

## Tobacco Use in China: Prevalence, Consequences and Control

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### Abstract

**Objective:** To provide an overview of the previous study findings on tobacco use patterns and deleterious consequences on the health and economy in China, the largest producer and consumer of tobacco products in the world. **Data Sources:** Medline literature searches, books, and reports from 1982 to 2002. **Data Synthesis:** Seven categories were examined (prevalence patterns of smoking, its correlations with age and gender, smoking initiation, risk factors, health and economic consequences, knowledge of and attitudes towards tobacco among smokers and non-smokers, and suggestions on tobacco control efforts). **Conclusions:** The results consistently indicated high prevalence rates in China, which varied significantly with gender, age, and region. The health and ensuing economic consequences of tobacco use are enormous. The authors urge the Chinese governmental authorities that investment in tobacco control is a wise and profitable venture to counteract the effects of tobacco before a highly probable health catastrophe occurs.

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### Introduction

In recent years, China's public health officials and national and international researchers reported a rapid increase in the prevalence of tobacco use in the country. Researches examining patterns of smoking found an exceptionally high prevalence among adults (Gong et al., 1995; Lam et al., 1997), and a slower, yet significant rise among younger age groups (Chinese Academy of Preventive Medicine, 1997; Yang et al., 1999). These findings led health officials and researchers to conclude that China will experience a concomitant and rapid rise in smoking-related diseases, and higher mortality rates attributed to tobacco use (Lam et al., 1997; Chen et al. 1997). The U.S. Centers for Disease Control and Prevention warned that, in the absence of a major effort to alter smoking behavior in China's population, the current smoking epidemic will result in an estimated two million deaths annually, half of which attributable to lung cancer (U.S. Centers for Disease Control

and Prevention [CDC], 1993). The CDC further warned that 50 million Chinese may be facing premature death from tobacco-induced diseases.

Tobacco consumption appears to be in step with tobacco production in China. Between 1981 and 1992, China's tobacco industry nearly tripled its tobacco growing areas, from 0.59 million hectares to 1.85 million hectares (1.46 to 4.57 million acres) (State Statistic Bureau, 1993). In 1994, the country opened its tobacco market officially to major overseas tobacco companies allowing them a share in the country's profits (Mackay, 1997a). Today, China represents the largest producer and consumer of tobacco products worldwide. Current tobacco output represents 40% of global tobacco production and consumption, 31% (Li et al., 1996), substantially higher than those of the U.S. Within three years of the country's official opening of its tobacco market to overseas companies, its output in metric tons increased from 2.09 million in 1994 to 2.39 million tons in 1997, or nearly 40% of

the world's output (Ministry of Health P.R. China, 2000). In 1980, China was a net importer of raw (unprocessed) tobacco; today it is a net exporter. These giant leaps in tobacco farming and manufacture had a sudden and significant impact on national consumption. A nationwide survey showed that between 1984 and 1996 cigarette consumption for males increased from eleven to fifteen cigarettes, and for females, from nine to ten per day (Chinese Academy of Preventive Medicine, 1997).

The substantial tax revenues accruing from the production and sale of tobacco products constituted 9.2% (27 billion yuans, U.S. currency equivalent, \$3.26 billion) of total government tax revenues and, in 1995, increased to 11.3% of total revenues (71 billion yuans, U.S. currency equivalent, \$8.57 billion). These needed revenues have overshadowed the deleterious effects of the product on the health of China's population (Ministry of Health P. R. China, 2000; Jin et al., 1995).

In this article, we examined and synthesized the literature of seven tobacco-related topics that included: prevalence patterns of smoking, prevalence and its correlations with age and gender, smoking initiation, risk factors, health and economic consequences, knowledge of and attitudes towards tobacco among smokers and non-smokers, and implications for tobacco control efforts. We conducted extensive literature review and synthesis of published research addressing these categories. Through Medline database and other sources, we identified articles, books and reports from 1982 to 2002. In addition, an important source was obtained from the proceedings of a conference titled, National Conference on Policy Development of Tobacco Control in China in the 21st Century (Ministry of Health P. R. China, 2000).

### **Prevalence of Smoking**

Table 1 shows the results of various surveys on smoking conducted in China between 1984 and circa 2000. In a 1984 national survey in the country, Weng and colleagues reported a 61% prevalence of tobacco use among males and 7.0% among females (Weng et al., 1987). In

1986, a survey of tobacco use in Beijing by Chen and associates showed a prevalence of 56.6% among males and 14.4% among females (Chen et al., 1997). A parallel study in Shanghai during the same year by Li and associates revealed a 50.5% smoking prevalence among males and 0.3% among females (Li et al., 1988). A 1993 survey of Shanghai by Gong and colleagues found a prevalence of 67% among males and 2.0% among females (Gong et al., 1995).

Two 1988 surveys of Beijing youth by Zhu and colleagues and of Harbin's youth by Hu and associates showed prevalence rates of 34.4% and 24.3 for males, and 3.9% and 3.0% for females, respectively (Zhu et al., 1992; Hu et al., 1990). Zhang and colleagues, surveying the youth population of Henan in 2000, found a prevalence of 15.1% among males and 1.4% among females (Zhang et al., 2000).

Surveys to date clearly indicate marked differences between the smoking behaviors of Chinese males and females across age groups as well as substantial increases in tobacco use, especially among males. The ratio of male to female smokers is about 6:1, but the variability among large metropolitan cities is substantial. For example in Shanghai, the ratio of male to female across age groups is 34: >1, whereas in Beijing it is about 4:1. Youth smokers reflect different trends where the ratio of male to female smokers is closer to the results of surveys conducted on the general population (that included all age groups). This ratio is 5:1 indicating that China's youth is rapidly catching up with their adult counterparts. Overall, smoking rates in China have increased by about 2.0% between 1984 and 1996, according to the Chinese Academy of Preventive Medicine (Chinese Academy of Preventive Medicine, 1997). This percentage increase however, belies the fact that when these surveys were initiated in the early 1980s, smoking prevalence among Chinese, especially males, was already high. The percentage increase may be largely attributed to new recruits among China's youth, and to the country's shift in tobacco production policy which allowed overseas tobacco companies,

with extensive and successful marketing experience, to operate in the country.

There are extremes in smoking behavior in China. In the province of Heilongjiang in the northeast region of the country, for example, an overwhelming majority of male and female

adults (90%) smokes. By contrast, in the regions inhabited by Chinese Muslims in the province of Ningxia, the northwest region of the country, less than 10% of the adult population of both genders smokes (Weng et al., 1987).

Table 1  
Prevalence rates of smoking from different surveys

Target population / Reporter	Year of data collection	Scope	Prevalence (%)	
			Male	Female
<b>General population</b>				
Weng, et al.	1984	National	61	7
Chen, et al.	1986	Beijing	56.6	14.4
Gong, et al.	1993	Shanghai	67	2
<b>Adult population</b>				
Li, et al.	1986	Shanghai	50.5	0.3
<b>Youth population</b>				
Li, et al	1991	Beijing	29	11
Zhu, et al.	1988	Beijing	34.4	3.9
Zhang, et al.	(2000)*	Henan	15.1	1.4
Hu, et al.	1988	Harbin	24.3	3
Li, et al.	1997	Beijing	23	5
Ye & Lin	1983	Beijing	19.7	0.4

\* Year in which survey was reported, not conducted.

Extremes in smoking behavior are also apparent in female smokers in various regions of China. Shanghai which boasts a high prevalence of smoking among adult males, has the lowest reported prevalence for female smokers (0.3 and 2.0%) (Gong et al., 1995; Li et al., 1996). This rate is substantially different from that reported for Beijing female adults (14.4%). Beijing surveys also show dramatic shifts in smoking behavior among Chinese youth. Between 1981 and 1991, the percentage of youth female smokers shifted from 0.4% to 11.0% (Li et al.,

1996; Zhu et al., 1992; Ye & Lin, 1983). Generally, shifts in smoking behavior, especially among females, are more pronounced in China's northern and northeastern regions than in the eastern and southern regions (10% versus 3.0%).

In 1997, the Chinese Academy of Preventive Medicine reported the results of a national survey on tobacco use among China's population (Chinese Academy of Preventive Medicine, 1997). Of the country's total population, 62.4% was reported as non-smoker,

and 35.3% current smoker or ex-smoker (2.3%). Of current smokers, 16.9% had contemplated quitting and 9.4% had succeeded in quitting. The relapse rate among those who quit was 11.2%.

### **Prevalence Patterns and Age**

In 1993, Gong and associates conducted a door-to-door interview of 3423 males and 3593 females in Shanghai to determine patterns of smoking among the groups as a function of age (Gong et al., 1995). Results showed marked gender differences. Smoking rates for males between the ages 15-19 and 20-24 reflect abrupt and dramatic shift in tobacco use--from 7.8% to 49.8%, more than a six fold increase. Males showed a peak prevalence of 81% between the age of 30 and 39 years. Gong and associates did not shed adequate light on female smokers except to note that while smoking among females was negligible at age 15, the increase was 4.3% by age 70. A later survey by the Chinese Academy of Preventive Medicine (1997) corroborated these findings and provided more insights into female smoking behavior. The Academy's survey results showed that smoking rates among females age 15 and below was 0.3%, increasing steadily to 12.8% at age 65. The national survey also revealed that youth and young adults, males and females, age 25 and under, comprised 8.3% and 1.9% of current smokers, respectively. Other surveys further corroborate these findings (Zhu et al., 1992; Zhang et al., 2000; Mackay, 1997b).

### **Initiation of Smoking**

The onset of smoking among U.S. adolescents occurs between age 11 and 15 years (Conrad et al., 1992; Stanton et al., 1993). A recent study of Chinese adolescents showed similar patterns (Zhang et al., 2000). The study revealed that 55.7% of current smokers and 50% of those who tried smoking stated that they had either started smoking or experimented with tobacco between the age of 10 and 14. An earlier study of 6th, 8th and 10th grade Chinese students showed that more than one-third of male students surveyed had tried smoking by age 13 (Li et al., 1996). According to a year 1999 Global Youth Tobacco Survey (World Health Organization [WHO], 1999), China had a much higher prevalence of early initiation of smoking than other countries

surveyed. In Chongqing, in southwest China, and Guangdong, in south China, for example, 39% and 38% of current young smokers, respectively, had started smoking before age 10. Lower, but still relatively high, percentages are reflected in data from Tianjin, in northern China (27%), and Shandong, in the northeast region of the country (17.1%)

While some studies have shown that adolescents and young adults initiated smoking at later ages, the trend appears to be toward earlier than later ages. Gong and associates, examining smoking patterns in the Minhang District of Shanghai, China, reported that 50.7% of males surveyed were current smokers who initiated their smoking at age 20-24, and 29.2%, at age 25-29 (Gong et al., 1995). The authors excluded adolescents younger than 15 years in their survey. Data from the 1996 national survey of young adults and adults, 15 years and older, indicated a drop of three years in the age of smoking initiation as compared with 1984 data (Chinese Academy of Preventive Medicine, 1997). In 1996, the average age of initiation of smoking for males was 20, and that of females, 25.

### **Smoking and Risk Factors**

Various studies have noted that cigarette smoking, particularly among youth, represents a complex behavior with several identifiable determinants, among them are interpersonal factors (family and peer influence), intrapersonal factors (self esteem), individual motivational and attitudinal factors, and cultural setting (Zhu et al., 1992; Stanton & Silva, 1991; Nichter et al., 1997). Having family members who smoke, for example, not only provides young people easier access to cigarettes, but the physical presence of these smokers in the environment has a powerful psychological impact on the young, creating a mental image that smoking is a behavioral norm (Jarallah et al., 1996; Flay et al., 1998). By contrast, a non-smoking family environment, combined with a strict stance against smoking, is likely to lead to a substantially lower prevalence of tobacco use especially among youth (Tang et al., 1998; Newman & Ward, 1989).

In 1996, Li and colleagues reported that the rate of smoking among youth was associated with poor academic performance, lack of participation in unstructured activities, and other problem behaviors as, for example, truancy, running away from home, and intentional damage of school property (Li et al., 1996; Li et al., 1999). Earlier, Li and other colleagues noted that the rationale for smoking also differs (Li et al., 1988). In their survey, respondents identified

social needs, problems with work/study, problems at home and relaxation and stress reduction. Similar findings are reflected in the 1996 national survey (Chinese Academy of Preventive Medicine, 1997). That survey also noted that the majority of adolescent smokers (68.8%) and those representing all age groups in China (57.4%) initiated smoking through experimentation with tobacco (Table 2).

Table 2  
Reasons for starting to smoke in the age group 15-19 years versus the total population

Reason	Proportion of starting to smoke (%)	
	15-19 years of age	Total population
Experimentation	68.8	57.4
Social need	11.7	17.1
Fashion	13.0	4.1
To get rid of fatigue	2.6	13.4
Others	3.9	8.0

Source: Chinese Academy of Preventive Medicine, 1997

Niu and colleagues attribute smoking and its persistence among smokers to heredity factors (Niu et al., 2000). The authors' survey results suggest that acquisition and maintenance of the smoking habit are as much influenced by heredity as alcohol consumption. They note that persistence of smoking, despite widespread awareness of cigarettes' adverse effects on health, can be explained by an underlying dependence on nicotine. The pharmacological and behavioral bases for nicotine dependence act similarly to that of cocaine and heroin dependence. They suggest that genetic influences may also play an important role in vulnerability to nicotine addiction.

Although China's public health sector has shown a great deal of interest in the country's epidemic of smoking, China remains a country where smoking is considered an acceptable

behavior, especially among adult males. The concept of acceptability is, in and of itself, a high risk factor. Smoking is associated with daily social interactions where social mores dictate that acceptance of a cigarette is in harmony with the culture, and rejection anathema to it. Exchange of cigarettes among Chinese represents a gesture of friendship, a behavior that has become associated with meeting old friends, visiting someone's home, attending banquets, asking for favors, and even tipping a service provider wherein the underlying and driving behavior is social acceptability (Cheng, Ernster, & He, 1990). This behavior is best exemplified by young smokers who, on the one hand, seek an autonomous self and an individual identity--symbols of one's personality and independence—and, on the other, capitulation to a social norm (i.e., smoking) regardless of its deleterious

consequences (addiction leading to chronic health problems) (Ye & Lin, 1983; Zhang et al., 2000; Zhang & Qui, 1993). Socio-cultural factors may, however, have a salutary effect on smoking behavior as, for example, the association in Chinese culture between smoking and prostitution--a single, powerful factor which, according to Li and Zhu and their respective associates believe keeps the rate of smoking among Chinese females low (Li et al., 1996; Zhu et al., 1992).

### **Tobacco Marketing and the Cultural Environment**

There is no tobacco market today equivalent to that of East and Southeast Asia. The Chinese market, however, leads in tobacco agriculture, tobacco production, tobacco sales, and tobacco consumption. To multinational tobacco corporations, China represents cooperative civil administration, absence of viable anti-smoking policies (Chelala, 1999), cheap labor, a burgeoning consumer population recently exposed to Western values and behaviors and above all, a tobacco-friendly culture. To China, tobacco production represents employment, tax revenues and badly needed hard currency from export of tobacco products. The importance of tobacco to China has recently been underscored by Zhou Ruizeng, Director of China's Tobacco Monopoly Administration who stated: "We should do a good job in tobacco publicity within the scope of law and improve the quality of tobacco advertisement and promotion and pay attention to substantial results [sic]" (Weissman, 2000). Ruizeng is supported by Chinese economists who counsel that a reduction in tobacco production may cause a ripple effect on the economy (Werner, 2001). Aware of low smoking rates among Chinese women, Werner notes that tobacco advertisers are expending enormous efforts to recruit new and younger smokers among them (Werner, 2001), using a variety of sophisticated advertising techniques (Weissman, 2000).

The symbiotic relationship between the Chinese government, tobacco farmers, tobacco manufacturers, and multinational tobacco corporations has facilitated tobacco industry's access to China's population through an

aggressive advertising campaign that is aimed, not only at metropolitan centers, but those regions in China's interior where overall smoking rates fall below 10% (Chelala, 1999). Although there is a great deal of variability in smoking patterns among large metropolitan centers in China, recent shifts in smoking behavior have proved the success of tobacco marketing strategies in recruiting new smokers among the young in general, and among women, in particular without diminishing efforts on male recruitment at any age. Beijing presents a good example of the impact of advertising and Westernization on smoking behavior.

Taking into consideration sampling differences, three surveys (Ye & Lin, 1982; Zhu et al., 1992; Li et al., 1996) show shifts in smoking behavior among Chinese youth over a period of about 10 years (Table 1). In 1982, the prevalence of smoking among male youth was 19.7% and among female youth, 0.4%. In 1988, it was 34.4% and 3.9%, and in 1991, 29.0% and 11%, respectively. Although these prevalence rates are not representative of China's youth, male or female, they do reveal changing cultural mores especially among females where smoking has been a culturally unacceptable behavior (Li et al., 1996; Zhu et al., 1992).

### **Health and Economic Consequences of Tobacco Use**

Chinese public health officials have long been aware of the injurious effects of tobacco on health and the mounting hospital data on tobacco-related health problems. In 1957, the mortality rates in urban areas for malignant tumors and cardio- and cerebro-vascular diseases were 36.9, 47.2, and 39.0 per 100000, respectively. By 1984, the rates had risen to 116.2, 124.6, and 116.3 per 100000 (Yu et al., 1990). The age-adjusted mortality rate for lung cancer in males in Shanghai, for example, rose from 28.5/100000 between 1963-1965 to 52.0/100000 between 1976-1979. In 1984, Shanghai's smoking rate among males exceeded 50%. According to Cancer Hospital of the Chinese Academy of Medical Sciences, the largest cancer hospital in the country, lung cancer was the most common in Beijing accounting for 20% of all diagnosed cancers.

Nine out of ten of lung cancer victims had a history of smoking (Cheng et al., 1990).

Jiang and Jin analyzed tobacco related deaths in China resulting from cancer and respiratory and circulatory system diseases (Jiang & Jin, 2000). Results of their analysis showed that in 1988 there were 514,000 deaths attributed to smoking among residents aged 20 years and above. The deaths from cancers and respiratory and circulatory diseases accounted for 41%, 37% and 22%, respectively. The male deaths attributed to smoking were 484,200, accounting for 94.2% of total deaths.

High rates of smoking in China have precipitated inquiries into the effects of secondhand smoke, or passive smoking, on non-smokers in homes and workplace (Cheng et al., 1990). The study of Gong and colleagues (1995) revealed that more than 88% of respondents in their survey reported that cigarette smoking is equally harmful to smoker and passive smoker. The authors refer to other studies that indicated that non-smoking women with smoking spouses had a 30% increased risk of developing lung cancer than women with non-smoking spouses. In addition, infants living with a smoker parent are at high risk of developing bronchitis or pneumonia in the first year of life (WHO, 1999).

The economic consequences of tobacco use in China, relative to total government outlays, are enormous. Jin and colleagues, basing their estimates on 1989 data, noted that the pecuniary cost of tobacco use on the country's economy was 27.1 billion yuan. The direct medical cost was 6.9 billion yuan, or 26% of total costs. Although rural and urban smokers contributed equally to the total health cost of tobacco use, nearly 80% of this cost (21.5 billion yuan) was attributed to male smokers. Respiratory diseases accounted for 58% of total costs, while circulatory diseases for 14.5%. Stroke, hypertension, and other illnesses accounted for the remainder (Jin et al., 1995).

#### **Knowledge and Attitudes about Tobacco**

Research to date has shown that a large majority (82%) of China's smokers (mostly males), is aware of the health hazards associated with

tobacco use but are not fully aware of the consequences of specific diseases or chronic health conditions that are smoke-related (Gong et al., 1995; Cheng et al., 1990). Paradoxically, this awareness is not reflected in decreases in smoking rates, rather, with an epidemic of smoking countrywide (Zhang & Qui, 1993). Li and colleagues (1988) examined knowledge and perceptions of smoking status among smokers (N=2,262) and non-smokers (N=5,623) at China's Shanghai's industrial colleges, focusing in particular on the hazards of smoking and tobacco's effect on health (Table 3). Although most respondents were able to confirm an association between smoking and smoking-related diseases, more non-smokers than smokers were able to confirm the relationship. In a later study, Cheng and associates (1990) reported that ever smokers were more likely to indicate that smoking increases the risk of lung disease and heart disease, and were significantly more likely than never smokers to state that smoking is detrimental to health. In the same study, however, the authors reported that 38% of individuals surveyed did not know whether smoking increased the risk of heart disease. This finding is consistent with that of Li and associates (1988) where slightly more than 50% of surveyed individuals confirmed the link between smoking and heart disease.

Despite public knowledge of the health hazards of smoking, the desire among China's burgeoning smoker population to quit is low, further depressing the quit rate. Although more than one third of smokers (37%) acknowledge that smoking is an undesirable behavior, only 50% of smokers and non-smokers feel that smoking is an addictive behavior. Even among non-smokers, nearly a quarter (25%) feel that smoking is not addictive (Li et al., 1988).

The 1996 national survey of tobacco use in China showed that 16.8% of all current smokers wanted to quit smoking. At survey time, 9.4% reported they were attempting to quit, 3.5% had quit two years prior to the survey, and 11.7% had tried to quit over a two year period but had relapsed (Chinese Academy of Preventive Medicine, 1997). Response to the survey's inquiry regarding reasons for quitting included

(Figure 1): 1) concern for one's own health or illness, or the hope of preventing disease; 2) disapproval from family members; 3) economic reasons; 4) convinced by health educators, and 5) environmental constraints--smoking bans in public places.

In Li and colleagues' survey (1988) of students of factory-operated industrial colleges in Shanghai (N=7665), 52% of smokers queried about the reasons for wanting to quit stated that it was to "improve health", and 42.4% because smoking is "bad for health". There was no response from the remaining 5.6% of students.

Table 3  
Health Hazard Knowledge of Cigarette Smoking among Men in Industrial Colleges, Shanghai, China 1986

Health Hazards	Smokers (N = 2,262)	Non Smokers (N = 5,623)
Cigarettes may cause cancer	70.3	86.5
Cigarettes may cause heart disease	55.1	62.3
Passive smoking is harmful to unborn child	75.6	87.8
Passive smoking is harmful to health	72.5	87.5

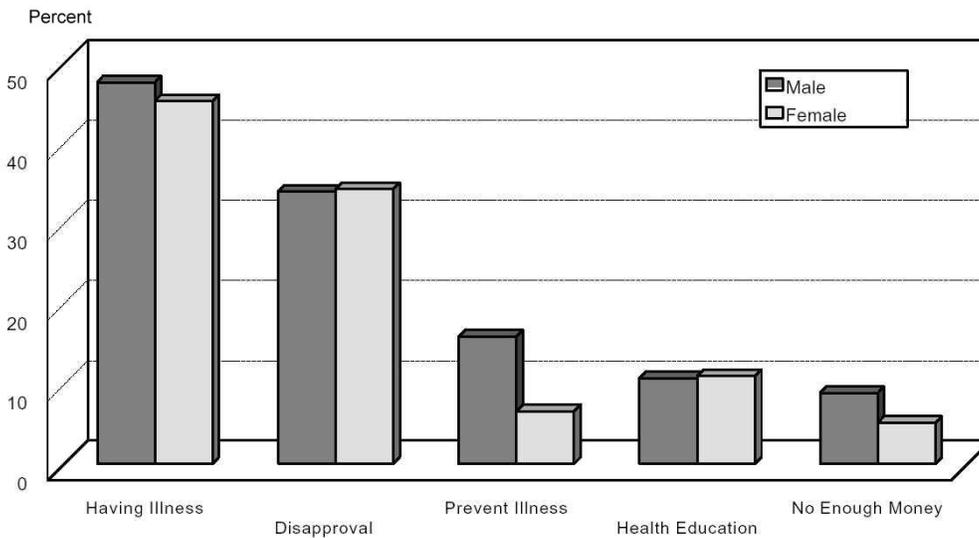


Figure 1  
Reasons for giving up smoking by sex in total population

**Tobacco Control**

Nearly twenty years ago, Ye and Lin suggested that the Chinese government should initiate a public information program on the hazards of smoking, focusing on primary schools and advising authorities that they should not be

satisfied with existing rules, specifically, the "Rule for Middle School Students" that prohibited smoking by this group of students (Ye & Lin, 1982). Hu and associates (1990) addressed the issue of incorporating anti-smoking efforts into school curricula, equating

such efforts with political and ideological education or indoctrination. Similar proposals, with minor variations, were advanced by others (Li et al., 1996; Zhang & Qui, 1993); these included use of societal influences or pressure to convince the young who smoke to quit, and those who don't, not to start (Hu et al., 1990). Still others recommended the creation of health worker and teacher models and placing these in communities (Gong et al., 1995).

Yu and colleagues (1990) proposed a comprehensive smoking control initiative that would focus on four interrelated actions: public information and education; smoking cessation; legislation and guiding policies; and research. They cautioned that unless China launches such a program, the country could face a health catastrophe. Other authorities, assuming an infra-structure in place, argued that the focus of a prevention, intervention and cessation program should be on adolescents and their families (Zhang et al., 2000; Zhang & Qui, 1993; Zhu et al., 1996). Cheng and associates (1990) corroborated this approach, extending the program to protect the young against secondhand, or passive smoking. A ban on advertising tobacco products was suggested by Li and Yu and their respective associates (Li et al., 1990; Yu et al., 1990). The former authors addressed the same issues as those of the latter authors, and all stressed an impending health catastrophe in China in the absence of prevention and intervention programs.

A group of researchers described a comprehensive strategy aimed at preventing smoking in schools, regardless of student age (Gong et al., 1995). The authors noted that the continuum of smoking behavior must be addressed from childhood through adolescence. They referred to this continuum as stages in smoking behavior that begin with preparation, followed by experimentation, and progressing to regular smoking. Zhang and colleagues (2000) emphasized early intervention to prevent formation of the smoking habit.

Other intervention strategies advanced are those that focus on major behavior modelers in Chinese society--physicians, school personnel,

parents, community leaders, and legislators, among other (Yu et al., 1990). In Chinese culture, physicians occupy a special status; they also are perceived as individuals who have a better understanding of the adverse effects of tobacco on health, hence the importance of their advice. Because these professionals are routinely in touch with patients, they can assume leadership positions in the crusade against tobacco (Cheng et al., 1990). Generally, these authors are of the opinion that health professionals' most difficult task is to convince government officials of the urgency of legislating smoking control laws, but underscoring the fact that most officials who are instrumental in formulating such laws are themselves smokers who do not wish to lose their privileges. That being the case, the authors advance a prevention plan that would focus on perception of smoking as an undesirable (negative) behavior to overcome peer pressure among the young (Zhang et al., 2000).

Further recommendations to control tobacco use in China included the legislation of laws that would prohibit sales of tobacco products to minors, increasing taxes on the sale of cigarettes, and forcing tobacco companies to reduce the tar and nicotine in cigarettes (Gong et al., 1995; Cheng et al., 1990; Yu et al., 1990). One novel approach to prevention was proposed by Niu and associates (2000). Basing their suggestion on the assumption that genetics may play a role in nicotine addiction, they proposed genome-wide screening studies of this addictive disorder to identify genes responsible for the nicotine dependence, claiming that this approach would provide a better understanding of addiction's pathophysiology as well as the discovery of potential targets for drug development (Niu et al., 2000).

The current literature on tobacco and tobacco control addresses the complex issues that Chinese health officials face and will continue to face over the next decades. There are, to be sure, attempts at moving from the stage of conceptualizing prevention and intervention programs to consideration of some plan(s) of action; but the task of implementing such plan(s) appears to be enormously complex. It took more

than three decades to legislate laws that would protect the health of U.S. citizens against tobacco products; the end is not near yet. With a population of 1.4 billion people, a burgeoning tobacco industry, a government partially dependent on tobacco tax revenues, a high rate of smoking, and cultural mores that shed positive light on smoking, Chinese health officials face insurmountable challenges as they consider strategies to avert an impending health catastrophe. These officials, nonetheless, appear intent on accepting the challenge.

In 2000, China's Ministry of Health, the Chinese Academy of Preventive Medicine and the WHO sponsored a National Conference on Policy Development of Tobacco Control in China in the 21st Century (Ministry of Health P.R. China, 2000). A range of issues were discussed that included tobacco-related morbidity and mortality, tobacco consumption, and practical and sustainable tobacco control programs. The conferees identified three major, albeit known, strategies to counter tobacco use in China: first, to deter the onset of tobacco use, particularly among adolescents; second, to promote smoking cessation, improve success rate and reduce relapse rate of cessation among smokers; and three, to reduce exposure to environmental tobacco smoke among non-smokers. The mere fact that such a conference would be held in China in the light of China's global role in tobacco production, and the involvement of WHO in the deliberations, is an indication that the country is at least beginning to weigh its economic investment in tobacco against a potential health catastrophe whose costs may be well beyond the current capacity and resources of the country.

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## China and Tobacco: Concluding Remarks

It would be inappropriate, if not futile, to weigh tobacco industry's contributions to the economy of China against human costs resulting from the industry's harmful product. The U.S. experience with the tobacco industry has shown that, although the industry is resilient, it can also be challenged, if not forced to concede to public opinion. China's health officials are already underscoring the mounting evidence of tobacco-related diseases, the loss of manpower, and the steady increase in the number of patients entering hospitals with long-term illnesses attributed to smoking. Governmental authorities cannot ignore these facts because they translate into governmental pecuniary outlays. These outlays may equal, if not exceed the profits accruing from the manufacture and sale of tobacco. In the long term, what counts is the health and productivity of the nation.

The U.S., Canadian and European approaches to tobacco control could be examined for their relevance to China's tobacco control needs, short-circuiting years of experimentation with various strategies, approaches, and legislative efforts. In the meantime, a number of suggestions by researchers merit consideration by Chinese health officials. The authors are firmly convinced that at the core of successful prevention and intervention programs is coalition building at community levels, structured educational programs, and follow up and follow through programs to ensure compliance and to minimize failure. The current tobacco epidemic of smoking in China cannot but lead governmental authorities to the conclusion that investment in tobacco control is a wise and profitable investment.

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