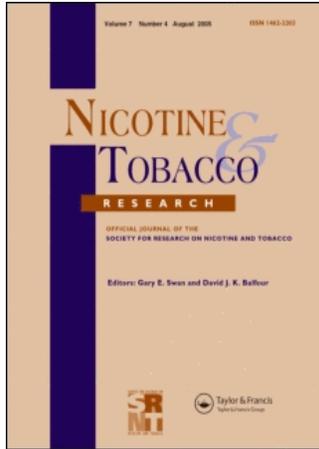


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Publisher: Informa Healthcare
Informa Ltd Registered in England and Wales Registered Number: 1072954
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Nicotine & Tobacco Research

Publication details, including instructions for authors and subscription information:
<http://www.informaworld.com/smpp/title~content=t713439766>

High quit ratio among Asian immigrants in California: Implications for population tobacco cessation

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Online Publication Date: 01 September 2007

To cite this Article: Zhu, Shu-Hong, Wong, Shiushing, Tang, Hao, Shi, Chih-Wen and Chen, Moon S. (2007) 'High quit ratio among Asian immigrants in California: Implications for population tobacco cessation', *Nicotine & Tobacco Research*, 9:1, S505 - S514

To link to this article: DOI: 10.1080/14622200701587037

URL: <http://dx.doi.org/10.1080/14622200701587037>

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High quit ratio among Asian immigrants in California: Implications for population tobacco cessation

Shu-Hong Zhu, Shiushing Wong, Hao Tang, Chih-Wen Shi, Moon S. Chen

Received 30 August 2006; accepted 9 March 2007

Asian immigrants to the U.S. are participants in a natural experiment on the effects of social norms on tobacco cessation. Smoking is socially acceptable in most Asian countries. When Asian smokers move to U.S. states such as California, they experience a radically different social norm toward smoking. This study examines ever smokers among two groups of Asian immigrants in California, Chinese and Koreans, and finds that most have quit smoking. The quit ratios (percent of ever smokers who have quit) for Chinese (52.5%) and Korean immigrants (51.1%) have quit ratios for ever smokers in California in general (53.3%), which is among the highest in the U.S. These high quit ratios contrast sharply with much lower quit ratios for Chinese in China (11.5%) and for Koreans in Korea (22.3%). Such large differences in quit ratios are the results of accumulated differences over the years, because of dramatic differences in annual cessation rates: Chinese in California quit at roughly seven times the rate of Chinese in China, and Koreans in California three times that of Koreans in Korea. Analyses further show that these large differences in annual cessation rates come mainly from the fact that these immigrants in California made quit attempts at a much higher rate than their counterparts in their home countries. These results suggest that creating an impetus to drive up quit attempts, which often results from a significant change in social norms toward smoking, is the most important strategy to improve cessation on the population level.

Introduction

This paper aims to demonstrate that a group largely overlooked in U.S. tobacco research—recent Asian immigrants—may provide critically useful information for increasing cessation on the population level. Recent immigrants from Asia are seldom considered as a separate category in U.S. smoking research, much less in cessation studies (Fagan et al., 2004; Lawrence, Graber, Mills, Meissner, & Warnecke, 2003). One reason is the language barrier, which prevents many recent immigrants from participating in studies conducted in English only. Only in the last few years have studies using multiple Asian languages been conducted with Asian smokers in the

U.S. (e.g., Carr, Beers, Kassebaum, & Chen, 2005a, 2005b; Ferketich et al., 2004; Jenkins, McPhee, Ha, Nam, & Chen, 1995; Ma, Shive, Tan, & Toubbeh, 2002; Rahman et al., 2005; Shelley et al., 2004; Yu, Chen, Kim, & Abdulrahim, 2002).

Having recent Asian immigrants in cessation studies presents unique advantages for scientific comparisons. Asian social norms regarding smoking differ radically from U.S. norms and especially from those in California, where many Asian immigrants live. The two immigrant groups chosen for this study, Chinese and Koreans in California, provide cases in point. Smoking is well accepted in China and Korea. About two thirds of men in these two countries smoke (D. S. Kim et al., 2005; World Health Organization, 2006; Yang et al., 1999). In both countries, smoking is seen everywhere and is a common element of social interaction. Examples include the widespread customs of offering cigarettes in business meetings and giving cigarettes as gifts on social occasions (S. S. Kim, Son, & Nam, 2005; Pan, 2004). By contrast, smoking prevalence in California

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is much lower. The most recent data show that only about 14% of California adults smoke (Centers for Disease Control, 2005). Smoking is increasingly socially unacceptable in California: It has been officially banned in work sites, restaurants, and bars for more than 10 years (Cowling & Bond, 2005), and the majority of private homes now have voluntary smoking bans as well (Gilpin et al., 2003). In fact, California's social norms concerning smoking are so dramatically different from those in China and Korea that it is hard to imagine any experimental manipulation, even under the best of conditions, producing a contrast of such magnitude. However, Chinese and Korean immigrants in California do experience such a contrast, and thus studying them can provide invaluable data on what this change in social norms does to their smoking behavior.

Several studies have already offered clues. Figure 1 summarizes the results from four population studies: Chinese in China, Koreans in Korea, Chinese in California, and Koreans in California (Ji et al., 2005; D. S. Kim et al., 2005; Maxwell, Bernaards, & McCarthy, 2005; Yang, Ma, Liu, & Zhou, 2005). For each group, it shows the percentage of ever smokers who have quit smoking. Such a percentage for a whole ever-smoking population at a given time has been termed a *quit ratio* (U.S. Department of Health and Human Services [USDHHS], 1989). The differences shown in Figure 1 are striking. Among ever smokers living in China, less than 12% have quit smoking. However, among Chinese ever smokers living in California, 57% have quit. The picture for Koreans is similar. Around 22% of ever smokers

living in Korea have quit, while 55% of Korean ever smokers living in California have quit.

Simply lining up the published data as in Figure 1 raises many questions. Why is the quit ratio among the immigrants so much higher? Did they quit smoking before or after they came to the U.S.? If they quit before, what might make prospective immigrants so much more likely to be former smokers? If they quit after, what might be making them much more successful at quitting than are smokers in their home countries? How does their quitting success compare with that of other smokers in their new country?

This study attempts to answer some of these questions by examining data on first-generation (i.e., foreign-born) Chinese and Korean immigrants in California. First, the study examines whether current tobacco surveys in California replicate the high population quit ratio reported by the studies cited in Figure 1. Replication is important because the quit ratios reported for these two Asian groups in California are quite unexpected. Not only are they dramatically higher than the quit ratios of ever smokers in China and Korea, but they are higher than the quit ratios reported for many U.S. states (Centers for Disease Control, 2005). They also appear to contradict the general assumption that many immigrants are not being reached by the tobacco control campaign. This study focuses on first-generation immigrants only, ensuring that the high quit ratio found among Chinese and Koreans is not caused by including study subjects who are native Californians of Chinese and Korean descent.

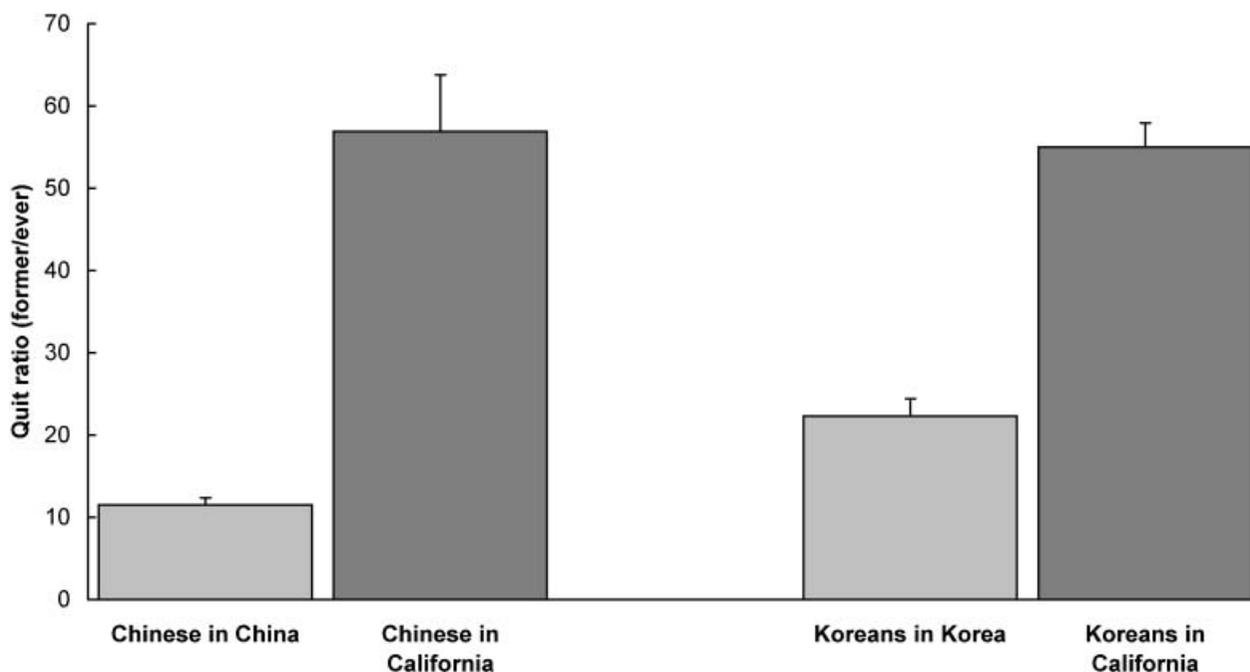


Figure 1. Quit ratio for Chinese and Korean ever smokers in China, Korea, and California; based on Yang et al. (2005), Maxwell et al. (2005), Kim et al. (2005), Ji et al. (2005).

Second, this study examines whether the former smokers among Chinese and Korean immigrants quit smoking before or after coming to the U.S. If they quit before, then their high quit ratios are only an artifact of self-selection, of little value for tobacco control research. If they quit after, then these immigrant groups' high quit ratios, compared with the low quit ratios in their home countries, are significant and have broader implications for population cessation.

Finally, this study compares the population quit ratios of Chinese and Korean immigrants with the quit ratio of the general smoking population in California. California has conducted an aggressive tobacco control campaign, with elements in multiple languages (including English, Spanish, Chinese, Korean, Vietnamese, and a few other languages), for more than 10 years. It would be valuable to find out how well the quitting message has reached these immigrants.

The present study focuses on Chinese and Korean immigrants for practical reasons. Chinese and Koreans are among the two largest of the many Asian populations in California (U.S. Census Bureau, 2002), which means population data for these groups are easier to find in the literature for purposes of comparison. In addition, data have just become available from two recent statewide California surveys specifically examining tobacco use among these two groups, and these surveys were conducted in Chinese and Korean in addition to English (Carr et al., 2005a, 2005b).

Methods

Data sources

Data for the present study come from three tobacco surveys in California. Two focus specifically on Asian populations: the California Chinese American Tobacco Use Survey (CCATUS) (Carr et al., 2005a) and the California Korean American Tobacco Use Survey (CKATUS) (Carr et al., 2005b). Both surveys were conducted in 2003 and recruited respondents by randomly telephoning numbers from purchased lists of households with ethnic Chinese and Korean surnames. Survey inclusion criteria involved age (18 years or over) and ethnicity (Chinese, Korean, or Chinese or Korean of mixed ethnicity). Only the first respondent in each household was eligible. To ensure a representative, unbiased sample from all areas of the state, U.S. census data were used to determine necessary numbers of respondents from each of California's seven Tobacco Control regions, with each region comprising one or more counties (Carr et al., 2005a, 2005b).

A professional survey research service, Strategic Research Group, Inc., used a computer-assisted telephone interviewing (CATI) system to screen people at random from the telephone lists. Overall, 52% of all Chinese households contacted participated in the CCATUS, and 48% of all Korean households contacted participated in the CKATUS. The total sample size for the CCATUS is 2,117, and for the CKATUS, 2,545. Detailed descriptions of the surveys can be found in reports issued by the California Health Department of Health Services (Carr et al., 2005a, 2005b).

Survey questions in the CCATUS and the CKATUS were drawn largely from the California Tobacco Survey (CTS), in use since 1990 (Gilpin et al., 2003), and were augmented with additional questions for the Asian populations. The CTS questions covered demographics, tobacco use and cessation behavior, secondhand smoke exposure, attitudes toward smoking and cessation, and exposure to information about smoking and health. Trained telephone interviewers from the Strategic Research Group administered the survey in each respondent's preferred language or dialect (English, Mandarin, Cantonese, Taiwanese, Fukieneese, Shanghainese, Toyshanese, or Korean) using a CATI system. To compensate for possible selection bias, survey results were weighted for number of adults per household and number of phone lines per household.

The third source of data is the 2002 California Tobacco Survey (CTS). This population-based, random-digit-dialed survey is conducted in English and Spanish every 3 years for evaluation of the California Tobacco Control Program (Gilpin et al., 2003). The 2002 CTS is a cross-sectional survey that used a modified Waksberg random-digit-dialed telephone methodology (Waksberg, 1978). It sampled 35,133 households for a screening interview, with a response rate of 45.7%. At screening, all adults (18 years or older) who reported smoking in the previous 5 years were scheduled for a detailed extended interview, as were 50.2% of other adults. The response rate for the extended survey of 24,296 adults was 75.3%. The total sample size for the 2002 CTS is 20,525. A more detailed description of the survey can be found in Gilpin et al., 2003. The 2002 CTS data on general Californians provide a benchmark for comparison to the CCATUS and CKATUS.

Participants

For CCATUS and CKATUS data, the present study focuses on ever smokers who are immigrants. We define *immigrants* as "living in the U.S. but born overseas." Among Chinese respondents to the CCATUS, 302 ever smokers (68.5% of all ever

smokers in the survey) were immigrants, with 63.6% born in mainland China, 6.0% in Hong Kong, 19.9% in Taiwan, and 10.6% in other countries. A total of 88.3% of these Chinese immigrants were 18 or older when they came to the U.S. On average, they had lived in the U.S. for 14.5 years (median). Among Korean respondents to the CKATUS, 884 ever smokers (84.4% of the total) were immigrants, with 98% born in Korea. A total of 85.6% were 18 years or older when they came to the U.S. On average, they had lived in the U.S. for 16.5 years (median). Of the 302 Chinese ever smokers, 9.6% were interviewed in English, and of the 884 Korean ever smokers, 7.7% were interviewed in English. The rest were interviewed in their native languages.

In our analysis of the 2002 CTS data, we included all ever smokers except first-generation Chinese and Korean immigrants. About 1.1% of the total sample of ever smokers in the 2002 CTS was excluded for this reason.

In the discussion section of this paper, we compare data for Chinese immigrants in California with data for Chinese in mainland China in order to draw implications for population cessation. This is for expositional simplicity only; it is not intended to imply that all Chinese immigrants come from mainland China or that this is the only valid comparison. The quit ratio for Chinese ever smokers in Taiwan is 13.0% (Wen, Levy, Cheng, Hsu, & Tsai, 2005), which is not very different from that for Chinese in China (11.5%; Yang et al., 2005). The quit ratio for Chinese in Hong Kong is much higher, 34.4% (Abdullah & Yam, 2005), but only 6% of Chinese immigrant respondents to the CCATUS were born in Hong Kong. While it would be ideal to make comparisons with each subgroup of Chinese immigrants, it is infeasible given the small sample size for each subgroup in the CCATUS.

Measures

The main measure of this study is the *quit ratio*, defined as “the percentage of former smokers among ever smokers” (USDHHS, 1989). *Ever smoker* can be defined in a number of ways. The most commonly used criterion is a “Yes” answer to the question, “Have you ever smoked at least 100 cigarettes in your lifetime?” A slightly more stringent criterion is a “Yes” answer to “Have you ever smoked regularly?” *Former smoker*, too, can be defined in a number of ways. One definition is “an ever smoker who is no longer smoking at the time of the survey.” Another is “an ever smoker who has quit for an extended period of time.” A commonly specified “extended period” is 1 year (USDHHS, 1989). When calculating quit ratios with data from the CTS, the CCATUS, and the CKATUS, we used multiple definitions of *ever*

smoker and *former smoker* to ensure that the results of comparisons between groups were not skewed by semantics.

Quit attempts provide another measure of quitting activities. The quit attempt analysis is restricted to attempts made within the 12-month period preceding the survey. A person was considered to have made a quit attempt if he or she tried to quit smoking and was successful for at least 24 hr (USDHHS, 1989).

This study also assesses exposure to California’s multilingual antismoking media campaign. For all three surveys, respondents were asked if they had seen, heard, or read any antismoking messages in newspapers or on TV, radio, or billboards in the last 30 days preceding the survey. The CCATUS and CKATUS used the questions from the 2002 CTS. However, the former two asked about TV, radio, and newspapers, while the latter asked about TV, radio, and billboards. Finally, this study assesses the use of cessation aids. Those who reported making a quit attempt in the past 12 months were asked if they had used any cessation aids. Respondents to the CCATUS and CKATUS were asked if they had consulted a doctor, used either Eastern or Western medicine, or called a telephone quitline. A “Yes” response to any of these was counted as use of cessation aids. Respondents to the CTS were asked if they had used counseling (face to face, telephone, etc.), nicotine gum or patch, prescription medicine, or self-help materials. A “Yes” response to nicotine gum or patch or to prescription medication to quit smoking or using any counseling was counted as use of cessation aids.

Statistical analysis

SAS statistical package version 9 was used for all descriptive analyses reported in tables and figures. SUDAAN version 9 was used for variance estimation. All percentages are weighted to reflect the respective Chinese, Korean, and general Californian populations (Carr et al., 2005a, 2005b).

Results

Table 1 presents basic demographic information on Chinese and Korean immigrant ever smokers, compared with ever smokers in California in general (from the CTS). The main difference between these Asian immigrants and ever smokers in California’s general population is gender. Ever smokers among Asian immigrants are mostly men (>85%), while only 58% of ever smokers in California’s general population are men. Given that women in China and Korea hardly smoke, this difference is expected. On average, Chinese immigrant ever smokers are a few years older, but they started smoking a few years later than

Table 1. Demographics of ever smokers and consumption levels of current smokers.

	Chinese immigrants	Korean immigrants	General California smoking population
	2003 CCATUS (<i>n</i> =302) % (\pm 95% <i>CI</i>)	2003 CKATUS (<i>n</i> =884) % (\pm 95% <i>CI</i>)	2002 CTS (<i>n</i> =10,112) % (\pm 95% <i>CI</i>)
Gender			
Male	89.2 (2.7)	87.4 (1.5)	58.2 (0.8)
Female	10.8 (2.7)	12.6 (1.5)	41.8 (0.8)
Age			
18–24	5.1 (3.4)	6.7 (2.5)	9.8 (0.3)
25–44	32.5 (6.6)	39.0 (3.6)	38.1 (0.8)
45–64	42.0 (7.1)	39.4 (3.6)	33.6 (1.5)
65+	20.3 (5.8)	14.9 (2.4)	18.5 (1.3)
Mean age	50.1 (2.3)	47.5 (1.2)	47.2 (0.4)
Education			
12 years or less	43.1 (6.7)	34.0 (3.6)	48.2 (0.8)
More than 12 years	56.9 (6.7)	66.0 (3.6)	51.8 (0.9)
Mean age starting to smoke	19.7 (0.9)	20.9 (0.5)	17.2 (0.3)
Consumption level			
Mean cigarettes	8.9 (1.5)	11.2 (0.9)	12.2 (0.4)
Median cigarettes	6.1	10.0	10.0
Percent smoking <15 CPD	73.5 (9.1)	66.1 (5.4)	59.8 (1.7)

CCATUS, California Chinese American Tobacco Use Survey 2003; CKATUS, California Korean American Tobacco Use Survey 2003; CTS, California Tobacco Survey (interview in English and Spanish only).

ever smokers in California in general, so the total years of smoking are about the same. There is little age difference between Korean immigrant ever smokers and Californian ever smokers in general.

Among current smokers, Chinese immigrants' average number of cigarettes per day (CPD) is about 3 cigarettes lower than the California average. Korean smokers do not differ significantly from general California smokers in CPD. With 15 CPD as a cutoff point for light smoking, there are more light smokers among Chinese and Korean immigrants than among California smokers in general. All occasional smokers surveyed were counted as light smokers, since they all smoked fewer than 15 CPD. Most smokers in California (59.8%) are also light smokers using fewer than 15 CPD as the standard, a fact that has been reported in previous California tobacco surveys (Gilpin et al., 2003).

Table 2 presents quitting data for the three groups. Among Chinese immigrants who reported ever smoking 100 cigarettes, 60.5% had quit smoking by the time of the survey. Among Chinese immigrants who reported ever having smoked, the quit ratio dropped to 57.2%. If only those who had been abstinent for at least 1 year were considered to have quit smoking, then the quit ratio dropped to 52.5%. Korean immigrants had a similar pattern of quit ratios, starting at 56.9% and dropping a few points as the criteria become more stringent. Both Chinese and Korean immigrants had very similar levels of quit ratios compared with ever smokers in California in general, as shown in the third column.

Since Chinese immigrants were older than the general smoking population in California, and since older smokers are more likely than younger ones to have tried to quit smoking, we adjusted our results for age. This adjustment decreased Chinese immigrants' quit ratio to 49.9%. We also adjusted for years of smoking (because quit ratio is an accumulated percentage over time). That adjustment brought the quit ratio back up to 55.4% because, as mentioned earlier, Chinese immigrants started smoking later than the general smoking population in California. Similar adjustments were made for Korean immigrants; however, these adjustments had a negligible effect because the age difference between Korean immigrants and the general smoking population in California is quite small.

Table 2 further shows that most Chinese immigrants who quit smoking (\geq 1 year) did so after moving to the U.S. (67.2%). Those who quit smoking in the U.S. took an average of 8 years to succeed. Korean immigrants showed a similar pattern, with an even greater proportion quitting after moving to the U.S. (76.8%); moreover, they took fewer years to succeed—an average of 6 years after moving to the U.S.

Finally, all those who were smoking 12 months before the surveys were asked if they had made a quit attempt that lasted at least 24 hr. On average, 60.4% of Chinese immigrant smokers had made at least one quit attempt in the 12 months before the survey. For Korean immigrant smokers, the quit attempt rate was 68.7%. These rates are comparable to, or higher

Table 2. Quit ratios and quit attempts.

	Chinese immigrants	Korean immigrants	General California smoking population
	2003 CCATUS	2003 CKATUS	2002 CTS
	(<i>n</i> =302)	(<i>n</i> =884)	(<i>n</i> =10,112)
	% ($\pm 95\%$ CI)	% ($\pm 95\%$ CI)	% ($\pm 95\%$ CI)
% quit among ever smokers of 100 cig.	60.5 (6.5)	56.9 (3.7)	59.8 (1.0)
% quit among ever regular smokers	57.2 (7.1)	56.1 (3.8)	58.4 (1.0)
% quit for ≥ 1 year	52.5 (6.6)	51.1 (3.7)	53.3 (1.1)
<i>Adjusted by age</i>	49.9 (6.6)	50.4 (3.7)	53.3 (1.1)
<i>Adjusted by years of smoking</i>	55.4 (6.6)	50.8 (3.7)	53.3 (1.1)
% quit after moving to U.S.	67.2 (7.9)	76.8 (4.2)	—
Years taken to quit after moving to U.S. (Median)	8	6	—
% quit attempts in previous 12 months	60.4 (9.9)	68.7 (4.9)	58.9 (1.5)

CCATUS, California Chinese American Tobacco Use Survey 2003; CKATUS, California Korean American Tobacco Use Survey 2003; CTS, California Tobacco Survey (interview in English and Spanish only).

than, the quit attempt rate for California smokers in general (58.9%).

Table 3 presents the level of exposure to California's antismoking media campaign. Exposure via television ranks highest among the three media forms for all groups. Overall, more than 82% of Chinese and Korean immigrant smokers reported exposure to any form of media-based antismoking campaign; this approaches the level of the general smoking population in California (84%).

Figure 2 shows use rates of cessation assistance in the past 12 months: 9.5% ($\pm 7.0\%$) for Chinese immigrants and 14.9% ($\pm 5.4\%$) for Korean immigrants, which are not significantly different from each other. Both rates, however, are significantly lower than that of the general smoking population in California, 22.8% ($\pm 1.8\%$).

Discussion

This study shows that more than half of the ever smokers among Chinese and Korean immigrants

living in California have quit smoking. The meaning of this level of population quit rate (quit ratio) can be examined in two ways. The immigrants' quit ratio can be compared with the quit ratio of smokers in California in general, and it can be compared with the quit ratios of ever smokers in the Chinese and Korean immigrants' countries of birth. The possibility of comparing the immigrants' data in these two ways is what makes them a most interesting group for the study of the effect of social norms on tobacco cessation.

The quit ratios found in this study, 52.5% for Chinese and 51.1% for Koreans, are comparable to the quit ratio for California ever smokers in general (53.3%). This study focuses exclusively on Chinese and Korean immigrants born overseas, but it replicates the quit ratios reported in previous population-based studies of Chinese and Koreans in California, studies that did not distinguish between U.S.-born and foreign-born subjects (Ji et al., 2005; Maxwell et al., 2005). Thus, we can conclude with reasonable confidence that Chinese

Table 3. Media exposure among ever smokers (30 days preceding the surveys).

	Chinese immigrants	Korean immigrants	General California smoking population
	2003 CCATUS	2003 CKATUS	2002 CTS
	(<i>n</i> =302)	(<i>n</i> =884)	(<i>n</i> =10,112)
	% ($\pm 95\%$ CI)	% ($\pm 95\%$ CI)	% ($\pm 95\%$ CI)
Television ^a	72.9 (5.8)	72.3 (3.2)	72.0 (1.5)
Radio ^a	44.5 (6.5)	37.7 (3.5)	39.7 (1.5)
Newspaper ^a	49.5 (6.5)	37.8 (3.5)	—
Billboard ^a	—	—	50.9 (1.7)
Any of the above	82.4 (5.1)	83.0 (2.8)	84.2 (1.3)

CCATUS=California Chinese American Tobacco Use Survey 2003; CKATUS=California Korean American Tobacco Use Survey 2003; CTS=California Tobacco Survey (interview in English and Spanish only). ^aAll anti-smoking media materials are in multiple languages including English, Spanish, Chinese, and Korean.

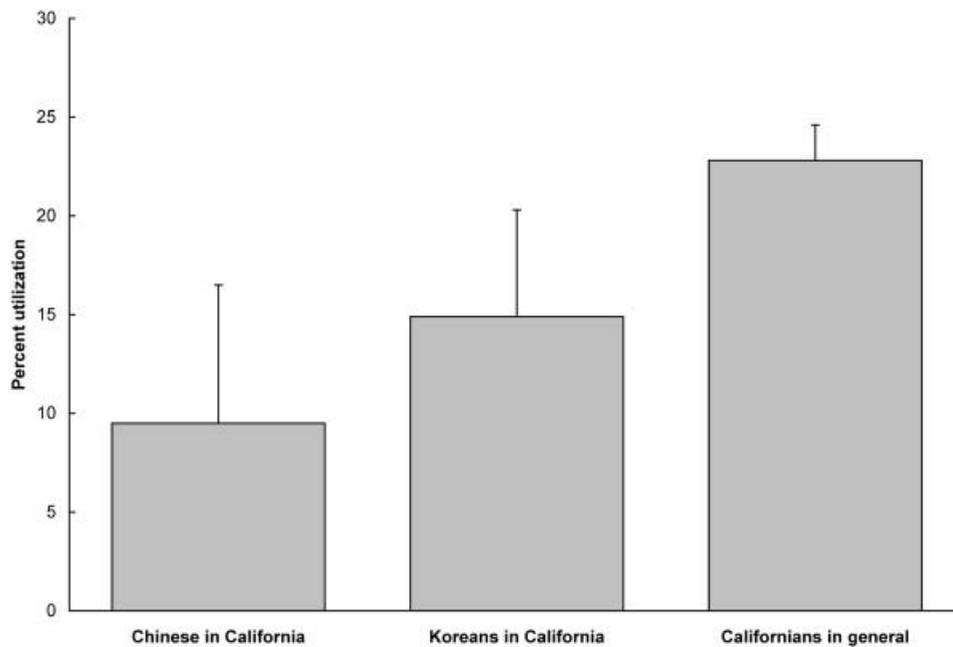


Figure 2. Percent using cessation service/aids among those who attempted to quit smoking; based on CCATUS, 2003; CKATUS, 2003; and CTS, 2002.

and Koreans in California have reached the same smoking cessation level as the general population in California.

When compared with the quit ratios in China and Korea, however (D. S. Kim et al., 2005; Yang et al., 2005), the quit ratios for immigrant Chinese and Korean ever smokers in California are dramatically higher (52.5% vs. 11.5% for Chinese, 51.1% vs. 22.3% for Koreans; Figure 1). Since quit ratio is a measure spanning an entire population, a difference of such magnitude deserves careful consideration. To see whether the high quit ratios for Chinese and Korean immigrants are artifacts of selection, the current study examined the year these immigrants quit smoking. It found that more than two-thirds of the former smokers quit after coming to the U.S. Using the data in Table 2, it can be estimated that 35.3% ($52.5\% \times 67.2\% = 35.3\%$) of Chinese ever smokers and 39.2% ($51.1\% \times 76.8\% = 39.2\%$) of Korean ever smokers quit after moving to the U.S. In other words, the quit ratios for these populations of ever smokers at the time of their coming to the U.S. were 17.2% ($52.5\% - 35.3\%$) and 11.9% ($51.1\% - 39.2\%$) for Chinese and Koreans respectively—much closer to the quit ratios in their countries of birth. Thus, these immigrants were not groups of smokers who were significantly different from other smokers in their home countries in terms of their quitting status when they first came to the U.S. Accordingly, their high quit ratios observed later (in the year 2003) in the U.S. cannot simply be attributed to self-selection biases.

Given that most immigrants had a low quit ratio when they first came to the U.S., the question is how they later could have such dramatically higher quit ratios than smokers still living in China and Korea. A crude estimation of annual cessation using the data in Table 2 and data from published studies on smoking in China and Korea can show how such a large difference came about. In the following discussion we use Chinese smokers as the example, but the same logic applies to Koreans.

The fact that 35.3% of Chinese immigrant *ever smokers* in California quit after coming to the U.S. (vs. 17.2% before) means that about 42.6% of Chinese immigrants who were *current smokers* at the time of immigration quit after coming to the U.S. ($35.3/[1-17.2\%]=42.6$). Table 2 further indicates that half of those who quit did so within 8 years. For purposes of simplicity, we can take half of 42.6% and then divide it by 8 years, which gives us an approximate annual cessation rate for these immigrants of 2.7%. In contrast, data from two national surveys in China conducted 6 years apart (1996 and 2002) show an annual cessation rate of approximately 0.4% (Yang et al., 2001; Yang et al., 2005). In other words, the annual cessation rate for Chinese-born smokers in California is almost seven times that of Chinese smokers in China. This is an unexpected magnitude of difference, given that even highly effective interventions in controlled clinical settings generally produce only a twofold effect in cessation rate (Fiore et al., 2000; Silagy, Lancaster, Stead, Mant, & Fowler, 2004), whereas this difference not

only is sevenfold but also is taking place on the population level.

Data in Table 2 provide an explanation for such an unexpectedly dramatic difference in annual cessation rate: Chinese immigrant smokers in California are much more likely to make quit attempts. The rate of past year quit attempts is 60.4% for Chinese immigrants in California. The rate of current smokers who reported having tried to quit at least once was 12% for Chinese in China in a large national representative survey (Yang et al., 2001). It is unclear what proportion of the quit attempts in Yang's 2001 China study occurred in the past year. However, even if they all had occurred in the past year, the annual quit attempt rate of Chinese in California would be five times the rate of Chinese in China. If 80% of the reported quit attempts had occurred in the past year (considering that smokers tend to remember only recent quit attempts; Gilpin & Pierce, 1994), then the annual quit attempt rate of Chinese in California would be more than six times that of Chinese in China. If all quit attempts had the same chance of success, then the annual cessation rate for Chinese smokers in California would be five to six times that of Chinese smokers in China. If, however, the success rate for quit attempts in California is actually higher because of factors such as home bans (Gilpin, White, Farkas, & Pierce, 1999) and the fact that 9% of quit attempts made by Chinese in California were aided quit attempts, a sevenfold effect is possible. In other words, the difference in the rate of quit attempts is the most significant factor producing the dramatically different annual cessation rates in these two groups of Chinese smokers. This explanation agrees with other studies demonstrating that a difference in quit attempt rates is often the simplest explanation for differing annual cessation rates across populations (Zhu, 2006).

The question, then, is why Chinese smokers in California are so much more inclined to try to quit than are Chinese in China. This study suggests some reasons, though it cannot provide a definitive answer. Immigrants adapt themselves, in greater or lesser degree, to their new environment, although the changes are not always for the better when it comes to health behavior (Chen, 2005; Landrine & Klonoff, 2004; Lee, Sobal, & Frongillo, 2000; Ma et al., 2004). In the case of Chinese immigrant smokers in California, the new social norm concerning smoking is likely to trigger quit attempts. The CCATUS did not measure its respondents' perceived social norm concerning smoking. However, the CCATUS did assess Chinese immigrants' exposure to California's multilingual antismoking media campaign. More than 80% reported having noticed antismoking messages in the media in the past month. This is a

significant level of exposure, the same level reported by California ever smokers in general (Table 3). Exposure to an antismoking media campaign can make one feel that smoking is not welcome. Other experiences, such as being restricted from smoking at work sites or even in homes, also increase the perception that smoking is socially undesirable. Workplace and home smoking bans have been shown to be significant factors motivating California smokers in general to try to quit (Cowling & Bond, 2005; Gilpin et al., 1999). Recent studies show that Asian immigrant smokers are experiencing high levels of restriction both at work and at home in California (Carr et al., 2005a, 2005b; Zhu, Wong, Nguyen, & Tedeschi, 2005), suggesting that the antismoking messages have reached these smokers.

To summarize, Chinese immigrants in California, by actively attempting to quit, achieved a much greater annual cessation rate than did Chinese in China (2.7% vs. 0.4%). As immigrants' number of years in the U.S. increased, the difference between quit ratios, which are basically the annual cessation rate accumulated over time, for these two groups widened steadily, so that by 2003, Chinese immigrants' quit ratio had reached more than 50%. The same logic can be applied to Korean immigrants. They also reported a high rate of exposure to media messages (83%), similar to California smokers in general, and had a high quit attempt rate (68.7%). As a result, their annual cessation is higher than that reported for Koreans in Korea, approximately 3.7% based on data in Table 2 in this study, compared with approximately 1.4% based a large longitudinal study in Korea (Cho, Song, Davey-Smith, & Ibrahim, 2004).

This study has several limitations, underscoring the need for clarification through future research. First, this study focuses on only two Asian immigrant groups. The results may not apply to the many, diverse Asian immigrant groups in the U.S. The similarity in results across the two groups, however, suggests that the principle responsible for the dramatic increase in annual cessation rates may operate in other groups that experience a significant change in social norms concerning smoking. For example, it may be predicted that a similar data pattern will emerge for Vietnamese immigrants in California, because many of them have lived in California for extended periods of time. This prediction can be tested, as a population tobacco survey is currently being conducted with Vietnamese immigrants in California. Second, the sample sizes of smokers for the CCATUS and the CKATUS in California are relatively small, especially when compared with the much larger sample sizes of national surveys in China and Korea (D. S. Kim et

al., 2005; Yang et al., 2001). This leads to relatively wide confidence intervals for any numbers reported in the tables after weighting by the respective populations. This study, however, has replicated quit ratios reported by earlier studies of Chinese and Koreans in California. Replication suggests stability of results. Third, this study reports only quit ratios of ever smokers. It does not have information on individual characteristics of smokers at the time when they tried to quit smoking, such as number of cigarettes smoked per day, previous quit attempts, or confidence in quitting. Factors such as these may contribute to these Asian immigrants' having a higher quit rate than their counterparts in their native countries, although the effect size of this predictor tends to be very small (around 0.1) (Hebert, Gamst, & Zhu, 2007). Finally, this study attributes the dramatically higher quit attempts of immigrants mainly to the changed social norm they experienced after moving to the U.S. However, no formal measure of social norms was attempted. Even though the literature contains ample evidence of the dramatic differences in social norms regarding smoking in the California and in China or Korea—and anyone who has visited cities in China or Korea and in California can testify to these differences—a more formal measure of social norms would be useful. It is our hope that studies like the present one will spur interest in developing such a measurement instrument to be used for population research.

The results of this study have practical implications for tobacco control in Asian countries and other countries where quit attempt rates are low. In order to increase the cessation rate in these countries, the first order of business is to increase the rate of quit attempts among current smokers. Discussion of cessation often focuses on the need to increase smokers' use of cessation aids. Cessation aids can help, but they are relevant only if smokers are actively trying to quit. This study shows that only small proportions of these Asian immigrants sought assistance to quit smoking, which cannot account for the dramatically different annual cessation rates on the population level (Zhu, 2006). It is mainly because these immigrants made many attempts to quit that their quit ratios approached that of California ever smokers in general. Yet most surveys in China and Korea do not even ask current smokers if they tried to quit smoking in the year preceding the survey. More research is needed to understand what can increase quit attempts among the current smoking population in Asia.

This study shows the advantages of studying immigrants and comparing data internationally. As mentioned, the existing differences in social norms provide a natural environment whose dramatic contrasts would be almost impossible to set up

experimentally. The data on Chinese and Korean immigrants reported in this study, if further replicated, have strong theoretical implications for tobacco cessation. They suggest that where smokers live is more important than their ethnicity or country of origin. They also suggest that, on the population level, smokers will eventually respond to the social norm where they live, and their cessation rate will approximate that of their community. Chinese and Korean immigrant smokers in California have stopped smoking at a dramatically higher rate than their counterparts in their native countries not because their personal propensity for success at quitting smoking suddenly changes after moving to a new country, but because the social norm in California makes them more likely to try. While this study does not provide mechanisms for *how* this happens on the individual level, it provides data showing *what* happens on the population level.

Acknowledgments

The data analysis and the writing of this paper were supported by National Cancer Institute Grants R01 CA104573 and U01 CA114640. The authors wish to thank Yuerong Zhuang for her statistical assistance and Kiandra Hebert for assistance with literature searches. Part of the paper was presented at the Special Studies Summit organized by the Tobacco Control Section of the California Department of Health Services, in Sacramento, CA, USA, September 7–8, 2005.

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