

Smoking in China

Findings of the 1996 National Prevalence Survey

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AS THE WORLD'S LARGEST PRODUCER and consumer of tobacco, China bears a substantial proportion of the global burden of smoking-related disease.¹ Of China's population of 1.2 billion, more than 300 million men and 20 million women are smokers, making China the world's largest actual and potential national market for cigarettes. In 1994 about 1.7 trillion cigarettes were produced in China and about 900 million were imported.² The sales volume has grown steadily since 1981 (FIGURE 1) when economic reforms were initiated, and current sales of cigarettes are estimated at 1900 cigarettes per adult per year.² More than 1000 brands of cigarettes are available in China with average prices ranging from approximately 5 RMB (\$0.63 per pack) in urban locations to 2 RMB (\$0.25) in rural areas. Western brands tend to be more costly. The average smoker is estimated to spend about 25% of his/her income on cigarettes.²

China is considered to be in an early stage of a tobacco epidemic, but the burden of disease attributable to smoking

See also p 1284.

Context As the world's largest producer and consumer of tobacco products, China bears a large proportion of the global burden of smoking-related disease and may be experiencing a tobacco epidemic.

Objective To develop an evidence-based approach supporting tobacco control initiatives in China.

Design and Setting A population-based survey consisting of a 52-item questionnaire that included information on demographics, smoking history, smoking-related knowledge and attitudes, cessation, passive smoke exposure, and health status was administered in 145 disease surveillance points in the 30 provinces of China from March through July 1996.

Participants A nationally representative random sample of 128 766 persons aged 15 to 69 years were asked to participate; 120 298 (93.8%) provided data and were included in the final analysis. About two thirds of those sampled were from rural areas and one third were from urban areas.

Main Outcome Measures Current smoking patterns and attitudes; changes in smoking patterns and attitudes compared with results of a previous national survey conducted in 1984.

Results A total of 41 187 respondents smoked at least 1 cigarette per day, accounting for 34.1% of the total number of respondents, an increase of 3.4 percentage points since 1984. Current smoking continues to be prevalent among more men (63%) than women (3.8%). Age at smoking initiation declined by about 3 years for both men and women (from 28 to 25 years). Only a minority of smokers recognized that lung cancer (36%) and heart disease (4%) can be caused by smoking. Of the nonsmokers, 53.5% were exposed to environmental tobacco smoke at least 15 minutes per day on more than 1 day per week. Respondents were generally supportive of tobacco control measures.

Conclusion The high rates of smoking in men found in this study signal an urgent need for smoking prevention and cessation efforts; tobacco control initiatives are needed to maintain or decrease the currently low smoking prevalence in women.

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in China will assume greater prominence in coming years. It is estimated that deaths due to smoking will increase from about 1 million worldwide in 1995 to more than 7 million in 2025.³ At current smoking rates, by the year 2025, 2 million smoking-related deaths are predicted to occur in China, and at least 50 million Chinese smokers alive today are expected to die prematurely.⁴ Data from China's disease surveillance point (DSP) system indicate that China is experiencing an epidemic of diseases caused by tobacco.⁵

To develop an evidence-based approach to tobacco control, the Ministry of Health and Committee of the National Patriotic Health Campaign entrusted the Chinese Academy of Pre-

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ventive Medicine and the Chinese Association on Smoking and Health, in collaboration with the Johns Hopkins University School of Hygiene and Public Health, with the responsibility to plan and conduct the Third National Prevalence Survey on Smoking. We report results of the 1996 survey, providing epidemiological evidence needed to understand the smoking-related problem in China and to develop appropriate interventions.⁶

METHODS

Survey respondents were selected from a population of about 10 million people, who reside in 1 of 145 preselected DSPs in the 30 provinces in China. The DSP system originated in the 1980s to provide surveillance for morbidity and mor-

tality.⁷ The system has evolved over time and the present system with its 145 surveillance points was established in 1989. The DSPs were selected from an official list of all neighborhoods in urban areas and villages in rural areas using principles of stratified and multistage random sampling. The strata included geographic area and urban or rural status and, within the rural areas, stratification into 4 levels based on indicators of mortality and socioeconomic status. Comparisons of the DSP population to the general population in terms of mortality, birth rate, and infant death rate show no significant differences. Such comparisons are made annually.⁷

In each DSP, persons from age 15 through 69 years from 1000 households were selected by a 3-stage clus-

ter, random sampling method.⁸ The method yields a sample that is self-weighted to provide national estimates. The 52-item survey questionnaire was administered by trained interviewers and included information on demographics, smoking history, smoking-related knowledge and attitudes, cessation, passive exposure to tobacco smoke, and health status.

Smoking status was defined according to World Health Organization classifications⁹: general or ever-smokers included persons who had ever smoked for at least 6 months; current smokers were smoking tobacco products at the time of the survey while former smokers were not; regular or daily smokers were persons smoking at least 1 cigarette daily; and heavy smokers smoked at least 20 cigarettes daily. Passive smoke exposure was defined as being exposed to another person's tobacco smoke for at least 15 minutes daily on more than 1 day per week. Overall smoking rates were calculated using a preweighting method and with age standardization to the 1990 national census.⁷ In addition, certain rates were calculated using 1982 census information to compare the results from this survey with those from the 1984 national survey of tobacco use.¹⁰ The 1984 survey of 519 600 persons also followed World Health Organization guidelines and was based on a national sample, although selected by a different sampling approach from the 1996 survey. In the 1984 survey, a multistage random selection approach was applied separately in cities and in rural areas.¹⁰ The 1984 survey also included persons 70 years and older.

RESULTS

Of the originally sampled population of 128 766, a total of 120 298 (93.4%) persons provided complete data and were included in the final analysis. There were 63 793 male and 56 020 female participants (485 surveys did not identify sex); two thirds were rural and one third were urban dwellers. The survey sample was nearly comparable by age and sex (TABLE 1) with China's overall population, with moderate underrepresenta-

Figure 1. Sales Volume of Cigarettes in China, 1981-1995

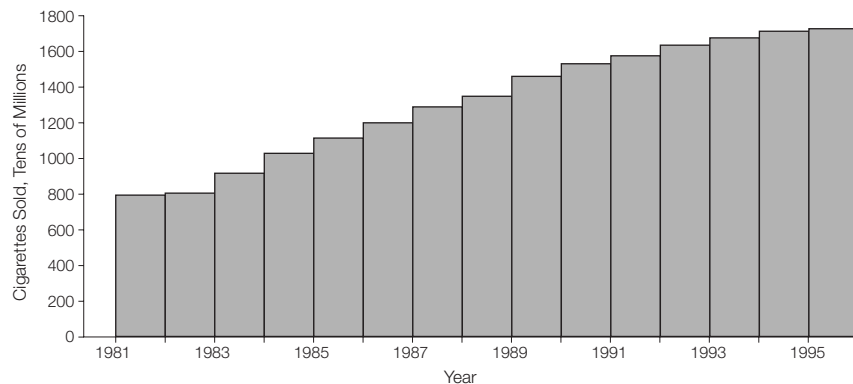


Table 1. Survey Population Compared With Estimated Population by Age and Sex for 1996*

Age Group, y	% of Men		% of Women	
	Survey (N = 63 793)	Estimated	Survey (N = 56 020)	Estimated
15-19	6.3	11.1	6.4	11.1
20-24	8.2	13.3	8.3	13.5
25-29	13.0	15.0	13.6	15.0
30-34	15.5	13.7	16.8	13.9
35-39	13.1	9.2	12.9	9.0
40-44	12.9	10.4	11.2	10.4
45-49	7.9	7.9	7.2	7.6
50-54	6.1	5.9	5.8	5.7
55-59	6.1	5.3	6.0	5.1
60-64	6.1	4.7	6.6	4.7
65-69	4.9	3.6	5.2	3.8

*Excludes 485 persons of unknown sex. (Source: US Bureau of the Census, International Data Base, www.census.gov.)

tion of persons aged 15 to 19 years and 20 to 24 years and slight overrepresentation of persons older than 50 years. The underrepresentation of young respondents is assumed to reflect the nonavailability of students for survey and the fact that younger adults often work away from home. The sampled population was representative of the nation in terms of geographic area, educational level, and occupation.

A total of 41 187 survey respondents (34.1%) smoked at least 1 cigarette per day. The prevalence rate for ever-smokers was 66.9% for men and 4.2% for women, with an overall prevalence of 37.6% for those who are 15 years and older in China's population. Among men, 63% were current smokers, as were 3.8% of the women, for an overall prevalence of 35.3%; 7.5% of men and 0.2% of women were heavy smokers.

Smoking prevalence rates by age group are shown in FIGURE 2 for men and women, respectively. For men, smoking rates increased rapidly from 18% among those 15 to 19 years old to 55% in the next 5-year age category, while for women the smoking prevalence increased slowly to about 5% at 45 years, then more rapidly to more than 14% for those 65 years and older. In older men, the current smoking rate declined as the percentage of ex-smokers increased.

Among men, smoking rates were lowest for those with at least a college education (54.2%) and highest for those with no more than primary schooling (72.4%). Smoking rates among men also varied by occupational group. More than 70% of farmers, factory workers, service people, private company employees, those self-employed, and the floating or itinerant population with no fixed residence were smokers. Smoking rates for male health care professionals (60%) and male teachers (56%) were also high. Among women, smoking rates by occupation were distinctly different, with the highest rates among retired persons (11%) and those working at home (8%).

The smoking rate for rural men (68.4%) was slightly higher than for urban men (64%) at all ages. Older

women living in urban areas smoked more than older women in rural areas, with a peak prevalence rate of 16% at age 65 years. Regional distributions showed that among men, smoking rates were

high throughout China, but particularly in the Southwest. For women, there was significant variation in smoking rates by region, with the highest rates in the Northeast and Northern areas of China

Figure 2. Age-Specific Prevalence Rates of Current and Former Smoking in Men and Women in China, 1996

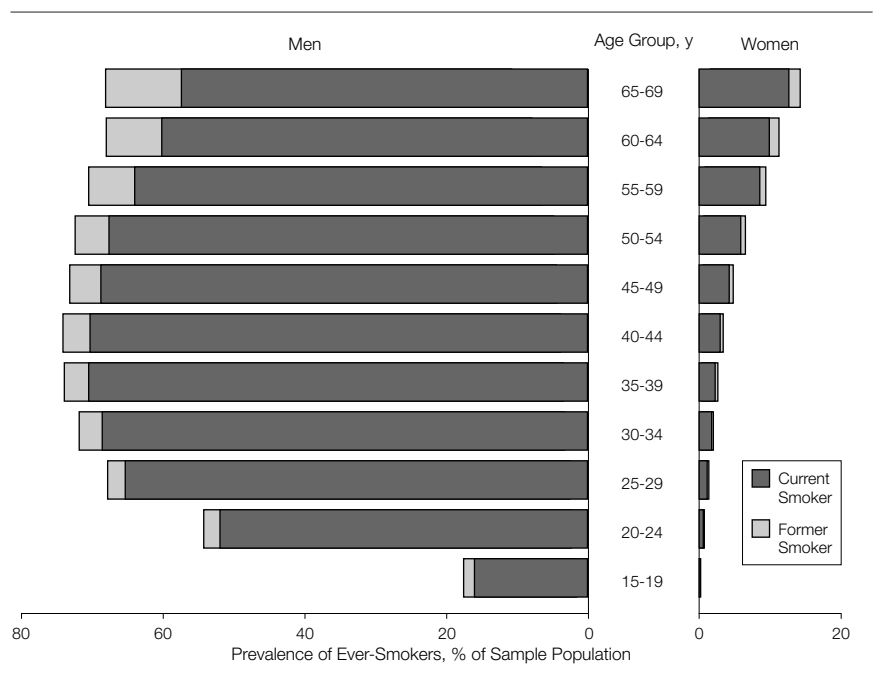
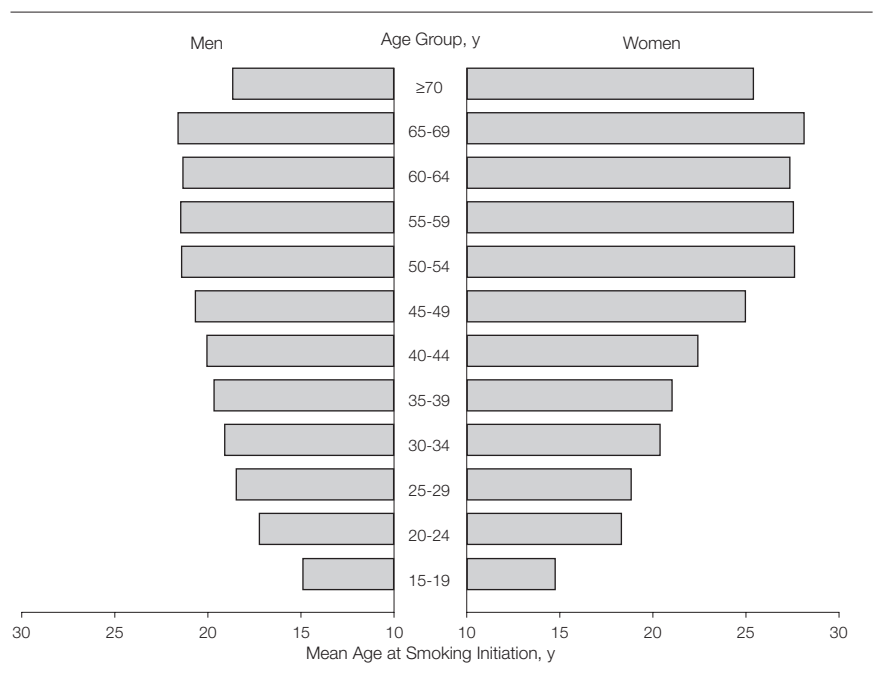


Figure 3. Mean Age of Starting to Smoke by Age Group and Sex, 1996



(10.2%) and the lowest (2.5%) in the South.

The average number of cigarettes smoked per day by men increased from about 2 per day at ages 15 to 19 years to 12 per day at 20 to 25 years, to an average of 15 cigarettes per day by age 30 years. Women aged 20 years and older smoked slightly more than 10 cigarettes per day. The mean age of smoking initiation was related to current age; younger smokers reported an earlier age of initiation than did the

older smokers (FIGURE 3). Smokers use filtered and unfiltered cigarettes; however, filtered cigarettes dominated the market, especially among younger smokers, and only about 20% of the respondents reported smoking unfiltered brands. Smoking practices varied across the country, reflecting different cultural practices by ethnic groups. The Chinese pipe was commonly smoked in the South and Southeast, and hand-rolled cigarettes were common in the Northeast.

Although different sampling methods were used for the 1984 survey, overall smoking trends between 1984 and 1996 can be assessed. The 34.1% prevalence of daily smokers in 1996 was higher by 3.4 percentage points than the 1984 rate. Smoking prevalence increased in people younger than 30 years, and decreased in those older than 45 years compared with rates for 1984 (FIGURE 4). From 1984 to 1996, the age of smoking initiation declined approximately 3 years for both men and women; for men, the average age declined from 22 to 19 years, and for women, the average declined from 28 to 25 years.

Only 2.3% of survey respondents were former smokers. Of current smokers in the survey, 16.8% said they wanted to quit and 9.4% reported being at some stage of trying to quit. Of the former smokers, 37% had been successful in not smoking for at least 2 years. However, 11.7% of smokers reported having made a quit attempt, but were again smoking. The prevalence of attempted and successful quitting increased with age (FIGURE 5). The most common reasons given for quitting were present illness (47%), fear of illness (34%), disapproval by a family member (16%), influenced by health education (9%), and cost (11%).

Of the nonsmoking respondents, 53.5% reported passive smoke exposure. When the numbers of active and passive smokers are combined, more than 72% of all Chinese (>600 million people) are exposed to tobacco smoke. More than 60% of female nonsmokers between ages 25 and 50 years (childbearing years) were passively exposed to tobacco smoke. Seventy-one percent of participants reported smoke exposure in the home, 32% in public places, and 25% in their workplace.

The majority of respondents showed evidence of some understanding of the harmful effects of active and passive smoking, and of risks to the fetus due to smoking while pregnant (TABLE 2). Most recognized that active smoking is risky and the majority also recognized passive smoking as harmful but were less knowledgeable about the effects on

Figure 4. Overall Prevalence of Current Smoking for 1984 vs 1996 by Age Group

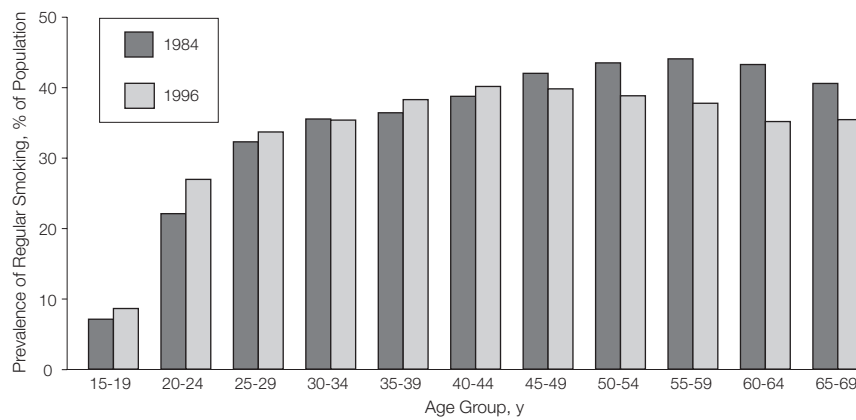
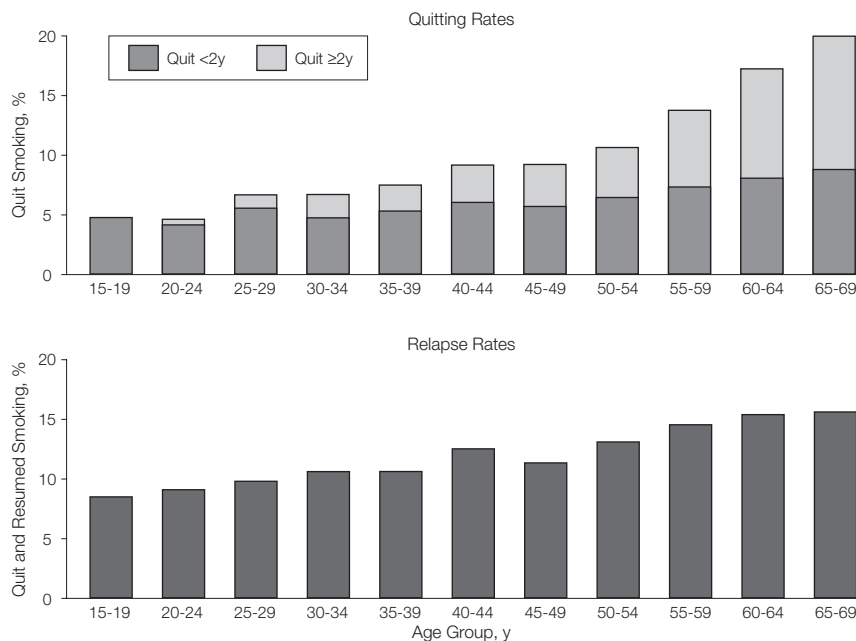


Figure 5. Quitting Rates vs Relapse Rates in Smokers by Age Group, 1996



the fetus because of the mother's smoking during pregnancy. In general, smokers tended to identify a lower level of harm than nonsmokers.

When respondents were asked about diseases caused by smoking, bronchitis was most often recognized (70%) as being smoking-related. Lung cancer was recognized by about 40% of both smokers and nonsmokers as related to smoking, and chronic heart disease by only about 4%. Smokers tended to report less harm due to smoking than nonsmokers, but the differences were not substantial. Knowledge of disease risks was markedly affected by level of attained education (FIGURE 6).

Almost 80% of both smokers and nonsmokers agreed strongly that physicians and teachers should not smoke. Almost as high a percentage of nonsmokers, 78%, said that parents should not smoke in front of children, as did 68% of smokers. There was strong support for government-enforced tobacco control policies, including bans against smoking in public places (74%); advertising bans (64%); warning labels on all cigarette packs (64%); and bans against sales to minors (83%). Only 29% of respondents favored increasing the cost of cigarettes as a tobacco-control measure.

COMMENT

The 1996 National Prevalence Survey was the first nationwide survey of smoking patterns in China since 1984.¹⁰ Recognizing the increasing problem of smoking, China's health leaders began significant efforts to build national control programs in the late 1980s. The Chinese Association on Smoking and Health was established in 1990, followed by the establishment of provincial associations. Tobacco control initiatives involving education and legislation were also initiated. Since the 1984 survey, a number of studies on smoking have been conducted in China, but these have been primarily local descriptive reports of smoking-related morbidity and mortality with less emphasis on knowledge, attitudes, beliefs, and behavior. Most studies have involved small population

groups in selected municipalities and rural areas.¹¹⁻¹⁷ Thus, the 1996 survey offers the first data following the implementation of substantial tobacco control efforts. The data may also reflect the consequences of multinational corporate involvement in China's tobacco market.

The survey results reaffirm the high prevalence of smoking among Chinese men and the low prevalence among Chinese women found in the 1984 survey. Even though there are methodological differences between the 2 surveys, both offer national smoking figures based on large samples, and comparisons of overall smoking estimates should have reasonable validity. The 1996 survey came at a time

when China had begun to address tobacco control needs while, simultaneously, the multinational tobacco companies were poised to market aggressively in China. These survey results indicate the enormous potential market in China for sales of Western cigarettes. The millions of men already smoking are a ready target for switching to Western brands, and women represent a potential mass market, particularly as the lifestyles of women move away from more traditional expectations.

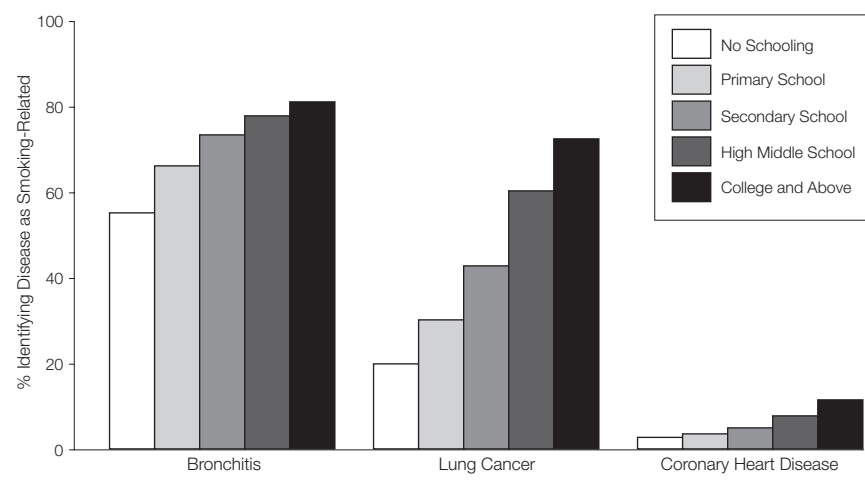
Other researchers have documented that tobacco consumption is a major cause of death in China, similar to what is seen in other countries.^{18,19}

Table 2. Prevalence Survey in China: Knowledge of Harm From Smoking by Smoking Status in 1996

Risk	Knowledge of Harm	Smoker, %	Nonsmoker, %
Active smoking	Serious	23.3	36.4
	Little	61.1	52.6
	None	7.5	2.0
	Unknown	8.1	9.1
Passive smoking	Serious	17.6	28.2
	Little	56.4	52.7
	None	10.8	4.4
	Unknown	15.3	14.7
Maternal smoking during pregnancy*	Serious	21.9	29.5
	Little	41.6	41.2
	None	4.6	2.6
	Unknown	31.8	26.4

*Indicates risk for the fetus, not the mother.

Figure 6. Percentages of Respondents by Educational Level Identifying Smoking as a Cause of Selected Diseases, 1996



Yuan et al²⁰ conducted a prospective cohort study of 18 244 male residents of Shanghai. Heavy smokers were at 60% greater risk for death than never-smokers, and relative risks were elevated for incident cancer cases, including lung, head and neck, and liver, and also for ischemic heart disease and chronic obstructive pulmonary disease. Two studies assessed the health effects of smoking in occupational cohorts. In a study of 1696 machine factory workers in Xian, China, ever-smokers, including both women and men, were at increased risk for death due to all causes, all cancers, and coronary heart disease.²¹ Chen et al²² observed 9351 factory workers in Shanghai over an average follow-up of 16 years. Male smokers in the study were at a 40% increased risk for mortality compared with nonsmokers, and their mortality was increased for lung, esophageal, and liver cancers, coronary heart disease, and chronic obstructive pulmonary disease. Women smokers were also at increased risk for death.

Further evidence of the effect of smoking on mortality in China comes from 2 recent studies. Liu et al²³ conducted a proportional mortality study of 1 million deaths in China occurring between 1986-1988. Although the study used a simple but practical approach to field data collection from surviving informants, the devastating impact of smoking was readily shown for lung cancer, respiratory disease, and heart disease. Smoking prevalence among surviving spouses was quite comparable with that found in our 1996 survey. Follow-up of 224 500 participants in a 1990-1991 national smoking survey provided confirmatory evidence from 45 DSP points.²⁴

These findings and the high prevalence of smoking documented in the 1996 survey signal an urgent need for tobacco control measures in China. Adding to the imperative is the earlier age of smoking initiation for both men and women. School-based surveys in China also indicate increasingly earlier smoking initiation among Chinese adolescents.^{11,16,17,25} Another ominous find-

ing from our survey is that the number of cigarettes smoked per day has increased by about 2 for both men and women. An earlier age of smoking initiation and an increase in the number of cigarettes smoked are associated with increased disease risk and may indicate a general pattern of moving toward the increasingly high-risk smoking profile seen in Western countries.

The heterogeneity of smoking habits in China will pose a challenge for those who develop tobacco-control initiatives. Smoking rates are much higher in men than in women; they also vary by education and occupation, although not so steeply as at present in the United States.²⁶ There are also regional variations in smoking rates and practices. Although overall smoking rates for women are low, the rates in the North and Northeast sectors are 4 times higher than in the South and East. Smaller studies in both Northern and Southern China have also shown similar rate differentials between these regions,^{15,27} indicating a need for more intensive education among women in these regions.

Some general findings emerged from this national survey, which can help guide the development of a tobacco-control policy. The smoking problem is multifaceted and no single variable or control measure will resolve the problem throughout China. Control measures will need to cover a wide spectrum from legislation to efforts to develop new community and social and behavioral norms. A high priority should be to prevent women and adolescents from starting to smoke. A national policy of setting goals and targets but encouraging those in local authority to find their own solutions fits well with current directions in Chinese policy. This is happening especially as political units take on the title and responsibility of becoming smoke-free, as, for example, in Shanghai. A national research agenda on tobacco control is needed, particularly to address issues that appear specific to China.⁶

Our survey found strong public consensus supporting national policies, in-

cluding preventing young people from starting to smoke, and placing bans on tobacco sales, advertising, and use. However, any policy will require rigorous enforcement because multinational tobacco companies have demonstrated great ingenuity in tapping into China, the world's largest market for future tobacco sales. Decisions to proceed should not await more information. Family values in China, for example, the great concern among parents for the health and future of their children (resulting from the 1 family, 1 child program), offer a unique opportunity to test interventions with parents to prevent adolescents from smoking. Our survey results indicate that, regardless of their smoking status, parents do not want their children to become future smokers.

Effective smoking cessation programs are needed in China. The survey findings indicate that about 50 million people in China want to quit. The high relapse rate among those who have tried shows that the Chinese people, similar to smokers around the world, need help to maintain cessation. Enhanced knowledge of the health risks of smoking might facilitate cessation, and trials of control measures designed to fit cultural and economic conditions are needed.

These survey results show that a remarkably high proportion of Chinese people strongly support control of the tobacco epidemic, even though the people underestimate the magnitude and severity of risks from smoking. These findings provide strong evidence that more health education is needed. For the public good, the Chinese people need to know the scientific evidence about disease risk and the potential benefits of quitting and preventing new smokers from taking up the habit. China has unique opportunities to show the rest of the world that tobacco control is possible, and that it can be accomplished by the country with the world's largest problem.

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By listening to the language of his locality the poet begins to learn his craft. It is his function to lift, by use of his imagination and the language he hears, the material conditions and appearances of his environment to the sphere of the intelligence where they will have new currency.

—William Carlos Williams (1883-1963)