

# Quit smoking advice from health professionals in Taiwan: the role of funding policy and smoker socioeconomic status

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## ABSTRACT

**Objectives** In 2002, Taiwan launched a program to encourage doctors to provide brief cessation counselling to their patients during routine outpatient visits. This study is to compare and analyse the annual prevalence rate of receiving advice to quit smoking from health professionals before (2004) and after (2005, 2006) the increase in funding and the withdrawal of additional funding (2007).

**Methods** We analysed pooled data from 2004 to 2007 Taiwan Adult Tobacco Survey, an annual random digit dialling telephone survey, to estimate the prevalence of receiving quit advice among ever smokers across these years. Smoking characteristics and the socioeconomic factors of smokers associated with receipt of advice to quit smoking were also examined.

**Results** The prevalence rate of receiving quit advice increased from 21.1% in 2004 to 28.2% in 2006, and then decreased slightly to 27.6% in 2007 after the funds were cut. Multivariate analyses results indicated that increasing financing for smoking cessation services in 2005, being male, older, a daily cigarette user, having previously attempted to quit, perceiving oneself as having poor health and being aware of the benefits of smoking cessation services were significantly positively associated with receiving quit advice from health professionals. In contrast, smokers who were younger, female and occasional cigarette users were less likely to receive quit advice. Also, smokers with socioeconomic disadvantages were not less likely to receive quit advice.

**Conclusions** During the period of increased funding for smoking cessation services, the rates of receiving quit advice increased among all smokers and across different socioeconomic groups.

## INTRODUCTION

The World Health Organization (WHO) has predicted that tobacco may kill a billion people by the end of this century. More than three-quarters of tobacco-attributable deaths will be in low-income and middle-income countries. The WHO have emphasised that individual country healthcare systems hold primary responsibility to provide tobacco treatment. The provision of brief quit advice should be integrated into primary healthcare services and other routine medical visits.<sup>1</sup> Some countries, such as the USA,<sup>2</sup> the UK<sup>3</sup> and Australia,<sup>4</sup> have published evidence-based guidelines to recommend effective tobacco cessation interventions ranging from brief quit advice to extensive counselling combined with pharmaceutical adjuncts.

A meta-analysis found that a brief advice intervention can increase quitting by a further 1% to 3%.<sup>5</sup> Another study found that offering basic quit advice could prevent about 13% of myocardial infarctions and 19% of strokes.<sup>6</sup> Despite these guidelines and studies showing cost-effective ways of preserving life and reducing illness, health professionals in many countries underperform in helping smokers quit,<sup>7–12</sup> and most smokers report not being offered cessation advice.<sup>13–16</sup>

Taiwan has a smoking prevalence of 22%; 39% of men and 5% of women smoke. Cigarette smoking in Taiwan has resulted in an estimated 18 000 deaths annually. Taiwan has about 4 million smokers, over half of whom have attempted to quit at least once.<sup>17</sup> Taiwan launched National Health Insurance in 1995 to provide healthcare for all citizens. However, smoking cessation treatments are not covered under the insurance plan. Health professionals seldom provide smoking cessation advice to their patients. The country enacted a tobacco health and welfare tax in 2002, the same year that it implemented the Smoking Cessation Outpatient Services program designed to encourage doctors to integrate smoking cessation counselling in routine outpatient visits. Taiwan's smoking cessation counselling guidelines recommend a 6-min counselling agenda termed the 'five As': ask, advise, assess, assist and arrange. Contracted doctors are required to attend a 6-h smoking cessation consultation/training workshop. Subjects are to receive a brief consultation about smoking cessation from health professionals (ie, doctors, nurses and pharmacists) and a prescription of medication that might help them quit smoking (eg, nicotine replacement therapy and bupropion).

The Smoking Cessation Outpatient Services program was designed to offer doctors financial incentives to provide brief cessation counselling during routine outpatient visits. An additional 250 New Taiwan dollars (NT\$, equivalent to US\$8) of doctor reimbursement was granted for delivering cessation counselling. However, only 20 000 smokers (0.5% of all smokers) had received treatment for their addiction in 2003. To increase the number of patients receiving smoking cessation services, the Taiwanese government increased reimbursement and medication subsidies starting in January 2005. Under the new funding policy, doctors started receiving NT\$350 (US\$11) per visit instead of NT\$250 (US\$8) they were receiving in 2004. Also, the government offered a subsidy of cessation medications to eligible subjects aged 19



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years or older who were smoking at least 10 cigarettes per day. In 2005, subjects could receive medication subsidies of up to NT \$400 (US\$13) per week instead of NT\$250 (US\$8) per week before the increase, while smokers with low income could receive higher medication subsidies of up to NT\$500 (US\$16) per week. Under the new program, every patient could receive two courses (8 weeks per course) on smoking cessation each year. In addition, the eligibility criteria for participating doctors were expanded from family practice, psychiatry and internal medicine to all other specialties including gynaecology, otolaryngology and surgery.

After the increase in financial support and the broadening of medical specialisations that can offer cessation services in 2005, the number of contracted doctors increased from 1841 (5.5% of all doctors) in 2004 to 3466 (10.4%) in 2005 and 4161 (11.9%) in 2006. Annual number of cessation services delivered increased 5 times, from 22 167 subjects (44 554 visits) in 2004 to 109 508 subjects (273 754 visits) in 2005.<sup>18</sup> However, as the number of smoking cessation services increased, total cost also increased from \$0.8 million in 2004 to \$7 million in 2005. Due to a budget shortage, in April 2006 the government reduced the funding to the pre-January 2005 levels. Enrolled doctors still receive an additional US\$8 for cessation counselling. Subjects also receive medication subsidies of US\$8 per week, while low-income people continue to receive higher medication subsidies (US\$16 per week). Reimbursement data show that the number of smokers receiving smoking cessation treatments decreased since April 2006.<sup>19</sup> However, whether the changes in the funding policy for smoking cessation services influenced cessation advice rates in large, population-based samples of smokers is unclear.

Smoking is associated with socioeconomic disadvantage and is an important contributor to health inequalities. The socioeconomic characteristics, insurance coverage, ethnicity and health status of smokers have been shown to influence receipt of smoking cessation advice.<sup>15 20–23</sup> In addition, the policy of funding changes for tobacco control programs is a critical factor in influencing the implementation and outcome of tobacco use prevention and cessation.<sup>18 24–26</sup> Despite studies that have shown a positive impact of financial reimbursement and insurance coverage on the provision of cessation counselling and utilisation of smoking cessation services,<sup>18 27–30</sup> few studies have evaluated the impact of changing funding for smoking cessation services on population-based cessation advice rates. This study aims to determine whether the changes in funding for smoking cessation services influenced trends in annual prevalence rates of receiving quit advice from health professionals during 2004–2007. We also assessed differences in the annual prevalence rates of receiving quit advice across these years by smoker socioeconomic status in Taiwan. Smoker characteristics related to receipt of quit advice also were examined.

## METHODS

This study used national population-based data from the 2004, 2005, 2006 and 2007 Taiwan Adult Tobacco Survey to assess the prevalence of receiving quit advice from health professionals. The Taiwan Adult Tobacco Survey is an annual cross-sectional, county-based random dialling telephone survey to estimate smoking behaviour and attitudes in a representative sample of the non-institutionalised adult population (age 18 and older) in Taiwan. The survey is conducted by the Bureau of Health Promotion, Taiwan. Telephone numbers are drawn from 5 strata categorised by the population size of 25 counties. In each county, the sample number of successfully interviewed individuals ranged from 400 to 800 based on the different strata. Phone

numbers were proportionally selected and called by random digit sampling. In each household, a representative adult sample was randomly selected. The household telephone coverage rate in Taiwan was up to 98% since 2000. The response rates were about 60% for the 2004–2007 surveys.

In the 2004, 2005, 2006 and 2007 Taiwan Adult Tobacco Surveys, representative samples of 16 688, 16 749, 16 922 and 16 588 people were interviewed successfully by telephone. According to the 2004, 2005, 2006 and 2007 databases, a total of 5358, 4846, 5220 and 4866 adults, respectively, were ever smokers, while 3292, 3131, 3072 and 2953 adults were current smokers. Individuals were identified as ever smokers by the question “Have you smoked at least 5 packs (100 cigarettes) in your entire life?”. Then individuals were asked “Do you now smoke cigarettes every day, some days, or not at all?”. To determine smoking cessation advice by health professionals, ever smokers were asked: “During the past 12 months did any doctor, nurse, pharmacist, or other health professionals advise you to quit smoking?”. Thus, all ever smokers were included in this study to assess the rates of receiving quit advice vis a vis different funding policies and smoker characteristics.

The independent variable in this study was receipt of quit advice from health professionals. Respondents who reported that they did not receive quit advice from health professionals were categorised as the reference group. The dependent variables included the funding policy for smoking cessation services and smoker characteristics. The different periods of funding policy for smoking cessation services were measured by year (2004, 2005, 2006 and 2007). Since the Taiwan government increased the funding for smoking cessation services from January 2005 through March 2006, the year 2004 was categorised as the reference group. Smoker characteristics obtained in this study included smoking status (ever vs current), cigarette use (daily vs occasional), quit attempts in the past year (yes vs no), perceived health status (good vs poor), their awareness of smoking cessation services (yes vs no), gender (male vs female), age (18–34, 35–49, 50–64, 65+), household monthly income (NT\$, ≤20 000, 20 001–60 000, 60 001–100 000, ≥100 001), educational attainment (elementary, middle, high school, college) and employment (yes vs no).

SAS software (V.9.1; SAS, Cary, North Carolina, USA) was used to analyse the data sets. To assess the prevalence of receiving quit advice in the 2004–2007 surveys, estimates were weighted to the respondent’s probability of being selected and the age-specific, sex-specific and education-specific populations from the 2000 Taiwan census. Trend analyses were used to test the changes in the annual prevalence of receiving quit advice in 2004, 2005, 2006 and 2007. Univariate and multivariate logistic regression were conducted to examine the relationships between the rates of receipt of advice to quit smoking from health professionals and the funding policy for smoking cessation services as well as smoker characteristics.

## RESULTS

### Smoking rates by demographic characteristics

After weighting the survey design, the overall prevalence of smoking among adults in Taiwan in 2004, 2005, 2006 and 2007 was 23.9%, 22.2%, 21.4% and 21.1%, respectively, while the prevalence of former smokers was 6.4%, 5.7%, 7.4% and 7.4%. Current cigarette smoking prevalence was 42.9%, 39.3%, 38.4% and 37.6% for men in 2004, 2005, 2006 and 2007, respectively, while smoking prevalence for women was 4.5%, 4.7%, 4.1% and 4.7% (table 1). As age increased, the percentage of current smokers decreased. Adults with at least a bachelor’s degree were

**Table 1** Prevalence rates of smoking by demographic characteristics

	Weighted percentage (%)			
	2004	2005	2006	2007
Total	23.9	22.2	21.4	21.1
Gender				
Female	4.5	4.7	4.1	4.7
Male	42.9	39.3	38.4	37.6
Age				
18–34	24.4	21.4	20.3	19.7
35–49	26.8	26.2	24.5	26.1
50–64	21.1	20.1	19.8	18.9
65+	19.0	17.2	18.9	16.3
Education				
Elementary	18.3	18.8	18.2	16.4
Middle	34.9	31.7	29.2	31.3
High school	27.7	26.1	25.6	24.6
College and higher	16.5	14.1	13.8	14.3
Household monthly income				
NT\$≤20000	21.1	19.1	18.8	19.7
NT\$20001–60000	26.1	25.3	22.7	22.5
NT\$60001–100000	26.5	23.9	23.2	22.8
NT\$≥100001	30.8	29.7	26.1	26.1
Unknown	21.4	18.5	19.4	17.6
Employment				
No	14.9	14.4	14.4	13.9
Yes	30.3	28.3	26.6	26.5

Using Taiwan year 2000 census as sample weights. N=16 688 (2004), 16 749 (2005), 16 922 (2006) and 16 588 (2007).  
NT\$, new Taiwan dollars.

less likely than other adults to be current smokers. For example, current smoking prevalence for those with college and higher education level was 16.5%, 14.1%, 13.8% and 14.3% in 2004, 2005, 2006 and 2007, respectively, while smoking rate for those with middle school education level was 34.9%, 31.7%, 29.2% and 31.3%. In addition, smoking rate among adults having household monthly income less than NT\$20 000 was lower than the rate among adults having higher income. Overall, the mean age of smokers was 42 years; 81% of smokers were daily smokers; 74% had employment; 20% had a household monthly income less than NT\$20 000; almost half of smokers had attempted to quit in the preceding year.

**Receipt of quit advice by different funding periods**

The increased funding for smoking cessation services in 2005 appears to have increased the prevalence rates of receiving quit advice during the previous year from 21.1% in 2004 to 26.8% in 2005 and 28.2% in 2006. However, the rate declined slightly to 27.6% in 2007 as the funding policy reverted to the pre-January 2005 levels in April 2006. By gender, the prevalence rate of receiving quit advice among male smokers increased from 21.9% in 2004 to 29.0% in 2006 and then slightly decreased to 28.7% in 2007, while the prevalence rate among female smokers increased from 14.7% in 2004 to 21.3% in 2006 and then decreased to 19.3% in 2007.

**Receipt of quit advice by smoker characteristics**

Table 2 presents the trends in receipt of quit advice during 2004–2007 by smoker characteristics. Trend analysis of the 2004–2007 data indicated an overall increase in the rates of receipt of quit advice across different smoker characteristic groups with the increased funding for smoking cessation services in 2005. However, the prevalence rates declined slightly in 2007 after the funds were cut. For example, for older smokers, the

**Table 2** Prevalence rates of receiving quit advice from health professionals

	Weighted percentage (%)				Trend test p value
	2004	2005	2006	2007	
Total	21.1	26.8	28.2	27.6	<0.001
Gender					
Female	14.7	20.6	21.3	19.3	0.04
Male	21.9	27.6	29.0	28.7	<0.001
Age					
18–34	14.0	17.9	19.9	18.4	<0.001
35–49	19.1	26.1	25.3	25.4	<0.001
50–64	30.2	37.2	37.2	40.0	<0.001
65+	34.6	45.6	51.6	46.4	<0.001
Education					
Elementary	33.4	38.6	40.7	40.2	<0.001
Middle	19.7	28.2	28.5	28.4	<0.001
High school	16.1	21.7	22.9	23.5	<0.001
College and higher	18.5	22.1	25.5	23.7	<0.001
Household monthly income					
NT\$≤20000	32.0	38.8	36.6	38.6	0.02
NT\$20001–60000	20.1	25.7	27.3	26.2	<0.001
NT\$60001–100000	19.9	20.6	25.4	23.4	0.04
NT\$≥100001	21.0	22.0	27.2	22.5	0.30
Unknown	17.5	25.4	26.7	26.2	<0.001
Employment					
No	24.1	35.7	35.3	33.8	<0.001
Yes	19.0	23.0	25.2	25.0	<0.001
Cigarette use					
Occasional	15.3	21.5	26.4	21.5	<0.001
Daily	24.1	28.4	28.8	29.6	<0.001
Quit attempts					
No	18.0	23.6	24.5	24.7	<0.001
Yes	24.6	31.0	33.1	31.2	<0.001
Perceived health					
Good	18.4	22.8	25.0	24.5	<0.001
Poor	34.4	33.1	38.0	38.9	0.03
Benefit awareness					
No	21.2	25.0	26.6	23.7	0.01
Yes	21.0	28.0	29.2	29.6	<0.001
Area					
Taipei	18.2	26.8	27.8	27.3	<0.001
Northern	19.5	25.6	26.1	24.0	0.04
Central	21.4	26.9	27.8	27.5	0.03
Western	23.2	28.1	28.1	32.2	<0.001
Southern	24.5	26.3	31.5	27.9	0.02
Eastern	28.8	30.0	35.8	25.3	0.92

Note: 1. Using Taiwan year 2000 census as sample weights. N=5358 (2004), 4846 (2005), 5220 (2006) and 4866 (2007).  
NT\$, new Taiwan dollars.

prevalence rate of receiving quit advice increased from 34.6% in 2004 to 51.6% in 2006 and then decreased to 46.4% in 2007. Similarly, for occasional cigarette users, the prevalence rate increased from 15.3% in 2004 to 26.4% in 2006 and then decreased to 21.5% in 2007. In addition, for smokers having household monthly income less than NT\$20 000, the prevalence rate of receiving quit advice increased from 32.0% in 2004 to 38.6% in 2007.

**Factors associated with receiving quit advice**

The univariate analysis results showed that increasing financing for smoking cessation services in 2005 was related to receiving quit advice. For example, the odds of receiving quit advice in the past 12 months in the 2006 survey was 1.40 times the odds in the 2004 survey (table 3). In addition, those who were male, older, less

**Table 3** Factors associated with receipt of smoking cessation services

	Unadjusted		Adjusted	
	OR	95% CI	OR	95% CI
<b>Financing policy</b>				
2004	1		1	
2005	1.23	0.91 to 1.64	1.26	1.11 to 1.42
2006	1.40	1.05 to 1.85	1.39	1.25 to 1.56
2007	1.34	1.00 to 1.77	1.37	1.22 to 1.53
<b>Gender</b>				
Female	1		1	
Male	1.74	1.19 to 2.53	1.50	1.29 to 1.74
<b>Age</b>				
18–34	1		1	
35–49	1.50	1.36 to 1.65	1.49	1.34 to 1.66
50–64	2.51	2.24 to 2.81	2.38	2.08 to 2.73
65+	3.35	2.96 to 3.79	3.29	2.75 to 3.93
<b>Education</b>				
Elementary	1		1	
Middle	0.61	0.54 to 0.69	0.86	0.74 to 1.01
High school	0.46	0.41 to 0.51	0.72	0.62 to 0.83
College and higher	0.48	0.43 to 0.54	0.77	0.67 to 0.90
<b>Income</b>				
NT\$≤20000	1		1	
NT\$20001–60000	0.60	0.54 to 0.67	0.98	0.85 to 1.12
NT\$60001–100000	0.58	0.50 to 0.66	1.00	0.84 to 1.18
NT\$≥100001	0.56	0.48 to 0.65	1.02	0.85 to 1.23
Unknown	0.57	0.51 to 0.64	0.98	0.85 to 1.13
<b>Employment</b>				
No	1		1	
Yes	0.69	0.64 to 0.75	1.04	0.93 to 1.17
<b>Cigarette use</b>				
Occasional	1		1	
Daily	1.63	1.50 to 1.78	1.74	1.58 to 1.92
<b>Quit attempts</b>				
No	1		1	
Yes	1.50	1.39 to 1.62	1.75	1.61 to 1.90
<b>Perceived health</b>				
Good	1		1	
Poor	2.12	1.92 to 2.34	2.03	1.82 to 2.25
<b>Benefit awareness</b>				
No	1		1	
Yes	1.15	1.06 to 1.24	1.29	1.18 to 1.41
<b>Area</b>				
Taipei	1		1	
Northern	0.92	0.82 to 1.05	0.92	0.81 to 1.06
Central	1.01	0.89 to 1.13	0.97	0.85 to 1.10
Western	1.12	1.00 to 1.26	1.03	0.91 to 1.17
Southern	1.10	0.97 to 1.24	1.02	0.89 to 1.16
Eastern	1.24	1.06 to 1.45	1.06	0.89 to 1.26

Using univariate and multivariate logistic regression. In the multivariate logistic regression, N=13 192; received n=3293; not received n=9899, -2 Log L= 13 789.5. NT\$, new Taiwan dollars.

educated, daily cigarette users, who had lower income, had previously attempted to quit and who perceived themselves as having poor health were more likely to receive quit advice from health professionals. For example, the odds of receiving quit advice for men was 1.74 times that of women. Similarly, smokers who had attempted to quit in the past 12 months had 1.50 times the odds of receiving quit advice compared to smokers who had not previously attempted to quit. Smokers who perceived themselves as having poor health had 2.12 times the odds of receiving quit advice compared to smokers who perceived themselves as having good health. Moreover, increased age had a strong effect on receiving cessation advice. For instance, compared to smokers between 18 and 34 years of age, the odds of receiving quit advice

for smokers over 65 years old was the highest (OR 3.35), followed by smokers between 50 and 64 years old (OR 2.51), followed by those between 35 and 49 years old (OR 1.50).

Results of the multivariate analyses indicated that increasing financing for smoking cessation services in 2005, being male, older, a daily cigarette user, having previously attempted to quit, perceiving oneself as having poor health, and being aware of the benefits of smoking cessation services were significantly positively associated with receiving quit advice. After adjusting for other variables, the odds of receiving quit advice (OR 1.26) increased after increasing funding for smoking cessation services in 2005. In 2006, the odds of receiving quit advice continuously increased (OR 1.39). In addition, after adjusting for other variables, smokers who were aware of the benefits of financing smoking cessation services had 1.29 times the odds of receiving quit advice than smokers not aware of the benefits. Similarly, after adjusting for other variables, receiving smoking cessation advice remained significantly higher for older individuals, males (OR 1.50), daily cigarette users (OR 1.74), those who had attempted to quit in the past year (OR 1.74) and those with perceived poor health (OR 2.03). However, after adjusting for other variables, employment and income status variables were no longer significantly associated with receiving smoking cessation advice.

## DISCUSSION

Increased financing for smoking cessation services has been positively related to provider involvement in consultation and smoker utilisation of smoking cessation services.<sup>18 26 27</sup> This study provides additional evidence to indicate that financing smoking cessation services appears to improve the rates of population-based receipt of quit advice. The results showed that the prevalence rates of receiving quit advice increased from 21.1% in 2004 (prior to the funding increase in 2005) to 28.2% in 2006. Then the rate declined slightly to 27.6% in 2007 as the funding policy reverted to the pre-January 2005 levels in April 2006. However, the decrease was not significant (OR 0.94, 95% CI 0.84 to 1.05). After increased funding for smoking cessation service, more doctors (12% of all doctors) from different specialisations participated in this program. In addition, local governments encouraged doctors in all township health centres to deliver smoking cessation services to enhance accessibility. Moreover, several programs such as smoking cessation media campaigns, community smoking cessation projects, health professionals smoking cessation training program, smoking cessation services for hospitalised patients, and a pilot study of the development of smoker identification system in public hospitals may also boost effects on receipt of quit advice from health professionals.

Nevertheless, the probability of not being offered advice in Taiwan (71%) remained high compared to the rates in the UK (59%)<sup>13</sup> and the US (39%).<sup>31</sup> Studies<sup>8 32–35</sup> have identified barriers to the low rates of health professional advice to quit smoking: time constraints, lack of financial incentives, lack of training and materials, perceived low effectiveness and being smokers. In Taiwan, 70% of the tobacco health tax was allocated to the National Health Insurance Security Fund. However, smoking cessation treatments are not covered under the National Health Insurance Plan. A doctor often sees more than 50 patients in a morning or an afternoon. Most doctors seldom ask about patients' smoking status and provide smoking cessation advice. The government should restructure the healthcare financing and accreditation systems to facilitate the institutionalisation of systems changes and adopt tobacco cessation interventions as an integral element of healthcare delivery.



Prior studies<sup>15 20</sup> found a complex relationship between socioeconomic status and receipt of quit advice, and the results were mixed. Our study found that the increased funding policy was associated with increasing prevalence of smoking cessation advice among smokers with socioeconomic disadvantages. The receipt rate of quit advice was higher for smokers with a household monthly income of less than NT\$20 000 than for other smokers. The univariate results showed that smokers with low education or low income had a higher probability of receiving quit advice. However, after adjusting for other factors, the socioeconomic factor was unrelated to the receipt of quit advice. This may be due to a strong negative correlation between household income level and age. Our results showed that smokers with household monthly income less than NT\$20 000 were mainly people over 65 years old (56%) and those between 50 and 64 years old (22.3%).

Under the Taiwan National Health Insurance system, low-income people are eligible to get full insurance coverage, while other residents have to pay a copayment. The implementation of a copayment system is to prevent people from seeking medical care that may not be necessary. However, the copayment mechanism may also discourage people, especially for low-income group, from seeking necessary medical care. To reduce financial barrier for low-income people to attend medical services, the government use the tobacco tax revenue to subsidise low-income people's premium. Also, low-income smokers could receive higher subsidies for cessation medication starting in 2005. Since many healthcare sectors in Taiwan provide drugs to patients, additional reimbursement for cessation counselling and medication may increase incentives for providers, especially for clinics, to deliver cessation services. As indicated above, the current policy of increasing financial incentives for providers and accessibility for low-income people may subsequently reduce health disparities by facilitating quit attempts for smokers with socioeconomic disadvantages.

Our findings are generally in accord with previous studies<sup>13 20 36 37</sup> that found smokers who had chronic diseases and were older were more likely to receive quit advice from providers. In contrast to some other studies, our study found that female smokers, occasional cigarette users and younger smokers were less likely to be given advice. Some prior studies<sup>13 20</sup> found being a female smoker increased the probability of receiving quit advice. In Taiwan, the female smoking rate is 5%.<sup>17</sup> Perhaps providers think that women are less likely to smoke, and it is thus less necessary to provide quit advice. Providers also may not easily recognise occasional cigarette users compared to daily users. The implementation of a smoker identification system should be promoted in all healthcare sectors to facilitate health professionals routinely giving quit advice and assisting patients to quit smoking.<sup>38</sup> Gender-sensitive smoking cessation programs should be developed to better target female smokers.

Our study also found that the smoking rate among younger people was higher. However, younger smokers and smokers with employment were less likely to report having received assistance to quit. In contrast, smokers who had attempted to quit and were aware of the benefits of smoking cessation were more likely to receive quit advice. Tobacco dependence is recognised as a chronic disease that requires ongoing repeated interventions and multiple attempts to quit.<sup>2</sup> Outpatient visits per person per year average over 14 in Taiwan.<sup>39</sup> One study found that receipt of quit advice by multiple health professionals increased quit attempts and quitting.<sup>40</sup> If a large number of health professionals offer cessation advice, then the cumulative effect on reducing smoking rate and disease burden could be substantial.<sup>41</sup> Moreover,

worksite smoking cessation programs should be promoted to increase the accessibility of cessation services for young adults. Population-wide strategies, such as smoke-free environments, increasing the tobacco tax and smoking cessation campaigns should continue to expand to create the demand for smoking cessation services.

This study has some limitations. First is the potential threat to validity from such factors as historical events. For example, smoking cessation media campaigns during the study period may have influenced the receipt rates of quit advice. Second, this study used existing data sets that did not collect information concerning organisational and healthcare provider characteristics, which might influence the delivery of cessation advice. Third, over a quarter of the respondents did not report their income. The missing data were placed in the 'unknown cases' group and included in the analysis. Fourth, data were based on the self-report of smokers, who may not have remembered smoking cessation assistance they received over a 12-month period.

Finally, another challenge to estimate the prevalence of receiving quit advice is to decide who to include in the denominator. Previous studies often used current smokers in the denominator, but that approach may lose some smokers who received cessation advice and then quit during the preceding year. The US guideline suggests that clinicians should provide every patient who uses tobacco with at least a brief intervention targeted and effective for smokers willing to quit, smokers unwilling to quit and former tobacco users.<sup>2</sup> This study used ever smokers in the denominator. Analyses showed quit advice prevalence among ever smokers was slightly lower than that of current smokers. For example, the rate of receiving quit advice among ever smokers in 2004, 2005, 2006 and 2007 was 21.1%, 26.8%, 28.2% and 27.6%, respectively, while the rate among current smokers was 24.1%, 27.7%, 28.2% and 28.2%. Since the smoking prevalence in Taiwan decreased from 23.9% in 2004 to 21.1% in 2007, the prevalence of receiving quit advice among ever smokers in 2007 may have been less. In addition, 28% of ever smokers answered 'not sure/unknown' with respect to receiving quit advice. Moreover, ever smokers who answered 'not sure/unknown' tended to have a higher percentage (37%) in the age group over 50 years compared to that of smokers who did not (26%).

In conclusion, trends analyses of the 2004–2007 data indicated that the prevalence of receiving quit advice increased across different socioeconomic groups with the appearance of increased funding for smoking cessation services, while the prevalence declined slightly after the funds were cut. Among smokers in Taiwan, older men, who were daily cigarette users, had attempted to quit in the past year, had perceived poor health and were aware of the benefits of smoking cessation services were more likely to report ever having received advice on quitting from health professionals, while female, younger and occasional cigarette users were less likely to have received quit advice. Nevertheless, smokers with socioeconomic disadvantages were not less likely to receive quit advice. Quitting advice is an important process for the purpose of smoking cessation. Research should further examine who had successfully quit smoking and environmental influences such as the healthcare organisation policy on provider delivery of cessation advice, smokers' receiving quit advice and smoking cessation rates at the population level.

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**Competing interests** None.

## What this paper adds

- ▶ The increased funding for smoking cessation services appears to have improved the prevalence rate of receiving quit advice from health professionals.
- ▶ The rates for receipt of quit advice across different socioeconomic groups increased during the increased funding period.
- ▶ Smokers who were younger, female and occasional cigarette users were less likely to receive quit advice from health professionals, while smokers with socioeconomic disadvantages were not less likely to receive quit advice.

**Ethics approval** The study was approved by the Bureau of Health Promotion, Department of Health, Taiwan and the Office for the Protection of Human Subjects at UC Berkeley.

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