including smokeless tobacco products], or check ‘no’ if the tobacco products are not available in this pharmacy.

**Item 10.** Check ‘Yes’ if any smoking cessation treatment available to customers in this pharmacy. Smoking cessation treatment includes prescribing smoking cessation medications to customers, providing customers with smoking cessation advice and/or assistance, or any other assistance which motivates and/or helps smokers to quit. Interviewers can ask the clerk: “is smoking cessation treatment/assistance available in your pharmacy? “

**Item 10a.** If smoking cessation treatment/assistance is available in this pharmacy, ask what type of the treatment/assistance is available, and enter the type of smoking cessation treatment/assistance that provided by this pharmacy to customers. The interviewer can ask the clerk: “what types of smoking cessation treatment/assistance are available in your pharmacy? “

**Item 11.** Check the appropriate option. Smoking cessation services include any free or not free services which are aimed to help smokers quit (check as many as needed).

**Item 11a.** Check the appropriate option (check as many as needed).

**Item 12.** Check ‘Yes’ if self-help smoking cessation materials are available in this pharmacy. The self-help smoking cessation materials include any printed materials which
have messages intended to motivate or help smokers quit, and include materials describing adverse health effects of smoking.

**Item 13.** Check ‘Yes’ if visible smoking cessation medication advertisements is anywhere in this pharmacy. Otherwise, check ‘No’.

**Item 13a.** Enter the advertised medication name [brand name, format of medication (tablet, patch, fluid, etc.)].

**Item 14.** Check ‘Yes’ if visible smoke free notice is anywhere in this pharmacy. Otherwise, check ‘No’.
References


25. Donovan RJ, Jancey J, Jones S. Tobacco point of sale advertising increases positive brand user imagery. *Tob Control* 2002;11:191-4


34. Zhao J, Gou JJ, Hu DY, et al. [Effect of the smoking cessation services in the outpatient department for patients with coronary heart disease]. *Zhonghua Xin Xue Guan Bing Za Zhi* 2013;41:1000-5


42. Rx TF. Local Legislative Efforts by State.  
   http://www.tobaccofreerx.org/local_efforts.html---!services/aboutpage.


   http://www.who.int/fctc/ten_fctc/en/.


57. “Woguo yibao buzhu biaozhun you meiren meinian 120 yuan tizhi 200 yuan”

[Medicare Subsidy Increased from RMB$120 to RMB$200 per Capita]. Jinghuan Shibao 2011


68. GYTS. Global Youth Tobacco Survey. 2014.


71. "Yaofang Jianmai Yanjiu Shimin zhihu 'Youmo'" [Pharmacies sell Tobacco and Alcohol, the Public say it's ridiculous]. *Anhui News* 2011

72. Daily C. Experimentation with smoking among elementary and middle school students kept increasing in Beijing 2009.


77. Consurtium TCL. Location, Location, Location:Regulating Tobacco Retailer Locations for Public Health. 2012.


82. Centers for Disease Control and Prevention. Global Adult Tobacco Survey Fact Sheet
http://www.who.int/tobacco/surveillance/en_tfi_china_gats_factsheet_2010.pdf?u
a=1.

83. Li L, Yong HH, Borland R, et al. Reported awareness of tobacco advertising and
promotion in China compared to Thailand, Australia and the USA. *Tob Control*

84. Henriksen L, Feighery EC, Schleicher NC, Haladjian HH, Fortmann SP. Reaching
youth at the point of sale: cigarette marketing is more prevalent in stores where
adolescents shop frequently. *Tob Control* 2004;13:315-8 doi:
10.1136/tc.2003.006577.

85. Rogers T, Feighery EC, Tencati EM, Butler JL, Weiner L. Community mobilization
to reduce point-of-purchase advertising of tobacco products. *Health Educ Q*
1995;22:427-42


87. Wakefield M, Morley C, Horan JK, Cummings KM. The cigarette pack as image:
new evidence from tobacco industry documents. *Tob Control* 2002;11 Suppl
1:173-80

88. Pollay RW. More than meets the eye: on the importance of retail cigarette

90. China Tobacco. [Improving Tobacco Retail in Changsha, Hunan].

   g/news/n_0002.html.


93. Chinese Association on Tobacco Control. [Reasons for a comprehensive ban on
   tobacco advertising and sponsorship]. 2014.
   TAB#place.

94. Kotecki JE, Elanjian SI, Torabi MR, Clark JK. Pharmacists' concerns and suggestions
   related to the sale of tobacco and alcohol in pharmacies. *J Community Health*
   1998;23:359-70

95. Nimpitakpong P, Chaiyakunapruk N, Dhippayom T. A national survey of training and
   smoking cessation services provided in community pharmacies in Thailand. *J

   the ITC China Survey. *Tob Control* 2010;19 Suppl 2:i12-7 doi:
   10.1136/tc.2009.031179.

97. Kok G, Gottlieb NH, Commers M, Smerecnik C. The ecological approach in health
   10.4278/ajhp.22.6.437.


   http://www.wpro.who.int/china/mediacentre/factsheets/tobacco_taps/en/.


134. Fraser T. Phasing out of point-of-sale tobacco advertising in New Zealand. Tob Control 1998;7:82-4


pharmacists employed in student experiential and other worksites in Western New 

144. Liu L, Feng GZ. [Analysis of the Current Situation of the Market of Smoking 
Cessation Medication in China]. *Central South Pharmacy* 2012;10:318-20 doi: 

145. Higashi H, Barendregt JJ. Cost-effectiveness of tobacco control policies in Vietnam: 
the case of personal smoking cessation support. *Addiction* 2012;107:658-70 doi: 

146. Borland R, Li L, Driezen P, et al. Cessation assistance reported by smokers in 15 
countries participating in the International Tobacco Control (ITC) policy 
evaluation surveys. *Addiction* 2012;107:197-205 doi: 10.1111/j.1360- 
0443.2011.03636.x.

147. West R, DiMarino ME, Gitchell J, McNeill A. Impact of UK policy initiatives on 
use of medicines to aid smoking cessation. *Tob Control* 2005;14:166-71 doi: 
10.1136/tc.2004.008649.

away free nicotine medications and a cigarette substitute (Better Quit) to promote 

149. Li Y. [Should Health Insurance Cover the Cost of Smoking Cessation Medication in 
China?]. *China Economic Weekly* 2012;19

150. Marashi-Pour S, Cretikos M, Lyons C, Rose N, Jalaludin B, Smith J. The 
association between the density of retail tobacco outlets, individual smoking 
status, neighbourhood socioeconomic status and school locations in New South


158. Ling CX. Achieving the goal of generating 10 billion RMB tobacco tax revenue each year. In: Beureau TM, ed., 2015.
159. More Women Smoking In China, Despite Aggressive Anti-Tobacco Campaigns.  

160. Various kinds of E-cigarettes are popular near schools and many students have tried these products in Linyi. *yimeng wanbao* 2015.
