Original Investigation

Socioeconomic Patterning in Tobacco Use in Argentina, 2005

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Abstract

Introduction: Globally, tobacco is the number one preventable cause of death, killing 1 in 10 adults. By 2030, 80% of all tobacco deaths will occur in developing countries. Social factors drive the adoption and cessation of smoking in high-income countries, but few studies have examined the socioeconomic patterning of smoking in developing countries.

Methods: Using data from the 2005 National Survey of Risk Factors for Non-communicable Diseases in Argentina, we investigated gender-specific socioeconomic patterning of current, former, and never-smoking status; the intensity of smoking; and smokers' readiness for cessation using multinomial logistic and ordinary least squares regression. We also investigated heterogeneity in the patterning by age.

Results: Higher socioeconomic position (SEP) was associated with less smoking for men in all age groups, although the results were most pronounced for men at younger ages (odds ratio [OR] of current vs. never smoking = 0.57, 95% CI 0.51–0.63 for higher vs. lower education at ages 18–24 years). For women, higher SEP was associated with more smoking in older age groups but less smoking in younger age groups (OR = 1.51, CI 1.41–1.62 and OR = 0.86, CI 0.78–0.96 for higher vs. lower education at ages 50–64 and 18–24 years, respectively). Higher SEP was also associated with higher odds of recently quitting compared to not considering quitting for men regardless of age group but for women only in younger age groups.

Discussion: The higher burden of smoking among those of lower SEP, especially in younger age groups, is a troubling pattern that is certain to impact future disparities in chronic disease outcomes unless interventions are undertaken.

Introduction

Tobacco is the number one preventable cause of death worldwide, killing 1 in 10 adults (Ezzati and Lopez, 2003; Mathers and Loncar, 2006). It is projected that by 2030, 80% of all tobacco

deaths will occur in developing countries (Mathers and Loncar). The global public health community has begun to make tobacco control a priority by passing the [World Health Organization WHO, 2003 \(WHO FCTC, 2003\)](#) and through increased research and policy attention (WHO, 2008). Despite progress, developing countries are experiencing an increasing burden of the tobacco epidemic.

The extent of the tobacco epidemic has varied substantially across regions as well as between countries within regions. In 1995, the Latin America and Caribbean region had the third highest smoking prevalence for men (39%) and the highest prevalence for women (22%) (Jha, Ranson, Nguyen, and Yach, 2002). In 2000, an estimated 15% of all male deaths and 6% of all female deaths at ages 30 years and over in the Region of the Americas B (which includes all Latin America except Cuba, Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, and Peru) were attributable to smoking (Ezzati and Lopez, 2003). For women, this proportion is the largest among developing regions (Ezzati and Lopez, 2004). Studies of Latin American cities have found smoking prevalence to range from 10.5% to 43.3% for women and 31.3% to 49.4% for men aged 25–64 years in 2003–2005 (Schargrodsky et al., 2008); 16.6% to 35.9% for women and 30.2% to 40.6% for men aged 40 years and older in 2003–2004 (Menezes et al., 2009); and 1.6% to 21.5% for women and 14.3% to 46.5% for men aged 60 years and older in 1999–2000 (Kim, De La Rosa, Rice, and Delva, 2007). This shows a wide range of smoking behaviors even within urban areas across Latin America. Although smoking prevalence remains high, there is some evidence that smoking is decreasing in some Latin American countries (Franco-Marina, 2007; Monteiro, Cavalcante, Moura, Claro, and Szwarcwald, 2007).

A number of countries in Latin America are among the leading tobacco producers in the world (e.g., Brazil, Argentina, Cuba, Dominican Republic, and Colombia), and production in the region increased 29.5% between 1995 and 2000 (Muller and Wehbe, 2008). In addition, the transnational tobacco industry has made a concerted effort to undermine tobacco control in Latin America (Aguinaga Bialous and Shatenstein, 2002; Sebrie

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and Glantz, 2007a; Stebbins, 2001). Accusations against the industry include that it has ignored the science on secondhand smoke, employed ineffective “youth smoking prevention” campaigns to boost its public image, promoted smuggling, and influenced government officials to weaken tobacco control (Aguinaga Bialous and Shatenstein, 2002; Sebrie and Glantz, 2007b).

Argentina is a middle-income country in the Southern Cone of Latin America. It is one of only a few countries in the world that has signed but failed to ratify the FCTC (WHO FCTC, 2011). Tobacco production is a major economic activity in the country, with 70% of the tobacco leaf grown exported (Mejia and Pérez-Stable, 2006). The tobacco industry is a strong force in Argentina, targeting youth through marketing (Braun, Mejia, and Jaganath, 2008; Braun, Mejia, Ling, and Perez-Stable, 2008), preventing litigation (Flores, Barnoya, Mejia, Alderete, and Perez-Stable, 2006), and working to prevent tobacco control legislation (Mejia and Pérez-Stable; Mejia, Schoj, Barnoya, Flores, and Pérez-Stable, 2008; Sebrie, Barnoya, Perez-Stable, and Glantz, 2005).

Social factors such as age, gender, socioeconomic position (SEP), and ethnicity drive the adoption (Kaplan and Keil, 1993) and cessation (Kotz and West, 2009) of smoking in populations in high-income countries, but few studies have examined the socioeconomic patterning of smoking in developing countries. The limited information available suggests that those of higher SEP tend to have lower smoking prevalence among men, with more heterogeneity among women (Bobak, Jha, Nguyen, and Jarvis, 2000; Cavelaars et al., 2000); these patterns depend greatly on country-level development, age group, and socioeconomic marker investigated. Socioeconomic disparities in smoking behavior are predictive of future disparities in chronic diseases. To better understand social patterns in smoking behavior among adults in Argentina, we analyzed data from a nationally representative survey conducted in 2005. We investigated (a) the socioeconomic patterning of current, former, and never-smoking status and intensity of smoking behavior; (b) whether socioeconomic gradients in smoking status and intensity varied by age or gender; and (c) the socioeconomic patterning of smokers' readiness for smoking cessation.

Methods

Data Source

We conducted a secondary data analysis of data from the 2005 National Survey of Risk Factors for Non-communicable Diseases conducted by the Argentina Ministry of Health, in cooperation with the National Institute of Statistics and Census and provincial authorities (Ministerio de Salud de la Nación, 2006). The purpose of the survey was to collect data on chronic diseases and their risk factors, health status, and health care service utilization. This was the first time a survey of this kind was conducted in Argentina; a subsequent survey was conducted in 2009. The study employed a four-stage probabilistic sample design with agglomerations of at least 5,000 inhabitants sampled at the first stage, censal radios (with an average of 300 housing units) or clusters of censal radios sampled at the second stage, housing units sampled at the third stage, and an individual 18 years or older randomly sampled from all households within

each housing unit at the fourth stage. The sample represents 96% of adults living in urban areas (with at least 5,000 inhabitants). According to the 2001 census, Argentina has a population of 36.3 million people, with 89% of them living in urban areas (defined as areas with at least 2,000 people) (Instituto Nacional de Estadística y Censos, 2001). A total of 41,392 people participated in the survey from all 23 provinces in addition to the city of Buenos Aires, the federal district.

Trained interviewers visited the sampled households. Study participants answered questions about their tobacco use and other behavioral risk factors, in addition to questions about demographics, SEP, and household characteristics. A current smoker was defined as someone who currently smokes all or some days and who has smoked at least 100 cigarettes in his/her lifetime. A former smoker was someone who has smoked at least 100 cigarettes in his/her lifetime but does not currently smoke. A never-smoker was someone who has never smoked at all or has smoked less than 100 cigarettes in his/her lifetime. The number of cigarettes smoked per day was determined based on responses to the question, “During the last 30 days, on average, how many cigarettes did you smoke per day?” The survey also asked a series of questions that allow categorization of respondents into the Prochaska stages of change (Prochaska and DiClemente, 1983). Precontemplation is the first step, in which the person has not considered stopping smoking or thinks they might stop in more than 6 months. Contemplation represents the step in which the person hopes to stop smoking within 1–6 months. The preparation stage is characterized by the person hoping to stop smoking within a month or less. Action is the stage when the person has stopped smoking but smoked for the last time within the last 6 months. In the maintenance step, the former smoker has not smoked for 7 months or more. The never-smoker stage represents people who have never smoked in their lives or if they have they have smoked less than 100 cigarettes in their lifetime.

SEP was measured using individual level of formal education and monthly household income. Self-reported individual education level included categories for no school, incomplete primary, complete primary (i.e., through Grade 7), incomplete secondary, complete secondary (i.e., through Grade 12), incomplete tertiary or university education, and complete tertiary or university or more. Education level was treated as an ordinal variable. Monthly household income in pesos (Argentinean currency) was reported in categories with ranges of no income, 1–100, 101–200, . . . , 1,001–1,250, . . . , 2,001–3,000, . . . , 5,001, or more. In order to create a continuous variable, we assigned each person the midpoint of the category as their monthly income. Both education and income were modeled as continuous variables in SD units. In sensitivity analyses, we investigated the linearity assumption for education and income by modeling each categorically; the results were consistent with an assumption of linearity.

Statistical Methods

All analyses were stratified by gender due to gender differences in smoking behavior worldwide (Grunberg, Winders, and Wewers, 1991; Waldron, 1991; Waldron et al., 1988) and potentially differential effects of socioeconomic factors and development on the health of men and women (Vlassoff, 2007). Survey weights were used to account for the complex sampling design.

Socioeconomic patterning by education and income were investigated separately.

Multinomial logistic regression was used to determine the socioeconomic patterning of smoking status and readiness for cessation. Smoking status was modeled as current versus never smoking and former versus never smoking. Smokers' readiness for cessation, based on the stages of change model, was also modeled as three levels: action stage, contemplation/preparation stage, and precontemplation stage (reference group). The contemplation and preparation stages were combined for this analysis since both stages represent a hope to stop in the near future. Ordinary least squares regression was used to investigate the socioeconomic patterning of smoking intensity, as measured by the number of cigarettes smoked per day among current smokers. Log transformation of the number of cigarettes resulted in qualitatively similar results, so the more easily interpretable metric was reported.

For each dependent variable (smoking status, cigarette consumption, and smokers' readiness for cessation), we ran two regression models for each SEP variable. In the first model, we adjusted only for age, and in the second model, we included an

interaction term between each SEP variable and age. Due to evidence of important heterogeneity in the socioeconomic patterning of almost all smoking outcomes by age in both men and women, we report odds ratios (ORs) associated with SEP for categorical smoking outcomes stratified by age. For cigarette consumption, we estimated predicted mean number of cigarettes smoked per day for the 10th, 25th, 50th, 75th, and 90th percentiles of education stratified by age. The percentiles of education reflect the distribution of education in the full sample using the continuous version of education described above. For women, the 10th, 25th, 50th, 75th, and 90th percentiles of education correspond to primary incomplete, primary complete, secondary incomplete, tertiary or university incomplete, and tertiary or university complete or more, respectively. The same is true for men, with the exception of the 75th percentile representing secondary complete rather than tertiary or university incomplete.

Results

Selected characteristics of the sample, stratified by gender, are reported in Table 1. Women reported lower monthly household income than men, but men and women had similar education

Table 1. Selected Characteristics of the Sample by Gender, Argentina, 2005

Variable	Men	Women
<i>N</i>	17,827	23,565
Age in years, mean $\pm$ SD (range)	42.7 $\pm$ 17.1 (18–97)	44.8 $\pm$ 18.0 (18–98)
Education, <i>N</i> (%)		
No school	289 (1.6)	558 (2.4)
Primary incomplete	2,048 (11.5)	2,924 (12.4)
Primary complete	4,198 (23.6)	5,474 (23.3)
Secondary incomplete	3,360 (18.9)	3,544 (15.1)
Secondary complete	3,563 (20.0)	4,535 (19.3)
Tertiary or university incomplete	2,303 (12.9)	2,946 (12.5)
Tertiary or university complete or more	2,033 (11.4)	3,560 (15.1)
Monthly household income (in pesos), mean $\pm$ SD (range)	920.7 $\pm$ 863.9 (0–5,500)	815.7 $\pm$ 774.3 (0–5,500)
Current smokers, <i>N</i> (%)	6,638 (37.2)	5,955 (25.2)
Former smokers, <i>N</i> (%)	3,832 (21.5)	2,954 (12.5)
Never-smokers, <i>N</i> (%)	7,303 (41.0)	14,586 (61.9)
Age in years when smoked for first time, mean $\pm$ SD (range)	16.7 $\pm$ 3.5 (9–33)	18.6 $\pm$ 5.5 (11–46)
Nondaily smoking status among current smokers, <i>N</i> (%)	1,905 (28.7)	1,665 (28.0)
Cigarettes/day during past 30 days, mean $\pm$ SD (range)	11.7 $\pm$ 10.7 (1–90)	8.9 $\pm$ 8.8 (1–90)
Cigarettes/day during past 30 days, <i>N</i> (%)		
1–4	1,968 (30.2)	2,286 (39.2)
5–9	1,000 (15.4)	1,104 (18.9)
10–19	1,721 (26.4)	1,422 (24.4)
20 or more	1,822 (28.0)	1,023 (17.5)
Prochaska stages of change, <i>N</i> (%)		
Precontemplation	5,421 (30.4)	4,889 (20.7)
Contemplation	685 (3.8)	530 (2.2)
Preparation	532 (3.0)	410 (1.7)
Action	438 (2.5)	410 (1.7)
Maintenance	3,394 (19.0)	2,544 (10.8)
Never-smoker	7,303 (41.0)	14,586 (61.9)

Note. Precontemplation: person has not considered stopping smoking or thinks that they might stop in more than 6 months. Contemplation: person hopes to stop smoking within 1–6 months. Preparation: person hoping to stop smoking within a month or less. Action: person has stopped smoking but smoked for the last time within last 6 months. Maintenance: former smoker has not smoked for 7 months or more. Never-smoker: person has never smoked in lifetime or if has smoked has smoked less than 100 cigarettes in lifetime.

levels. Education and income were positively, though not highly, correlated (Spearman correlation = .46). Smoking prevalence was high for both genders, with 37% of men and 25% of women classified as current smokers and 21% of men and 12% of women as former smokers. Among smokers, women began smoking at slightly older ages than men (19 vs. 17 years old). Men smoked more cigarettes/day than women (means of 12 and 9, respectively). The stages of change results indicate that many current smokers are in the precontemplation stage of change (30% in men and 21% in women). People in this stage do not see quitting as necessary and do not plan to quit within the next 6 months.

Table 2 displays the gender-stratified multinomial logistic regression results for smoking status, with never-smokers as the reference group. Older age was associated with lower odds of current smoking and higher odds of former smoking versus never smoking for both men and women; the associations of older age with the odds of being a former smoker were stronger in men than in women (*OR* of being former vs. never-smoker = 1.48, 95% *CI* 1.44–1.52 for men and *OR* = 1.05, 95% *CI* 1.02–1.07 for women in education-adjusted model). Higher SEP was associated with lower odds of current smoking in men but showed no association with former smoking (*OR* = 0.80, 95% *CI* 0.77–0.83 for education for current vs. never smoking). In contrast, higher SEP was associated with greater odds of current and former smoking in women (*OR* = 1.09, 95% *CI* 1.06–1.13 for education for current vs. never smoking).

Further analyses revealed evidence of important effect modification of the socioeconomic patterning by age for both genders (*p* for interaction < .0001 in men and women for education for current and former vs. never smoking). For men, higher education was associated with lower odds of smoking (both current and former vs. never) across all age groups except former smoking in men aged 50–64 years (Figure 1). The inverse association of education with smoking was stronger among younger men than older men. Among women, higher education was associated with higher odds of current and former smoking compared to never smoking in older age groups; in contrast, in

younger age groups, women with higher education had lower odds of current smoking. The qualitative patterns and statistical significance of the results for income were similar, but the magnitude of the associations was smaller.

In regression analyses for intensity of smoking, measured as cigarettes smoked per day among current smokers, older age was associated with greater cigarette consumption for men and women (see Supplementary Material). Education showed no association with consumption for men or women, but higher income was associated with greater consumption for both genders (mean difference = 0.30, 95% *CI* 0.13–0.45 for men and mean difference = 0.57, 95% *CI* 0.44–0.70 for women in income model). There was evidence of heterogeneity in the SEP results by age, especially with education. For both men and women at younger ages, higher education had either no association or was associated with fewer cigarettes smoked per day (Figure 2). However, at older ages (especially in those ages 50 and older), higher education was associated with more cigarettes smoked per day. These differences were more pronounced for women than men.

Multinomial logistic regression results for the stages of change variables can also be seen in the Supplementary Material. For men, older age and higher SEP are associated with an increased odds of being in the action stage (i.e., quit smoking within the past 6 months) compared to the precontemplation stage (i.e., do not see quitting as necessary or do not plan to quit within the next 6 months). For women, higher education was associated with increased odds of being in the action stage compared to the precontemplation stage, although associations were much weaker than those observed for men, and no patterns were observed by income (*OR* of being in the action stage per *SD* increase in education = 1.59, 95% *CI* 1.43–1.77 for men and *OR* = 1.11, 95% *CI* 1.00–1.23 for women). Action was not consistently patterned by age in women (if anything, greater age was associated with lower odds of action). Being in the contemplation or preparation stage was not consistently or strongly associated with age or SEP in either gender when compared to the precontemplation stage.

Table 2. Adjusted Odds Ratios (ORs) (95% CIs) of Current vs. Never-Smokers and Former vs. Never-Smokers According to Age and Socioeconomic Characteristics for Men and Women, Argentina, 2005

		Current vs. never-smoker	Former vs. never-smoker
Men	Age (centered, per 10 years)	0.88 (0.86, 0.90)	1.48 (1.44, 1.52)
	Education (per <i>SD</i>)	0.80 (0.77, 0.83)	0.99 (0.95, 1.03)
	<i>p</i> for interaction term	<i>p</i> < .0001	<i>p</i> < .0001
	Age (centered, per 10 years)	0.89 (0.87, 0.91)	1.45 (1.41, 1.48)
	Income (per 500 pesos)	0.91 (0.89, 0.93)	1.01 (0.99, 1.03)
	<i>p</i> for interaction term	<i>p</i> = .7014	<i>p</i> = .0270
Women	Age (centered, per 10 years)	0.78 (0.76, 0.79)	1.05 (1.02, 1.07)
	Education (per <i>SD</i>)	1.09 (1.06, 1.13)	1.29 (1.24, 1.34)
	<i>p</i> for interaction term	<i>p</i> < .0001	<i>p</i> < .0001
	Age (centered, per 10 years)	0.78 (0.76, 0.79)	1.02 (0.99, 1.04)
	Income (per 500 pesos)	1.06 (1.04, 1.08)	1.15 (1.13, 1.18)
	<i>p</i> for interaction term	<i>p</i> < .0001	<i>p</i> < .0001

Note. The effect estimates are from the main effect models; estimates are not shown for the interaction models.

Figure 1. Odds ratios (ORs) and 95% CI of current and former smoking versus never smoking associated with a 1 SD increase in education, by age and gender, Argentina, 2005.

Both men and women showed important heterogeneity by age in the socioeconomic patterning of the action (though not contemplation/preparation) versus precontemplation stages (Figure 3). Higher education was associated with higher odds of being in the action stage versus precontemplation stage for men regardless of age group, though the association was stronger at older ages ($OR = 2.51$, 95% CI 2.00–3.16 for ages 50–64 years). For women, higher education was also associated with higher odds of being in the action stage compared to the precontemplation stage, but only in younger age groups; there was no association for older women.

Discussion

Our analyses of this nationally representative sample from Argentina showed evidence of social inequalities in smoking-related outcomes and also suggested that stronger associations of low SEP with adverse smoking behavior are emerging among younger generations. Higher education and income were associated with less smoking for men in all age groups, regardless of the marker used, although the results were most pronounced for men at younger ages. For women, higher education and income were associated with more smoking in older age groups but less smoking in younger age groups. The number of cigarettes smoked was also generally positively associated with

Figure 2. Predicted mean cigarettes smoked per day by education and age for men and women, Argentina, 2005.

education in older age groups but less strongly so, or even inversely patterned, in younger age groups, although this interaction was not observed for income. These findings suggest that the socioeconomic patterning of smoking is changing with successive generations in Argentina and increasingly concentrated among those with lower SEP. This pattern is particularly pronounced in women.

Few studies have investigated the epidemiology of smoking in Argentina. The prevalence of current smoking was reported to be 40% for men and 23% for women in 1992 (da Costa e Silva and Koifman, 1998), with similar estimates (38% for men and 24% for women) in 2001 (Martinez et al., 2006). We found a weighted prevalence of current smoking of 35% for men and 25% for women in 2005, suggesting a slight decrease in prevalence for men but little change or potentially slight increase for women. Within the city of Buenos Aires, one other study reported that more education was associated with less current smoking for men but more current smoking for women, but these results were not adjusted for age (Kim et al., 2007). A study using data from a 2001 national household survey in Argentina found that higher education was associated with less current smoking for men but more current smoking for women, with opposite trends for former smoking (Martinez et al.). These results are generally consistent with our findings of stronger inverse social patterning in men than women overall. Our study adds to these findings by revealing stronger inverse associations of SEP with smoking in men in the younger age groups and important differences in the social gradient by age in women, with positive associations of higher SEP with smoking in older women but an inverse patterning emerging in the younger age groups. These results suggest that smoking is increasingly concentrated in the lower SEP groups.

Globally, few studies have comprehensively investigated the socioeconomic patterning of smoking in other middle- and

Figure 3. Odds ratios (ORs) and 95% CI of action versus precontemplation stage associated with a 1 SD increase in education, by age and gender, Argentina, 2005.

low-income countries. Work in Asia and Africa generally shows that higher SEP is associated with less current smoking (Hoang, Byass, Dao, Nguyen, and Wall, 2007; Pampel, 2008; Pappas, Akhtar, Gergen, Hadden, and Khan, 2001), except in rural areas in Pakistan and India where there was no socioeconomic patterning (Pappas et al.; Singh et al., 1997). In Latin America, a study of adults 60 years and older in seven cities in Latin America and the Caribbean in 1999–2000 reported that higher education was associated with less current smoking for men and showed no gradient for women (Kim et al., 2007). A study of Chilean adults showed no association between current smoking and SEP (Vega et al., 1999), while among older Mexicans, higher SEP was associated with more current smoking in urban areas but less current smoking in less urban areas (Smith and Goldman, 2007). Together with this other work, our results highlight the changing nature of the socioeconomic patterning of smoking and the concentration of smoking in the lower socioeconomic groups as the smoking epidemic evolves in middle- and low-income countries. The concentration of smoking in low SEP groups is especially worrisome because of the many socioenvironmental factors that promote and sustain smoking in these groups (such as psychosocial stress, advertising, and accessibility of tobacco). These factors make it especially challenging to reduce smoking rates.

Our study also examined the intensity of smoking, showing a generally positive association between the number of cigarettes smoked and education in older age groups but less strongly so, or even an inverse association, in younger age groups. There were, however, drastic differences in cigarettes smoked per day by education between age groups 50–64 and 65+ for both men and women. Men aged 65+ smoked far fewer cigarettes/day, regardless of education, compared to men aged 50–64. This could represent a survivor effect: men who were heavy smokers who would have been in the 65+ age group may have died due to smoking-related diseases, while those who are still living may have smoked fewer cigarettes all along or may have changed their behavior to smoke fewer cigarettes once seeing the effects of smoking on others their age. For women aged 65+, the number of cigarettes smoked per day depends more greatly on education level than for women aged 50–64, for whom there is

no pattern between education and number of cigarettes smoked. This could again be related to survivorship. Since higher SEP has been shown to have generally positive health benefits, heavier smokers with higher education may be more likely to survive than heavy smokers with lower education. This would explain the result of fewer cigarettes smoked per day among women aged 65+ at the lower education levels.

We also investigated the prevalence and socioeconomic patterning of readiness to quit among smokers, according to the Prochaska stages of change model. Stage differences are predictive of a person's attempt to stop smoking and their success in smoking cessation (DiClemente et al., 1991). We found that the vast majority of current smokers are in the first stage of change or precontemplation when smokers have not considered stopping their smoking behavior or think they might stop in more than 6 months. Being a recent quitter was positively associated with education in both genders, although this relation was substantially stronger in men than in women. There was also some evidence that education was more related to quitting in younger women than in older women, which is consistent with the inverse socioeconomic gradient in smoking generally observed in younger women. These results highlight the importance of targeting messages regarding quitting, as well as offering support for quitting for persons of lower SEP. Although prevention is paramount, research in the United States has shown that smoking prevalence will not decrease without also increasing cessation (Mendez and Warner, 2000). Public health messages must include options for quitting and support to access these options. A potential barrier to cessation is that although nicotine replacement therapies are increasingly available in Latin America, their costs are high compared to cigarettes (Muller and Wehbe, 2008). This is likely to enhance and reinforce socioeconomic gradients since nicotine replacement therapy increases the rate of quitting by 50%–70% (Stead, Perera, Bullen, Mant, and Lancaster, 2008).

The FCTC has encouraged governments to enact a wide range of policies to decrease smoking. In a simulation model of tobacco control policies in Argentina, researchers found that the largest reductions in smoking prevalence and premature death due to smoking came from employing multiple policies simultaneously, although large tax increases could also cause large reductions on their own (Ferrante, Levy, Peruga, Compton, and Romano, 2007). Some of the most common population-based interventions to reduce smoking include clean air laws to end smoking in workplaces and public places; restricting smoking in schools; preventing cigarette sales to minors; large pictorial-based health warning labels on tobacco products; prohibiting tobacco advertising, sponsorship, and promotion; mass media educational campaigns; and increasing tobacco prices through taxation. Of these interventions, however, the only one that consistently affects socioeconomic classes differentially is the last: increasing the prices on tobacco products is more effective in reducing smoking in lower income adults and those in manual occupations (Fayter et al., 2008).

The Argentina tobacco control movement has seen some progress in recent years. For instance, the city of Buenos Aires and several provincial governments have passed clean indoor air legislation (Programa Nacional de Control de Tabaco, no date). However, some of these laws are weak, with allowances

for separate smoking areas in restaurants of a large enough size, and enforcement is spotty (Kozak, 2008). The Argentina government, as well as governments in other countries facing the complex obstacle of the tobacco epidemic, will benefit from implementing a wide range of policy options. However, it would be helpful to also keep in mind how policies might affect the socioeconomic gradients in smoking behavior. For instance, large tax increases on tobacco products would potentially reduce smoking behavior overall while also working to decrease the relative burden of smoking among those of lower SEP. This is consistent with our results showing that higher income is associated with more cigarettes smoked per day in both men and women.

This study has several limitations. Due to its cross-sectional nature, we are not able to determine if the differences in the socioeconomic patterning of smoking that we see according to age groups represent an effect of aging on the SEP patterning (i.e., a change in the SEP distribution as people age) or a birth cohort effect (i.e., difference in the SEP patterning across successive generations). Longitudinal studies that track persons as they age would be necessary to differentiate both. Nevertheless, documenting differences in SEP by age is still of public health importance as it has implications for prevention, regardless of the cause of the effect modification by age. Although the survey is a large, national, and population-based survey, it does not include people who live in areas with less than 5,000 people. However, this is a small segment of the population since 89% of Argentina's population live in urban areas (defined as areas with at least 2,000 people) according to the 2001 census (Instituto Nacional de Estadística y Censos, 2001).

Very few studies in developing countries have investigated the socioeconomic patterning of smoking. While those of higher education and income levels may be the first to adopt unhealthy behaviors such as smoking in low- and middle-income countries, they are also more likely to have the resources to change their behavior and environment. There are a number of reasons why those of lower SEP may smoke more and quit less, including less access to health promotion messages, living and working in environments that promote smoking, exposure to psychosocial stressors, and inability to afford products such as nicotine replacement therapy to help combat their addiction. Further studies are necessary to better understand the causes of this socioeconomic patterning in Argentina and other Latin American countries. A growing concentration of smoking in persons of lower SEP is likely to result in increased disparities in chronic diseases unless appropriate interventions are undertaken.

Supplementary Material

Supplementary Materials can be found online at <http://www.ntr.oxfordjournals.org>

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Declaration of Interests

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