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The Decline of Smoking among Female Birth Cohorts in China in the 20th Century: A Case of Arrested Diffusion?

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Abstract

The smoking prevalence by age of women in China is distinct from most other countries in showing more frequent smoking among older women than younger. Using newly developed birth cohort histories of smoking, the authors demonstrate that although over one quarter of women born 1908–1912 smoked, levels of smoking declined across successive cohorts. This occurred despite high rates of smoking by men and the wide availability of cigarettes. The analysis shows how this pattern is counter to that predicted by the leading theoretical perspectives on the diffusion of smoking and suggests that it arose out of a mix of Confucian traditions relating to gender and the socio-economic and political events early in the 20th century which placed emerging women's identities in conflict with national identities. That a similar pattern of smoking is evident in Japan and Korea, two countries with strong cultural affinities to China, is used to buttress the argument.

Keywords

tobacco; China; East Asia; diffusion theory; gender; “modern girl”

Tobacco use is often referred to as a worldwide epidemic, because of its broad diffusion among many groups within societies, its spread across societies, and its many direct health risks (WHO 2009; Lopez, Collishaw and Piha 1994). Among the many topics under study, the level of smoking in China and the potential health consequences have come under increasing scrutiny. China is now the largest consumer and producer of tobacco in the world with 350 million smokers accounting for 37% of the world's cigarette production. (Shafey et al. 2009:22). Tobacco related diseases in China in recent years have been estimated to cause from two-thirds of a million deaths (Gu et al. 2009) to more than a million (Liu et al. 1998; Eriksen et al. 2012). Two out of three Chinese men were current smokers according to the 1996 national prevalence survey, and that proportion varied little between the ages of 25 and 70 (Weng and Niu 1998; Yang et al 1999).

By contrast to the men, only 4% of women in China younger than age 70 were reported as ever smokers in the 1996 survey. This pattern is similar in both magnitude and the degree of gender differential to those observed in a number of non-western countries, as reported by Waldron et al. (1988) and Morrow and Barraclough (2003a, 2003b). Though noted in passing in several places, this low level of smoking prevalence has generally escaped detailed analysis.¹ Smoking prevalence by gender in China also resembles the patterns

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¹A recent exception is Benedict (2011)

found in Korea and, to an extent, Japan, two countries with strong cultural and socio-economic affinities.

Additionally, in the case of China and the other East Asian countries, the low current level of female smoking masks a complex age structure and history not generally found elsewhere. More specifically, the age distributions suggest that smoking among women in these countries was at a much higher rate earlier in the 20th century than later, and that younger cohorts of women did not adopt smoking at anything like the rate of older women. This East Asian pattern runs counter to that predicted by the prevailing theories on how levels of adoption and use advance over time and is particularly surprising in light of the long history of tobacco use in China, Japan, and Korea. How do we account for this arrested diffusion of smoking among women, and what do these insights suggest for a more nuanced understanding of the forces affecting adoption and cessation?

In the next sections we describe the age patterns of use expected according to current theoretical perspectives on the spread of smoking and show their fit with the U.S. experience and several European countries. We then demonstrate how the East Asian countries differ from these expectations, utilizing in the case of China, birth cohort data on smoking prevalence not previously available. The final section examines the question of why this distinctive pattern evolved, tracing the history of smoking in East Asia with special attention to the cultural, socio-political and economic forces at play during the early decades of the 20th century. It is worth noting that the paper reverses the usual trajectory of statistical analysis: we begin by observing the age patterns of use over time and use historical dynamics to suggest why this pattern emerged, rather than employing statistical data and analysis to clarify historical trends.

Theoretical Perspectives on the Prevalence of Smoking

The key theoretical perspectives employed to discuss the spread, level, and prevalence patterns of tobacco use are those of epidemic, diffusion, and, when accounting for male-female differences, issues of gender equality. Lopez et al. (1994) for example posit a “descriptive model of the cigarette epidemic,” illustrated in figure 1, which defines four stages - from two to three decades each in length - during which the prevalence of cigarette consumption rises rapidly from a low level for men to a peak at the end of stage II, and then starts a decline, somewhat rapidly in stage III, and more gradually in stage IV. Women's prevalence of smoking is assumed to lag behind that of men by one or two decades, but to increase rapidly in stage II before starting a gradual decline in stages III and IV. But as the authors note, the model they describe is a very general categorization and the “exact timing, duration, and magnitude of the epidemic will vary significantly from one country to another” (Lopez et al. 1994:245).

The diffusion of innovations perspective attempts a more explanatory approach by subsuming tobacco adoption and use under this broader set of models which seek to track “an innovation, defined as an idea, practice, or object perceived as new by an individual or other relevant unit of adoption, which is communicated through certain channels over time among the members of the social system” (Rogers 1976:292). As Wejnert (2002) notes, such communication and influence alter an actor's probability of adopting an innovation and in a broad sense, studies of diffusion have the potential for providing an empirical and quantitative basis for developing more rigorous approaches to theories of social change.

Diffusion of innovation models call attention to the rate at which various subgroups within a population adopt and terminate their use of tobacco. The earliest models pointed to the younger and more elite groups as leading the way in adoption, with those in lower socio-economic groups following. But with greater awareness of the dangers of smoking, it is

expected that the more educated will terminate earlier than the less educated and also adopt less frequently, eventually changing the social class prevalence relationship (Lopez et al. 1994; Pampel 2005, 2006).

With regard to gender, it is generally asserted that men take up smoking first and the extent to which women follow depends on their status within society, the level of economic development, and specific cultural aspects (Waldron 1991, Nathanson 1995, Pampel 2001). As example, the relatively rapid increase of smoking among women in the more economically developed countries after World War II, is often credited to improvements in gender equality that were occurring at the same time (Nathanson 1995).²

Smoking Prevalence in the United States

The data in Table 1 for the United States for select years from 1955 – 2009 illustrate a number of the patterns suggested by the above perspectives. By 1955, it would appear that United States was approaching the end of stage II of the Lopez et al. model, with male prevalence at 57% and female prevalence substantially lower at 28%, but from all evidence rising rapidly. By 1965, the United States had entered stage III, male rates having peaked and now at 51%, but female rates rising slowly to 34%. The figures for 1985 and 1995 are representative of the end of stage III and stage IV. In 1995, the male smoking rate at 26% is less than half of the 1955 level, while the female rate has declined more gradually from its peak in 1965, so that the differential between male and female smoking is greatly diminished from the earlier years. Since 1995, both male and female rates have continued to decline moderately, with males maintaining a somewhat higher prevalence level, but the differential is much less than in 1955 or 1965.

The age-specific data are also generally in keeping with the diffusion perspective. For both males and females, prevalence is higher at the younger ages (under age 45) in 1955 and 1965 than the older, pointing to increased adoption by successive cohorts of younger people. There is less gender differential at younger ages than older and the female age distribution is much more skewed among women so that the ratio of male to female proportion smoking rises sharply with age in those early years. From 1985 on, female smoking is more on a par with male smoking at many ages so that the male to female ratios are reduced; and in 1995 there is almost parity in the ratios and distributions.

Pampel's (2005) analysis of changes in smoking by male and female birth cohorts from 1889 through 1976 by educational level in the United States, derived from the General Social Surveys, tends to support the hierarchical pattern of adoption and cessation described above. Among the oldest cohorts observed there is either a slight positive relationship or zero relationship between smoking and education, which grows increasingly negative in the more recent cohorts. Escobedo and Peddicord's (1996) birth cohort analysis by education from the National Health Interviews Surveys covering cohorts from 1889 through 1976 shows a similar trend in the changing relationship by education across cohorts in smoking prevalence between older and younger cohorts.

For countries in which women have adopted smoking more recently, as in Italy and Spain, a sharp gradient by age is observed as the increase in female smoking occurs disproportionately among younger women. In Spain, for example, in 1987, a survey in

²Pampel's (2001) analysis argues that this was more due to ongoing diffusion trends than to emerging gender equity. His measure of diffusion, however, is the number of decades since cigarette consumption reached its peak in each country, and is designed to capture the stage of smoking prevalence of men and women. As such it is a descriptive measure of typical trends rather than a reflection of any set of individual or societal actions, which several critics of diffusion analysis believe is necessary, as discussed further below.

Catalonia revealed that 41% of those aged 25 to 34 smoked, compared to 14% of those aged 35 to 44, and less than 5% of those aged 45 or older (Nicolaidis-Bouman et al. 1993).

Smoking Patterns in East Asia

A time series of smoking prevalence by age and gender is not available for China. Table 2 presents data from the major survey conducted in 1996³, but the next section presents a detailed birth cohort analysis derived from a 2002 survey which fills in much of the history. For Korea and Japan a partial time series is available, as shown in table 3.

In contrast to the United States pattern, these tables reveal that smoking among women is much lower than among men, and in almost all instances, the smoking prevalence of females increases with age, suggesting that older women in these countries adopted at higher rates than their younger counterparts. In Japan, the most recent years show an upsurge in smoking at younger ages (not unlike Spain) which is not apparent in China and Korea so that the dominance of the older age groups observed for 1965 and 1975 no longer holds.

Unlike the pattern for women, the age distribution for men is much more rectangular, with high proportions smoking at each age. As a result, the ratio of male to female smoking ratio is much higher at younger ages than at older ages. In China, it ranges from about 50 to 1 at ages 25–29 to only 6 to 1 at ages 60–64, reversing the pattern for the United States shown in Table 1.

Birth Cohort Analysis of Chinese Smoking Patterns

Though the age distribution of smoking prevalence at one or more points in time provides valuable information as to differential behavior among the birth cohorts, it provides only limited historical perspective. If two age groups differ in prevalence, one does not know whether they differed in rates of adoption or cessation or both, and how ages of initiation may have differed. Nor does one know how prevalence levels evolved over time. Birth cohort histories of smoking can be constructed when one has individual data on current smoking behavior, date of initiation and date(s) of cessation. These data provide a much richer history which is particularly useful for aligning the trends and patterns of smoking with the social, economic, and cultural forces ongoing in the country. Birth cohort analyses of smoking have been carried out for a large number of countries, including Germany, Italy, Spain, United Kingdom, Japan, and South Korea (Harris 1983; Brenner 1993; LaVecchia, Decarli, and Pagano 1986; Fernandez et al. 2003; Kemm 2001; Marugame et al. 2006; Park et al. 2005). To the best of our knowledge, this is the first such analysis which covers nearly all of China. An earlier birth cohort analysis of smoking by Kenkel et al. (2009) covered only nine provinces, and these provinces, as revealed by the 1996 survey, are not nationally representative of smoking behavior in China.⁴

The data used are derived from the 2002 Chinese Longitudinal Healthy Longevity Survey (CLHLS) data which covers 22 out of China's 31 provinces.⁵ The 2002 wave includes 16,064 Chinese ages 65 and older as of that date. Details of the survey including its availability for download can be obtained online (Chinese Longitudinal Healthy Longevity Survey 2009). Our analysis of the 2002 CLHLS data is performed on a sample of 11,045 respondents born between 1908 and 1937. We stratify this sample by rural-born (N=9171) and urban-born respondents (N=1874). The survey asked respondents if they have ever

³Data on smoking prevalence in China can also be found in a national survey conducted in 1984. However, the 1984 data are over-representative of the urban population (Weng 1988).

⁴Kenkel et al. (2009) use data from the Chinese Health and Nutrition Survey (CHNS) which covers the provinces of Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning, and Shandong.

⁵The missing provinces represent about 15% of the population (Yi et al. 2009).

smoked, the age they began smoking, and the age they quit smoking.⁶ These reports plus appropriate life tables and estimates of differential survivorship of smokers and non-smokers permit the calculation of birth cohort histories of smoking. (Appendix 1 gives a short description of the technique as described by Harris (1983) and the details of the survivorship data used.)

The key results of this analysis are presented in Figures 2 and 3 for male and female birth cohorts of urban and rural origin born from 1908 through 1937. Collectively these cohorts have lived through a tumultuous century in China's history, marked by extraordinary social - economic and cultural and political changes exemplified by the creation of the Chinese Republic (1911), the Sino-Japanese war, the Second World War, the Chinese Civil War, the formation of the People's Republic in 1949, the Great Leap Forward and the Cultural Revolution. Figures 2a and 2b, which show the prevalence of smoking for cohorts of urban and rural women, dramatically explicates the simple age distribution presented in Table 2. Among those of rural origin, the oldest women, those born between 1908 and 1912, reached a peak prevalence of smoking of over 25% (during ages in the late 40s and early 50s) and the level of smoking declined quite sharply and regularly with each succeeding cohort, so that the peak level for the two youngest cohorts (those born 1928–37) was about 11%.

Among urban women the broad pattern is similar but the decline from cohort to cohort is not as regular. Like their rural counterparts, those born 1908–1912 show the highest prevalence, 27% (at ages 50–54), and the 1913–1917 cohort shows a sharp drop-off from that level. But the 1918–22 cohort almost matched the oldest cohort in level and the 1923–27 cohort slightly exceeded the 1913–1917 cohort at its peak. As with rural women, the two youngest cohorts displayed much lower smoking levels at each age and peaked at about 12%. Whether these modest differences from the rural pattern reflect the greater vagaries in smoking behavior and cigarette availability in the urban areas or are more an artifact of the relatively small sample of urban women cannot be determined from these data alone.

The patterns for male smoking shown in figures 3a and 3b are quite different. For rural men, the age curves of prevalence across birth cohorts are almost identical, with peaks between 74 and 78% and only a slight dip in peak prevalence to 72% for the youngest cohort. For urban men the age curves are also remarkably similar, with smoking prevalence peaking in a narrow range of 66 to 70%.

Differentials in smoking adoption and cessation in China by socio-economic characteristics do not form a clear pattern. Several do seem to display influence at various points in the 20th century, but at other times expected differentials seem masked by major socio-cultural events.

Benedict (2011:210) notes that the rapid adoption of cigarettes circa 1900 was aided by the fact that the use of snuff and water pipes was pervasive across social classes at that time and that cigarettes allowed for social distinctions as they were relatively expensive at first and only the elite could afford the more expensive brands. The cohort patterns of smoking prevalence for women in figures 2a and 2b do show that although the peak smoking prevalence for the oldest cohort (1908 – 12) was about the same for urban and rural women, urban women born between 1913 and 1927 had distinctly higher rates. The two youngest cohorts (1928 – 1937) however resemble one another closely. Among men, smoking prevalence is somewhat higher among the rural born, for all cohorts (figures 3a and 3b).

⁶A total of 152 cases were dropped due to conflicting responses to these three questions or to missing information about birth place.

An analysis of the termination reports by birth cohort and urban-rural birth indicates that the oldest cohorts of urban women had somewhat higher cessation levels than their rural counterparts, but this differential does not hold among women born after 1923. The cohort analysis of men shows consistently higher termination ratios among the urban –born men than the rural (author-cited work 2010:18).

We also investigated differentials in smoking by education and found only slight effects in the univariate and multivariate analysis of this status variable. Among urban men and women, those with some education reported somewhat lower ever- smoking rates than those without any education, except for those cohorts born 1913 to 1922. But the pattern was reversed among rural women, with those with some education displaying a somewhat higher rate than those without education. There was almost no difference by education among rural men. The analysis of the 1996 Chinese prevalence survey by Yang et al. (1999) does point to the differential behavior in adoption and cessation by the more educated leading to the modest declines in overall prevalence observed among men in recent years.

In sum, the most distinctive aspect of the smoking prevalence patterns in East Asia is the major differences in level between men and women, and especially the declining level of prevalence across successive birth cohorts of women. Given the long history of tobacco use in the region, these patterns are contrary to those expected by current theoretical perspectives and the patterns observed elsewhere.

Understanding why a major region of the world possesses such a distinctive profile can add to our general understanding of the dynamics of tobacco adoption and use and perhaps assist in efforts at tobacco control. This is the focus of the next two sections.

Explaining the East Asian Smoking Pattern

History of Adoption in China, Japan, and Korea

The use of tobacco in China, Japan, and Korea was well established quite early in the 17th century, and evidence of its introduction can be traced to the 16th century. In China, the plant appears to have been introduced to Southern China via the Philippines and to northern China by the Manchus, and via Korea and Japan.⁷ In Japan, after its introduction by the Portuguese in the 1590s, tobacco use became quickly widespread in the early decades of the 17th century, to the point that there were edicts promulgated by 1615 banning its use in order to prevent fire (Laufer 1924). Not long after its arrival in Japan, the Japanese introduced tobacco into Korea, where it was quickly highly regarded. Dutch observers in the 17th century report that smoking was general and indulged in by both sexes, as well as by young children (Laufer 1924).

Reports of visitors as well as local observers and available data point to widespread use of tobacco in China at an early date. Brook (2004) reviews several manuals and discussions of tobacco from the 17th century on, and notes that although there was reference to both its ill effects as well as desirable qualities in the earliest material, the idea that smoking was a danger to health was largely absent in the literature after the 17th century until its reappearance in more recent medical literature. He cites the 18th-century author, Lu Yao, of a smoking manual (*Yanpu*) that “in recent times there has not been a gentleman who does not smoke and “even women and children all have a pipe in their hands.” Brook (2004: 88–89) also reports on an English observer, writing in 1878, who noted, “it is the fashion for girls at even eight or nine years of age to have as an appendage to their dress a silken purse

⁷There are reports of tobacco being cultivated in Fujian province by 1590 and being distributed to other provinces (Laufer 1924; Brook 2004).

or pocket to hold the pipe and tobacco to which they aspire, even if they do not already use them.” Similarly, Benedict (2011: 202) reports observations of widespread smoking by women from travelers in the late 19th century.

Although pipe smoking was the traditional means of tobacco use in China, cigarettes made rapid inroads. In 1858, the Treaty of Tianjin allowed cigarettes to be imported into China duty-free and in 1889 – 1890 the American Tobacco Co. and the British American Tobacco Company entered the Chinese market. Shortly thereafter a number of domestic tobacco companies were established. Goodman (1994) reports an estimate that 1.25 billion cigarettes were consumed in 1902, 7 billion by 1910, and that this number grew to 87 billion by 1928.

A similar rapid conversion to cigarettes occurred in Japan. Goodman (1994) dates this conversion by 1920 if not earlier. He notes that Japan was one of the first foreign markets to be targeted by W. Duke and Sons; and the American Tobacco Company and that British and American companies bought stakes in Japanese manufacturers at an early date. All these interests were liquidated however when the Japanese government formed a state tobacco monopoly in 1904 (Goodman 1994).

An 1898 report from the Consul General of the United States to Korea (reprinted in the New York Times, September 4, 1898) confirms the extensive level of pipe smoking by both men and women and notes the rapid inroads of cigarettes, both domestically produced and imported. In 1899, the Korean government set up the Korea Ginseng and Tobacco Monopoly, which over time became the sole outlet for Korean farmers to sell their product as well as the sole source of cigarettes and other forms of tobacco for consumption (KT&G Corporation).

Pressures and Counter-Pressures in Cigarette Adoption

All societies develop rules and norms that distinguish some behaviors as more appropriate for females than for males, and in many these rules as well as access to resources are largely controlled by males. The rapid rise of cigarettes triggered an evaluation of their proper place in East Asian societies, particularly in relation to its use by women versus men. East Asia was not alone in formulating rules and norms with regard to cigarettes. In the United States, 15 states had passed laws banning their sale by 1909; and in 1908, New York City passed legislation forbidding women to smoke in public (Borio 2003; Segrave 2005). Waldron et al. (1988:1272) in their analysis of nonwestern societies show not only that tobacco access in general became gender patterned in many of these, but that cigarettes, in particular, often became proscribed while traditional forms of tobacco use did not face as strong gender sanctions.

In each of the East Asian countries as well as the United States, the changing attitudes toward tobacco use by women took place during periods of social, economic, and political upheaval during which the proper role of women in a number of spheres was fiercely debated. Below we trace these dynamics as they played out in China, touch on related developments in Japan and Korea, and briefly contrast these countries with developments in the United States to give a sense of the subtle threads by which different norms emerged.

China

The forces of modernization – politically, culturally, and economic – signified by the end of the Qing Dynasty and the advent of the Republic, increased contact and influence from the West as well as the growth of industry and commerce. It also led to a significant weakening of the Confucian values that had guided China for so long. These values (三从四德; *san ren si de*) defined the ideal woman as virtuous and subordinate, largely confined to her home and subservient to the male members of her family. As women gained greater emancipation and

visibility as result of their outside employment, there was also greater acquaintance with practices in the United States and Europe and striking changes in conventional dress and behavior, influenced in part by the audacious public behavior of Shanghai courtesans to which the press gave extensive coverage (Bailey 2006). One result was a rapid adoption of cigarettes by the more elite and fashionable women of Shanghai and other major cities, and by other women – shop girls and factory workers – who followed the lead of these trendsetters.

The forces of modernization were not unidirectional however. Strong feelings of nationalism generated resentment about the commercial domination by the West and led to periodic boycotts of Western products as well as a desire to avoid Western practices viewed as decadent. One form of this resistance was the emergence of an image of the proper Chinese women as educated and working in behalf of the new China but not emulating the decadent practices of the glamorous Western women who were of dubious morality and who smoked and drank in public. Many male reformers, while supporting greater emancipation and rights for women, were concerned that the excesses in behavior they perceived were counterproductive to the welfare of the new China they envisioned. This led to active debate about the proper role of women and those whose dress and behavior departed from convention increasingly came in for harsh criticism in the media and other forums.

This countervailing pressure was enhanced by long-standing gender distinctions in Chinese culture as promulgated in the Confucian traditions, and by a nuanced distinction between activities appropriate to each gender as captured in the yin/yang distinction. Such distinctions were incorporated into smoking etiquette at an early date, mandating that strong tobacco smoke was not appropriate for women and dictating that women should use longer pipes to cool the smoke or use the water pipes which came into widespread use after 1800 (Brook, 2004:89). The etiquette also prescribed that women should smoke in the privacy of their own home and not in public. For those looking to maintain these distinctions, cigarettes fell into a category of harsh smoke inappropriate for the delicate nature of women.

Thus both the more progressive forces for a new China and the more conservative forces for the maintenance of existing traditions developed rationales to curtail the adoption of cigarettes by women.

Though the aggressive marketing and advertising of cigarettes by many of the brands appearing during the early years of the 20th century served to promote their use in general, the messages also contained some countervailing force with regard to adoption by women. Advertising was directed at both men and women. For the former, Kohrman (2007:100 – 101) notes that a major image conveyed was that of a stronger, more virile Chinese man, and frequently emphasized the social aspect, depicting men smoking in groups. This male dominated aspect of cigarette adoption was enhanced by the formation of special clubs and retreats where men could indulge this practice during their leisure hours (Zhou 2004:162). Female oriented advertising often depicted glamorous women in a sexually alluring fashion. Zhou (2004:166) argues that these images were meant to convey the modern Chinese woman at home in a rapidly industrializing society but as critiques of the lifestyle implied by these images took hold, they actually served to undermine the respectability of female smoking (Benedict 2011:220).

The indigenous forces in China struggling to contain female adoption of cigarettes were abetted by the attitudes and actions of the many missionaries active in China during this period. As Benedict (2011:211) makes clear, Westerners regarded the high prevalence of tobacco use, relative to that of the United States and England, that they encountered among women in China and several other countries in the 19th century as evidence of their cultural

backwardness and failure to progress. In addition to this cultural charge of backwardness, British and American anti-smoking groups which became active during the Victorian age viewed smoking as a sign of “national degeneration” and “physical deterioration,” particularly concerned with its effect on youth and women and on the latter's ability to reproduce and bear healthy children. These views were also promulgated within China by the American female missionaries associated with the World's Woman's Christian Temperance Union (WWCTU) as part of their opposition to alcohol, tobacco and opium use, one component of their multi-pronged program. A number of China's leading and most influential social feminists were active members of the WWCTU. Benedict (2011:216) sums up the message of these foreign critics as follows:

“...to save China, Chinese women not only had to unbind their feet, become educated, and move into the productive workforce but also had to give up tobacco along with their opium pipes. In so doing, wives and mothers would serve as strong moral exemplars for their husbands and children, leading them away from the ‘race poisons’ that threatened the very foundations of Chinese civilization.”

These views of backwardness and possible physical deterioration had considerable impact on Chinese intellectuals early in the century and prompted many to work actively against smoking, especially among women and juveniles, and also led to the formation of local anti-cigarette associations and frequent editorials and newspaper articles about the dangers to China's future from these smoking patterns.

By the time of the Nanjing decade, 1927 – 1937, social disapproval of smoking by women appeared widespread. During this decade, women who smoked, especially in public, were regarded in the popular culture as “modern girls” (*modeng nüzi* or *modeng xiaojie*), trendy and fashion conscious women often treated in the popular culture as immoral, disinterested in politics, and unpatriotic for their excessive consumption and flouting of conventions (Yen 2005, Dong 2008, Edwards 2000). This superficial “modern girl” was regarded as a “*pseudo* new woman,” whose preoccupations with recreation, consumerism, and fashion were not only in contrast to the public-mindedness and morality of a *real modern woman*, but also were a threat to national well-being (see Edwards 2000:124–125; Yen 2005). As noted, tobacco advertisement during this period which often featured the eroticized ‘modern girl’ tended to solidify this view.

Pressure against female smoking was also reinforced by the New Life Movement initiated in 1934 by Chang Kai-shek with active participation of his wife. This ambitious movement sought to instill greater morale and discipline in the population by reducing corruption and apathy, practices such as smoking and opium use and dancing, and improving personal hygiene and physical training (deBary 1964). Although the strictures promulgated applied to men and women, the burden of embodying the ‘new life’ fell disproportionately on women (Yen 2005). Madame Chiang Kai-shek entreated women to be the guardians of morality within their roles as mothers and wives, writing in an article in 1936: “the women must realize that mostly their thoughts and actions are not right, and they must emancipate themselves from ignorance and inertia. Their family life should be orderly, their houses clean, and they should resolutely work against gambling, smoking, drinking, extravagance, and other bad habits of life.” (Benedict 2011:235).

These countervailing forces seemed to have sharply curtailed the diffusion of smoking among women that seemed in evidence with the 1908–1912 cohorts. The birth cohorts of 1913–1917, who would have reached prime adoption age around 1940, show a sharp drop off in smoking (Figures 2a and 2b) from the 1908–1912 cohorts. The inference from these patterns supports the argument that by the late 1930s a strong normative prohibition against women's smoking had taken hold in China.⁹

It is also worth stressing that the smoking prevalence among women did not advance after the formation of the People's Republic of China in 1949 and at first glance this is surprising. Under Mao and during the Cultural Revolution there was ostensibly a very clear program for women to take a more equal part in the occupational structure, working side-by-side with men in a variety of jobs, and in the economy more generally, and the heavy smoking patterns of the leadership might be expected to enhance smoking by both men and women. Mao's famous pronouncement that "women hold up half the sky" was supposed to signal a new era of gender equality. Some observers of the Cultural Revolution point out the unisex aspect that prevailed—with women wearing the same uniforms and clothing as men as example— but several analysts have shown that the strong rhetoric was not fully matched by action (Yang 1999; Honig 1985). Precedent was given to steps that promoted economic growth even if these came at the expense of gains for women. Despite these reservations there were notable advances in gender equality and it speaks to the entrenched nature of the norm against female smoking (especially in public) that even the substantial shift in the ideology and practice of gender equality produced no noticeable increase in female smoking prevalence as revealed in Figures 2a and 2b. Indeed, Benedict argues that smoking became even more intensely masculine during the Maoist era. During the Maoist years, the exchange and use of cigarettes became crucial for building male social networks, solidifying agreements, and securing special favors (Kohrman 2007, 2008; Benedict 2011:245–6). Through visual propaganda and frequent images of powerful political leaders, including a chain-smoking Mao Zedong, the use of cigarettes became associated with patriotic virility and machismo (Benedict 2011:245).] Some analysts also suggest that many of the urban young men sent to the countryside during the Cultural Revolution were introduced to smoking there by their rural counterparts, and this led to some upsurge in smoking prevalence in urban areas after they returned, while young women generally would not face similar social pressures to smoke (Cheng et al. 1990). At the same time, Honig (2003) states that, officially, there were strong bans against smoking on the part of the youths being 're-educated', and she notes incidents in which both leaders and youths were punished when they were caught smoking.¹⁰

Japan and Korea

The data in Table 3 suggest that the smoking behaviors of the female birth cohorts in Japan and Korea resemble those of China, and this is confirmed by the birth cohort analyses carried out by Marugame et al. (2006) for Japan and Park et al. (2005) for Korea. In each country there was a rather steady decline in the prevalence of smoking from the oldest cohorts to the youngest cohorts, which closely parallel the time span covered by the analyses in Figures 2 and 3, pointing to an ongoing social environment in which women increasingly refrained from or were discouraged by rules and customs from taking up tobacco use. It thus appears that the gender pattern of smoking observed for China is not unique to that country,

⁹An intriguing question suggested by the events of 1900 – 1940 is whether women born earlier than 1908 (the first cohort we can observe) might have smoked at an even higher rate than the 1908 – 1912 cohorts. Although no data exist for these women, we speculate that the smoking prevalence of women born approximately from 1890 to 1907 may have exceeded the (rural) 27% peak prevalence rate we observe for the 1908 – 1912 cohorts. These earlier cohorts grew up when pipe smoking was still widespread among women and children, and came of age between 1910 and 1930, when cigarette consumption was growing rapidly and when public opinion about the proper role and behavior of women was still evolving and cigarette smoking was often viewed as fashionable and appropriate for the 'new' Chinese woman (Benedict 2011: 200–206). The 1908 – 1912 cohorts by contrast came of age as the Nanjing Decade was well underway and critiques against female smoking were gaining ground and becoming solidified. As such, their level of smoking may already reflect a downturn from the previous high.

¹⁰The cohort data presented in figures 3A and 3B do not suggest a significant uptake in smoking prevalence by those coming of age during the Maoist period on the part of the two youngest cohorts in comparison with the older cohorts, nor an upsurge by the older cohorts. It is possible that the amount of smoking per user increased during this period given the efforts of the government to boost consumption (Kohrman 2007:101). For women, the low peak prevalence obtained by the two youngest cohorts – who largely came of age during this period – confirms the anti-smoking climate for women, possibly reinforced by the lower availability of cigarettes for them in the way tobacco vouchers were allocated to families (Kohrman 2007:101– 102)

but broadly shared with its East Asian neighbors. The question then centers on whether there were also similarities in the historical dynamics of these countries that have brought about this resemblance. Though we cannot trace here the history of Japan and Korea in the same detail as China, it does appear that there were several common cultural, social, economic, and political forces in operation early in the 20th century that, among their many wide-reaching effects, brought to the fore disputes about the proper role of women in society. Women were seeking a new identity at the same time that new national identities were being forged and these two processes were not always in harmony.

In both Japan and Korea there was increased contact with and influence from the West from the late 19th century on along with rapid industrialization, urbanization, and commercial development.¹¹ These cultural and socioeconomic forces increased women's labor force participation in the modern sector and as in China led to a weakening of the neo-Confucian tradition of women as "virtuous and obedient" and to the adoption, by many women, of the styles, dress, and behavior of the images portrayed in pictures of the Western women. As in China, this new "modern girl" image was met by resistance both from traditional forces and from many intellectuals who viewed these behaviors as mindless adoption of irresponsible Western practices and a deflection from the goal of creating professional workers and modern, prudent housewives (See Yoo 2005, 2008; Sato 2003 for more detail of these developments and conflicts).

It would appear therefore that through the first four decades of the 20th century, the rapid social, political, and economic changes ongoing in each of these East Asian countries, along with increased contact with the West, led to considerable redefinition of national and individual identities. A major component of this redefinition centered on the proper role of women. Though details vary across countries, in each, women entered 'contested spaces' with strongly differing views in the media and among key groups about their proper dress and behavior. In each country, there was a distinct 'modern girl' or 'modern woman' movement, characterized by appearance, dress, and behaviors including the smoking of recently available cigarettes, that emulated the West, or at times more extreme images of the West. The movements seemed to reach their peak in the 1920s but within each country counter pressures by traditional forces as well as those seeking a new national identity somewhat at odds with women's goals became dominant in the 1930s. These curtailed and modified the women's movements and their associated actions, leading to new compromised definitions of women's proper role. Although these compromises left several real gains in place – like better access to education and improved status within the household – one aspect of the redefinitions was the emergence of a strong normative injunction against women's use of tobacco, particularly in public.

As with many rules firmly embedded in the social fabric, it is not unusual to find them stated as accepted fact or common knowledge, without further attention to their origins. This is exemplified in several analyses of smoking behavior when reporting on gender differences. For example, commenting on the gender differential in smoking prevalence in China, Cheng et al. 1990 (160) state:

In young women, however, smoking has traditionally been considered distasteful and socially improper.

¹¹In Korea, after 1885 a number of missionary schools were established which provided some Korean women with a Western-style education (Yoo 2008) and the Korean branch of the WWCTU was founded in 1923 which conducted anti-smoking campaigns (KWCTU 2008). After the Meiji restoration, Japan closely followed developments in the West and was sensitive to attitudes and opinions expressed about it. The charge that widespread smoking by women and children was a sign of backwardness and national degeneracy enabled anti-smoking activists within the country, working with foreign WWCTU missionaries, to pass an anti-juvenile smoking bill in 1900, according to Benedict (2011:216).

For Japan, Marugame et al. (2006:126) say:

Before WWII, Japanese society did not accept smoking by young women. Therefore, Japanese women began smoking later in life. This was especially true for older generations.

For Korea, Cho et al. (2008:616) say:

Under the influence of Confucianism, which emphasizes patriarchal family systems and high levels of control over women, smoking has not been considered to be an acceptable habit of women. Even today, Korean women often feel strong social pressures against smoking in public.

Contrast with the United States

In many respects, the use of tobacco by women in East Asia appears to be the mirror image of the history of women in the United States. Although there were many reports of women smoking pipes or using snuff in colonial times, there appeared to be very little smoking by women during most of the 19th century and circa 1870 use of cigarettes was associated with loose morals or a rebellious bohemianism (Amos and Hoagland 2000, Segrave 2005). The cigarette itself was considered both an effeminate and yet more vicious form of smoking than cigars or pipes, and, as noted, was subject to legislation barring its sale in many states by 1900 (Segrave 2005). Nevertheless, with the advent of modern machine forms of manufacture which greatly lowered its cost, the cigarette made rapid inroads. As described by Segrave, from 1880 to 1908, the question of women smoking became subject to both media and public attention for the first time. Women who did smoke were mainly upper-class who smoked covertly at home or at private parties. There was practically no smoking by women in public places such as restaurants, theaters, or hotel lobbies. World War I greatly enhanced the image of the cigarette, as Gen. Pershing and others called for more tobacco for the troops and women's greater participation in industry gave them more freedom to smoke. Thus in the period from 1908 to 1919 more women went public and challenged the prejudices against smoking, and more and more restaurants and hotels allowed women to smoke.

These gains were strongly contested by several opposition groups, most notably the Woman's Christian Temperance Union (WCTU), and several religious leaders. From 1920 to 1927, colleges and universities became a major area of contention between the opposing points of view. In 1920, Segrave reports that almost none of these institutions permitted women to smoke, but by 1925–26 almost all allowed smoking on campus to some extent. There was very little advertising of cigarettes directly addressed to women before 1927. But images of women smoking were prominent in the movies before then, evolving from portrayals of only “evil” women smoking (e.g. as in *Carmen*) to more natural settings; and, as noted, the general subject of women smoking and the opposing viewpoints were prominent in newspapers and magazines from the late 19th century on. The last state laws restricting sales of cigarettes to women were repealed by 1927 and smoking by women continued to advance broadly across all venues and social classes.

Why did smoking by women in the United States continue to advance during the first half of the 20th century, while in the East Asian countries it diminished greatly over this period? Though a definitive answer may not be possible, several distinguishing features of the U.S. situation in contrast to the one described for China might be noted. In the United States, cigarette smoking by women appeared to be taken up first by the elite and influential women and evolved during a period in which women were struggling for greater freedom and equality with men, particularly in their active pursuit of the right to vote. In addition opposition to women's smoking mainly focused on their doing so in public; it seemed that

few questioned their right to smoke in private, even though this faced increased medical opinion that this was deleterious to their health and a view that smoking was a debasement of the higher moral and ethical nature of women. It is also important to recognize that in the early 20th century, the East Asian countries were experiencing a period of ambiguous national identities which competed with the new identity being forged by women in the emerging socio-economic climate. Many of the influential and intellectual men, among others, took the lead in opposing female behaviors that emulated the West in dress and behaviors, including smoking. The United States by contrast was not facing a similar challenge but rather coping with the pressures mounted by women's groups for equality in voting and a ban on alcohol. Although a number of these groups also favored restrictions on women smoking, and saw gains in voting as leading to this outcome, that goal appeared secondary to the others.

Implications for Theory and Policy

The history of women's pattern of smoking in the East Asian countries calls into question the generalizability of the models of diffusion and epidemic often noted in the literature, whereby smoking is taken up first by younger, more elite men and then spreads to the less elite and to women, with increasing attractiveness to succeeding cohorts. And although Lopez and others sometimes acknowledge that this model may not apply to all countries and times, its lack of fit to a major region of the world has received little attention. More detailed analysis of the exceptions to the general pattern can deepen our understanding of the factors which influence the adoption and use of tobacco in different settings.

In contradistinction to its use with infectious diseases, the word “epidemic” in connection with cigarette adoption and cessation may mask the voluntary nature of these behaviors. Women in Asia early in the 20th century were faced with many countervailing forces, some of which promoted cigarette use and some of which discouraged its adoption. Women in different situations would face a different mix of these forces and had to assess the gains and losses in deciding whether to adopt cigarette use. The failure of the diffusion model to capture the pattern of smoking in East Asia is a failure to examine these multiple influences and how they intersected with each woman's individual situation.

Several critiques of the diffusion model have pointed to the many structures and interactions that need to be examined empirically to understand the nature and extent of diffusion. The National Research Council (2001) discussed several: the nature of relevant action groups and social networks that an individual is involved with; examining the specific content of interpersonal interactions; understanding conditions that promote communication or delay adoption such as the homogeneity or heterogeneity of groups; testing whether individual adoption is a function of the adoption by others; and ethnographic research to determine the role of cultural systems.

Rogers (1976: 294) in his review paper sounds a similar note in citing lack of attention to process and “shortchanging of structure” among the conceptual/methodological biases associated with diffusion research. More generally, Wejnert (2002) stresses that a model of diffusion must take into account the nature of the innovation, the characteristics of the innovators, and the environmental contexts, reflecting among other things the societal culture. Her review notes cases where cultural factors hindered the adoption of an innovation. Waldron (1991) expresses a similar concern about the generality of the diffusion model in discussing the limitations of Ferrence's (1988) diffusion analysis to capture many of the key factors involved.

The history of cigarette use in East Asia also demonstrates that modest modifications in a product can have large consequences for patterns of use. Although there was by all accounts

widespread pipe smoking in East Asia by both men and women in the 19th century and early 20th century, the advent, and eventual dominance, of the commercially produced cigarette was treated as an innovation prompting its own set of rules as to social acceptability. The result was the strongly gendered division of smoking prevalence in East Asia, documented above, which did not occur in the United States or Europe.

The different outcomes in East Asia and the United States also contribute to a deeper understanding of gender relations. In both regions, in the early decades of the 20th century, there were rapid socioeconomic changes including greater participation by women in education, business and industry along with demands for greater equality in public life. And although women continued to make progress throughout the 20th century, the gender-based norms about smoking arising in East Asia have remained relatively impervious to these gains. By contrast, norms against women's use of cigarettes never became established in the United States despite at times quite vocal opposition, and cautionary medical opinion, and women's smoking practices were very much on a par with men by the 1950s. This demonstrates how social changes that allow or encourage gender equality may be surprisingly selective, promoting equality in some spheres but remaining highly resistant than others.

Policy Implications—A new report estimates smoking-related deaths in China at 1.2 million currently and projects that the number may rise to 3.5 million by 2030 (Eriksen, MacKay, and Ross 2012). A 2010 survey reveals that more than half of Chinese men are still smoking, in contrast to less than 3% of women (World Health Organization 2010). The challenge for the East Asian countries we have been examining is to reduce the high smoking prevalence among men while preventing an uptake in the use of tobacco by women (WHO 1999).

To what extent does the history of tobacco use by women in the 20th century inform the outlook for the 21st? As before, women are faced with incentives to smoke as well as incentives to refrain from smoking. As in the early 20th century, women in East Asia are currently much more prominent in public life, given their increased education and labor force participation. Increased presence as modern educated businesswomen, desires to be stylish, and concerns about weight gain may lead to a redefinition of identity in a number of areas, including smoking, particularly given the continuing high prevalence of smoking that they will be exposed to among their male associates (Fukuda et al. 2005).¹²

Also paralleling the past, women will be subject to more aggressive marketing and advertising as companies realize the size of the potential market and changing trade practices have opened up these countries to more competition. Tobacco companies will recognize the great sales potential if they can increase smoking rates among women. As stated more dramatically in Shafey (2009:32), “You could say the single biggest marketing opportunity in the world is to sell cigarettes to Chinese women” (quote attributed to Jeff Collin).

At the same time, there are significant counter pressures to tobacco adoption. Within each country, the strong tradition that smoking is inappropriate for women remains, and most young women will have grown up in households where their mothers and other older female role models will not have smoked. In addition, public health efforts to curtail smoking are

¹²A major difference in the status of women presently and in the past is the decline in the proportion of women marrying and their later age at marriage, leading to more years of independent living. In Korea for example, 40% of women were single at ages 25–29 in 2000 compared to 14% in 1980 (Byun 2004, table 6.3) and in China, the proportion never married increased from 5% in 1982 to 13% in 2005 (China Data Center).

ongoing in each country and greater awareness of the dangers of tobacco use, especially among the more educated, should reduce the motivation to adopt and make women less susceptible to the aggressive promotions.

In addition to the rather standard measures to curtail tobacco use—warning labels, bans on smoking in public places, higher taxes—countries are experimenting with various approaches that seek to alter the norms, attitudes, and values that support smoking. These so-called norm-change strategies to promote the cessation of smoking or for avoiding initiation are prominent in tobacco control discussions and efforts (see for example Morrow et al. 2003a, 2003b; Chapman and Freeman 2008; Zhang et al. 2010). The importance of considering norms as part of the anti-smoking campaign in East Asia has been noted by several observers (Khang et al. 2009; Cho et al. 2008; Marugame et al. 2006). Though many of these strategies will be directed at the general public, some may be gender or group specific (for example, directed to juveniles). In China, Malone (2010) notes a video¹³ produced by the Chinese Center for Disease Control and Prevention which tackles the widespread social custom of proffering cigarettes to others or offering cigarettes as gifts by showing in graphic terms that “giving cigarettes is giving harm.”

The role of women, both in terms of their own behavior and their potential influence on men is crucial. If younger women start to adopt smoking at rates comparable to many other countries, it will greatly exacerbate the public health challenges that China will face in future years. Somewhat ironically, it may be that an appropriately modified reprise of the refrain from 100 years ago which extols women for their forbearance from smoking and for being strong exemplars for their male counterparts, may serve to reinforce their generally low usage and assist the efforts to reduce male dependence. But as the history of women's smoking behavior during the rapid social changes early in the 20th century demonstrates, in the face of all the pressures and counter pressures that a group faces, it will be the myriad individual decisions about appropriate behavior that determines the overall outcome.

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Appendix 1: Methodology for Calculating Birth Cohort Histories of Smoking Behavior

The data used are survey reports of smoking status and histories of older respondents, including age of initiation, and age of cessation (if applicable), life table survivorship probabilities appropriate to the population and time period, and estimates of differential mortality of smokers and non-smokers.

¹³The video may be viewed at <http://www.worldlungfoundation.org/ht/d/sp/i/7217/pid/7217>.

For each birth cohort (or 5-year cohort), the report on smoking enables one to identify whether the respondent was smoking at each point in the past and his or her age at that point. But those presently observed are the survivors of the larger cohort of smokers and non-smokers. To adjust for this, one needs to “resurrect” the current respondents back to the earlier age. In addition, one needs to take into account the differential survival probabilities of smokers and non-smokers, since smokers have a higher rate of mortality (Hammond 1966).

As outlined in Harris (1983:474), the prevalence of cigarette smoking at age t (denoted by p_{tu}) is derived through the following equation:

$$P_{tu} = \frac{P_{tu}/S_{tu}}{P_{tu}/S_{tu} + (1 - P_{tu})/N_{tu}}$$

Where P_{tu} denotes prevalence of smoking at age t among respondents alive at age u , S_{tu} is the proportion of smokers at age t who survive to age u , and N_{tu} is the survival probability of non smokers at age t .

We estimated S_{tu} and N_{tu} from life-tables generated by Banister and Hill (2004), the World Health Organization, and the United Nations for the basic survivorship functions applicable to China. We then use the differential in survival between smokers and non-smokers provided by Hammond (1966), adjusted slightly to fit our understanding of the Chinese case.

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Figure 1.
Model of the "Cigarette Epidemic"
Source: Lopez et al. 1994

Figure 2a.
Mortality-adjusted Smoking Prevalence for Birth Cohorts by Five-Year Intervals: Rural Chinese Women

Figure 2b.
Mortality-adjusted Smoking Prevalence for Birth Cohort by Five-Year Intervals: Urban Chinese Women

Figure 3a.
Mortality-adjusted Smoking Prevalence for Birth Cohorts by Five-Year Intervals: Rural Chinese Men⁸

⁸Please note the difference in scale along the Y-axis compared to figures 2a and 2b.

Figure 3b.
Mortality-adjusted Smoking Prevalence for Birth Cohorts by Five-Year Intervals: Urban Chinese Men⁴

Table 1
United States: Percent of Men and Women Smoking and Male to Female Ratio by Age Group

	Percent Males				
	1955	1965	1985	1995	2005
18-24	56.5	54.1	28.0	27.8	28.0
25-34	67.3	60.7	38.2	29.5	27.7
35-44	66.3	58.2	37.6	31.5	26.0
45-64	55.7	51.9	33.4	27.1	25.5
65 and over	26.8	28.5	19.6	14.9	8.9
Total	56.9	51.2	32.2	26.5	23.4

	Percent Females				
	1955	1965	1985	1995	2005
18-24	34.8	38.1	30.4	21.8	20.7
25-34	40.8	43.7	32.0	26.4	21.5
35-44	36.7	43.7	31.5	27.1	21.3
45-64	21.0	32.0	29.9	24.0	18.8
65 and over	4.9	9.6	13.5	11.5	8.3
Total	28.4	33.7	27.9	22.7	18.3

	Male:Female Ratio				
	1955	1965	1985	1995	2005
18-24	1.62	1.42	0.92	1.28	1.35
25-34	1.65	1.39	1.20	1.12	1.29
35-44	1.81	1.32	1.19	1.16	1.22
45-64	2.65	1.62	1.12	1.13	1.34
65 and over	5.47	2.97	1.45	1.30	1.07
Total	2.00	1.52	1.15	1.17	1.28

Source: National Center for Health Statistics 2011, 1970

Table 2

China: Percent of Men and Women Smoking by Age and Male to Female Ratio

CHINA 1996						
Age	Percent Women		Percent Men		Ratio of Male to Female Smokers	
	Current	Ever	Current	Ever	Current	Ever
20-24	0.7	0.8	52.8	55.0	79.9	73.3
25-29	1.3	1.4	66.0	68.1	52.8	50.1
30-34	1.9	2.1	69.2	72.2	36.5	35.0
35-39	2.4	2.7	71.0	74.2	29.8	27.5
40-44	3.1	3.5	70.6	74.3	22.8	21.5
45-49	4.4	4.8	69.6	73.6	16.0	15.2
50-54	5.9	6.6	68.4	72.7	11.3	11.0
55-59	8.7	9.5	65.0	71.0	7.2	7.5
60-64	10.1	11.4	60.8	68.6	6.1	6.0
65-69	12.8	14.4	58.1	68.6	4.5	4.8
Total	3.8	4.2	63.0	66.9	16.6	15.9

Source: 1996 China National Prevalence Survey of Smoking Patterns (Weng and Niu 1998)

Table 3

Percent of Men and Women Smoking by Age in Japan and South Korea

JAPAN							
	1965	1975	1980	1985	1990	1995	2003
Women							
20-29	6.6	11.0	-----	15.0	-----	20.3	24.1
30-39	13.5	12.4	-----	14.8	-----	17.6	19.7
40-49	19.0	15.5	-----	13.4	-----	13.0	18.9
50-59	23.0	18.0	-----	11.8	-----	10.8	13.3
60+	23.0	21.2	-----	12.4	-----	8.2	6.8
Total	15.7	15.1	-----	13.5	-----	13.3	14.7
Men							
20-29	80.5	80.1	-----	70.9	-----	65.4	56.9
30-39	84.7	78.8	-----	71.3	-----	66.2	62.0
40-49	86.7	82.2	-----	65.2	-----	65.6	59.6
50-59	81.4	77.7	-----	65.7	-----	53.9	53.6
60+	74.6	70.1	-----	56.5	-----	46.4	36.7
Total	82.3	78.3	-----	66.1	-----	59.0	52.0

SOUTH KOREA							
	1965	1975	1980	1985	1990	1995	2003
Women							
20-29	-----	-----	1.4	1.3	1.5	-----	7.2
30-39	-----	-----	2.7	1.6	1.4	-----	5.2
40-49	-----	-----	9.2	4.1	3.3	-----	1.8
50-59	-----	-----	28.4	16.4	11.3	-----	2.8
60+	-----	-----	47.2	32.5	29.5	-----	10.4
Total	-----	-----	12.6	8.0	7.7	-----	5.3
Men							
20-29	-----	-----	76.5	71.6	77.7	-----	79.2
							66.2

SOUTH KOREA									
	1965	1975	1980	1985	1990	1995	1996	2003	
30-39	----	----	78.4	74.0	79.1	----	77.5	61.4	
40-49	----	----	81.6	71.2	72.9	----	60.0	55.7	
50-59	----	----	83.3	69.2	73.2	----	55.8	47.7	
60+	----	----	79.5	66.3	68.9	----	54.2	41.5	
Total	----	----	79.3	71.2	75.3	----	69.8	56.7	

Sources: Japan Health Promotion and Fitness Foundation, 2008; Korean Gallup Organization, Korean Tuberculosis Association