

# The Italian national trends in smoking initiation and cessation according to gender and education

C. SARDU, A. MEREU, L. MINERBA, P. CONTU  
University of Cagliari, Department of Public Health, Monserrato (CA), Italy

## Key words

Smoking initiation • Smoking quitting • Health policies

## Summary

**Objectives.** *This study aims to assess the trend in initiation and cessation of smoking across successive birth cohorts, according to gender and education, in order to provide useful suggestion for tobacco control policy.*

**Study design.** *The study is based on data from the "Health conditions and resort to sanitary services" survey carried out in Italy from October 2004 to September 2005 by the National Institute of Statistics. Through a multisampling procedure a sample representative of the entire national territory was selected.*

**Methods.** *In order to calculate trends in smoking initiation and cessation, data were stratified for birth cohorts, gender and education level, and analyzed through the life table method.*

**Results.** *The cumulative probability of smoking initiation, across subsequent generations, shows a downward trend followed by*

*a plateau. This result highlights that there is not a shred of evidence to support the hypothesis of an anticipation in smoking initiation. The cumulative probability of quitting, across subsequent generations, follows an upward trend, highlighting the growing tendency of smokers to become an "early quitter", who give up within 30 years of age.*

**Conclusion.** *Results suggest that the Italian antismoking approach, for the most part targeted at preventing the initiation of smoking emphasising the negative consequences, has an effect on the early smoking cessation. Health policies should reinforce the existing trend of "early quitting" through specific actions. In addition our results show that men with low education exhibit the higher probability of smoking initiation and the lower probability of early quitting, and therefore should be targeted with special attention.*

## Introduction

Analogously too other western European countries, Italy is moving to the stage four of the epidemic model proposed by Lopez, characterized by a slow decline in tobacco use in both genders [1-3]. The reduction of smoking prevalence results from a shifting equilibrium between smoking initiation, and cessation: across subsequent generation the incidence of new smokers falls, while the incidence of smoking cessation increases [2, 4].

In this phase, fostering cessation of smoking and promoting the development of smoke free personal environments should be the key strategy to control tobacco epidemic [1].

In Italy, although lacking a comprehensive antismoking policy, several actions have contributed to the stigmatization of smoking: restrictive laws, education and information programs, increasing tobacco taxes [2]. Overall the Italian antismoking approach until 2000 was for the most part addressed to preventing the initiation of smoking, with the exception of pregnant women who were the target of specific smoking cessation interventions. It is only in the last National Health Plan (2006-2008), that promoting the cessation of smoking in the general population, appears among the primary objectives of tobacco control policies.

During last decade, information on smoking trends, provided by Mass Media and National Health Services, on the one hand emphasizes an alarming anticipation in the smoking onset, and on the other hand disregards the importance of early smoking cessation and its positive consequences for health [5].

This study aims to assess the trend in initiation and cessation of smoking across successive birth cohorts, according to gender and education, in order to provide useful suggestions for tobacco control policy.

## Methods

The study is based on data from the "Health conditions and resort to sanitary services" survey carried out in Italy from October 2004 to September 2005 by the National Institute of Statistics [6]. Through a multisampling procedure, a sample representative of the entire national territory was selected.

Data on smoking habits, collected by self completed questionnaires, were obtained through the following questions:

- Do you smoke? (yes; no but I used to smoke; no I never smoked).
- How old were you when you started smoking?
- How old were you when you stopped smoking?

The smoking habit was obtained analyzing the answers given to these three questions.

People who answered “yes” to the question “Do you smoke?” were considered as ever smokers.

This research focus on 86,492 people (42,039 men and 44,453 women) aged between 18 and 67 at the moment of the interview. The sample has been divided in 5 years birth cohorts centered around age of smoking initiation (or cessation) having as a last digit 0 or 5, also in order to minimize the recall bias inducing people to prefer the full numbers (last digit 0 or 5). In each cohort, people was stratified for gender and education level, obtained through specific questions. The education level included 2 categories: low education level, including people with junior high school or less, and high education level including people with senior high school or more.

In order to calculate trends in smoking initiation and cessation, data were analyzed through the life table method. In the survival analysis of age of smoking initiation, carried out on 86,492 people, the age at which people started smoking was considered as initiation time, and people who never smoke were included as censored data. In the survival analysis of age of smoking cessation, carried out on 37,409 people, the age at which people quit was considered as cessation, and ever smokers were considered as censored data.

Results of survival analysis are expressed as cumulative probability of starting (or quitting) smoking within a defined age. The cumulative probability of starting (or quitting) smoking within a defined age, is the probability that a person start smoking at an age less than or equal to the defined age.

Trends were analysed through regression analysis.

Confidence intervals are not shown because due to the large sample size they are extremely narrow and therefore irrelevant.

The number of subjects included in the survival analysis stratified for gender, age, and birth cohort is reported in Table I.

## Results

The cumulative probability of smoking initiation within a defined age, stratified for gender, education level and birth cohort is reported in Table II.

Overall, the cumulative probability of smoking initiation achieves the maximum in 1950s cohorts, declines in successive ones, and appears stable in the youngest generations.

In both educational levels, data show a gender difference with a cumulative probability of smoking initiation higher in men than in women; this difference is more significant in low education level, and tends to decrease across generations.

Across birth cohorts, educational differences become more evident among males and reverse among women, giving rise in younger generations to a higher probability of smoking initiation in low educated groups.

The cumulative probability of smoking initiation within the age of 12 is small, settling around values lower than 4%; across generation it shows a slight decline followed by a substantial stabilization, indicating the absence of an anticipation in smoking initiation.

The cumulative probability of smoking initiation within the age of 15 is stable among men and grows among women until 1958-62 cohort, while in successive generation it is constant.

The cumulative probabilities of smoking initiation within the age of 20 and of 25 confirm patterns observed at previous age in both genders and educational levels, but the decrements across birth cohort become more pronounced.

The cumulative probability of quitting smoking within a defined age, stratified for gender, education and birth cohort is shown in Table III.

Overall, the cumulative probability of quitting smoking follows an upward trend.

In both educational levels, the cumulative probability of quitting smoking is higher in women than in men; this gender difference is more marked in low education level, and in younger generations. Across birth cohorts educational differences in the probability of quitting

Tab. I. Number of subjects included in the survival analysis stratified for gender, age, and birth cohort.

Gender and education		Birth cohorts									
		1938-42	1943-47	1948-52	1953-57	1958-62	1963-67	1968-72	1973-77	1978-82	1983-87
Analysis of Smoking initiation	Men, Low Education	2857	2731	2758	2484	2684	2908	2669	2073	1556	1150
	Men, High Education	762	1025	1519	1756	1953	2147	2178	2297	2187	2336
	Women, Low Education	2348	3134	3275	2842	2733	2490	2322	1643	1133	692
	Women, High Education	517	808	1212	1567	2032	5055	2669	2753	2690	2538
	<b>TOTAL</b>	<b>6484</b>	<b>7698</b>	<b>8764</b>	<b>8658</b>	<b>9402</b>	<b>12600</b>	<b>9838</b>	<b>8766</b>	<b>7566</b>	<b>6716</b>
Analysis of Smoking cessation	Men, Low Education	1882	1872	1932	1701	1781	1766	1589	1232	873	-
	Men, High Education	517	690	1001	1095	1107	1039	974	1024	900	-
	Women, Low Education	718	877	1150	1164	1189	1194	860	591	436	-
	Women, High Education	196	367	563	779	946	914	843	826	821	-
	<b>TOTAL</b>	<b>3316</b>	<b>3806</b>	<b>4646</b>	<b>4739</b>	<b>5023</b>	<b>4913</b>	<b>4266</b>	<b>3673</b>	<b>3030</b>	-

**Tab. II.** Cumulative probability of smoking initiation within a defined ages, according to gender, education and birth cohort. The cumulative probability of starting smoking within a defined age, is the probability that a person start to smoke at an age less than or equal to the defined age.

Age	Gender & education	Birth cohorts										R	p
		1938-42	1943-47	1948-52	1953-57	1958-62	1963-67	1968-72	1973-77	1978-82	1983-87		
12	Men, Low Education	3.9	3.1	3.6	3.4	3.0	2.9	2.1	2.1	2.4	2.1	0.83	0.000
	Men, High Education	2.5	3.0	3.4	1.8	1.7	1.3	1.1	0.6	1.0	0.7	0.79	0.001
	Women, Low Education	0.2	0.3	0.6	0.5	1.5	1.3	1.0	0.9	0.9	1.6	0.58	0.011
	Women, High Education	0.2	0.2	0.2	0.3	0.4	0.4	0.3	0.3	0.5	0.5	0.54	0.016
15	Men, Low Education	18.7	21.1	24.9	24.8	24.0	23.7	23.3	20.3	19.2	20.1	0.05	0.549
	Men, High Education	13.5	17.7	20.2	17.7	16.1	11.8	11.1	9.8	10.4	8.8	0.62	0.007
	Women, Low education	1.7	3.0	6.3	9.4	12.8	12.2	11.6	10.3	14.8	12.1	0.72	0.002
	Women, High Education	1.5	4.5	6.3	9.2	10.0	9.9	7.3	5.7	8.3	8.4	0.30	0.101
20	Men, Low Education	56.6	60.9	64.6	63.6	62.2	57.3	55.0	54.6	54.0	-	0.37	0.082
	Men, High Education	56.8	58.3	57.9	56.9	49.7	43.1	39.3	39.2	38.7	-	0.88	0.000
	Women, Low education	16.5	17.3	25.8	32.9	37.6	36.6	32.7	31.2	37.2	-	0.63	0.010
	Women, High Education	21.7	29.7	36.2	42.0	40.4	32.4	26.5	25.5	28.5	-	0.01	0.811
25	Men, Low Education	62.7	66.1	68.2	66.7	65.0	59.4	58.3	58.5	-	-	0.50	0.049
	Men, High Education	63.6	64.2	63.3	60.4	54.8	46.5	43.3	43.6	-	-	0.90	0.000
	Women, Low education	21.3	21.8	30.4	37.1	41.1	39.8	35.4	34.8	-	-	0.56	0.033
	Women, High Education	28.4	37.0	43.1	46.8	44.2	35.5	30.3	29.4	-	-	0.04	0.617

**Tab. III.** Cumulative probability of quitting smoking within a defined ages, according to gender, education and birth cohort. The cumulative probability of quitting smoking within a defined age, is the probability that a person give up smoking at an age less than or equal to the defined age.

Age	Gender & education	Birth cohorts										R	p
		1938-42	1943-47	1948-52	1953-57	1958-62	1963-67	1968-72	1973-77	1978-82	1983-87		
20	Men, Low Education	0.6	1.1	1.7	2.4	3.7	5.0	2.5	2.7	4.7	-	0.58	0.0166
	Men, High Education	0.4	0.4	2.1	2.1	4.5	6.0	3.2	3.7	6.0	-	0.69	0.0055
	Women, Low education	1.4	1.1	1.8	3.8	5.0	6.1	3.0	5.8	9.6	-	0.73	0.0034
	Women, High Education	0.0	0.5	1.8	3.7	4.1	7.5	4.5	3.8	8.3	-	0.71	0.0045
25	Men, Low Education	2.4	3.8	4.7	8.3	10.3	11.9	9.0	11.3	-	-	0.81	0.0022
	Men, High Education	1.7	3.9	6.5	7.8	12.0	15.7	10.7	16.2	-	-	0.85	0.0010
	Women, Low education	3.2	2.5	5.8	9.5	11.7	15.7	12.3	17.9	-	-	0.90	0.0003
	Women, High Education	1.5	5.2	7.6	10.9	14.0	15.6	12.9	17.2	-	-	0.89	0.0004
30	Men, Low Education	6.7	9.6	10.7	17.8	19.0	20.2	20.1	-	-	-	0.90	0.0012
	Men, High Education	7.7	8.7	16.1	20.6	22.1	28.5	25.3	-	-	-	0.90	0.0010
	Women, Low Education	7.4	7.1	10.6	17.6	18.8	25.7	25.8	-	-	-	0.94	0.0002
	Women, High Education	6.1	9.3	17.4	22.7	24.7	28.4	31.0	-	-	-	0.96	0.0001
35	Men, Low Education	10.8	15.3	18.5	24.8	26.6	30.9	-	-	-	-	0.99	0.0001
	Men, High Education	14.1	17.5	23.7	30.9	30.6	42.4	-	-	-	-	0.95	0.0010
	Women, Low Education	11.7	11.2	16.4	23.5	24.1	36.9	-	-	-	-	0.90	0.0043
	Women, High Education	11.2	15.3	25.8	30.8	31.7	42.7	-	-	-	-	0.96	0.0006

smoking becomes particularly relevant after 25 years of age.

The cumulative probability of quitting smoking within the age of 20, although to a small extent, constantly increases across birth cohorts, with the only exception of 1968-72 generation characterised by a sudden fall. In the youngest generation the probability of quitting

settles around 5-6% in men and 8-10% in women, without relevant education differences.

The cumulative probability of quitting smoking within the age of 25 follows an increasing trend across subsequent generations, faster in women and in high educated men. In the 1973-78 generation the probability of quitting settles around 11% in low educated men and 16-

17% in other groups. Data confirms a brief decrement in the 1968-72 birth cohort.

The cumulative probability of quitting smoking within the age of 30 shows the same pattern previously described, but with higher increments and more marked education differences. In the youngest generation the probability of quitting smoking is equal to one fifth in low educated men, one quarter in high educated men and low educated women, and one third in high educated women.

The cumulative probability of quitting smoking within the age of 35 confirms the anticipation in the breaking of smoking habit observed at previous ages.

## Discussion

This paper analyses Italian's attitude towards initiation and cessation of smoking in 10 consecutive birth cohorts.

With regard to smoking onset, the cumulative probability of smoking initiation, across subsequent generations, shows a downward trend followed by a plateau. Gender and educational differences give rise, in younger generation, to a higher probability of smoking initiation in low educated group, particularly in men. These results are in accordance with previous studies stressing the positive association between low education level and smoking habit [3, 7, 8, 9].

With regard to smoking cessation, the cumulative probability of quitting, across subsequent generations, follows an upward trend, highlighting the growing tendency of smokers to become "early quitters", who give up within 30 years of age. The gap between the two education levels, and to a greater extent between the genders, increases across successive birth cohorts, giving rise, in younger generation, to a higher probability of quitting smoking in women and in high educated men.

Results suggest that the Italian antismoking approach, for the most part targeted at preventing the initiation of smoking emphasising the negative consequences, have an effect on the early smoking cessation. It can be hypothesised a "delayed effect" of the preventive actions which, although mainly designed for adolescents, may have a greater impact on young adults due to their greater responsiveness to this kind of message. Stjerna et al. support this hypothesis demonstrating that, although well informed about the health hazards, the adolescents

notion of tobacco is based on a sort of paradox: although considered risky, smoking is viewed as acceptable during the teenage years, since the most alarming dangers are attributed to adult smokers [10]. During adolescence the philosophy of life is "living day by day"; smoking is a way of being part of the crowd, and adolescents do not worry about the consequences of their lifestyles. In young adulthood the philosophy of life gradually becomes "looking towards the future"; in this context the prevention campaigns emphasising the harmfulness of smoking are probably effective in inducing anticipated cessation [10-12].

The importance of early smoking cessation is evident in relation to the health consequences: people who stop smoking at 30 years of age avoid more than 90% of the risk attributable to tobacco than those who continue to smoke [13, 14]. In the first half of the 21st century tobacco related mortality will be affected more by smoking cessation than by smoking initiation [13].

Health policies should "ride the wave" of this positive tendency, reinforcing the existing trend of "early quitting" through specific actions [15, 16].

Our findings do not support the hypothesis of an anticipation in smoking initiation. Until now the perception of an anticipation in smoking initiation, although not grounded on data evidence, have oriented antismoking programmes towards a false emergency, claiming for immediate actions to stop "children" from starting to smoke, and disregarding more global and effective approaches fostering the young's potentialities of smoking cessation [16, 17].

In addition, our results highlight that men with low education exhibit the higher probability of smoking initiation and the lower probability of early quitting, and therefore should be targeted with special attention [9, 18]. The smoking habit since the 1960s has become more and more a "poverty related disease" as has been documented in the past for infectious diseases. National data document that smoking is one of the causes of death, which is most highly correlated with social inequality, and a similar gradient are observed for morbidity (cancer incidence) [3, 19, 20].

Using data on smoking from a national survey for the analysis of temporal trends has some potential limitations related to misclassification of short term smokers or light smokers, multiple brief "quits" and age related differences in recall of start and stop times.

## References

- [1] Lopez DA, Collishaw NE, Piha T. *A descriptive model of the cigarette epidemic in developed country*. *Tob Control* 1994;3:242-7.
- [2] Sardu C, Mereu A, Pitzalis G, Minerba L, Contu P. *Smoking trends in Italy from 1950 to 2000*. *J Epidemiol Community Health* 2006;60:799-803.
- [3] Mereu A, Sardu C, Minerba L, Contu P. *Smoking trends and educational level in Italy in the age group 20-24, from 1950 to 2000*. *Subst Use Misuse* 2009;44:163-71.
- [4] Verlato G, Melotti R, Corsico AG, Bugiani M, Carrozzi L, Marinoni A, et al. *Time trends in smoking habits among Italian young adults*. *Respir Med* 2006;100:197-206.
- [5] Istituto Superiore di Sanità. <http://www.iss.it/ofad/>
- [6] Istituto Nazionale di Statistica. *Indagine multiscope sulle famiglie: Condizioni di salute e ricorso ai servizi sanitari 2005*. <http://www.istat.it>
- [7] Huisman M, Kunst AE, Mackenbach JP. *Educational inequalities in smoking among men and women aged 16 years and older in 11 European countries*. *Tob Control* 2005;14:106-13.
- [8] Faggiano F, Versino E, Lemma P. *Decennial trends of social differentials in smoking habits in Italy*. *Cancer Causes Control* 2001;12:665-71.

- [9] Graham H, Inskip HM, Francis B, Harman J. *Pathways of disadvantage and smoking careers: evidence and policy implications*. *J Epidemiol Community Health* 2006;60(Suppl 2):7-12.
- [10] Stjerna ML, Lauritzen SO, Tillgren P. "Social thinking" and cultural images: teenagers' notions of tobacco use. *Social Science & Medicine* 2004;59:573-83.
- [11] Pierce JP, Gilpin EA. *News media coverage of smoking and health is associated with changes in population rates of smoking cessation but not initiation*. *Tob Control* 2001;10:145-53.
- [12] Business Information Analysis Corporation, 1985. RJR young adult motivational research. <http://legacy.library.ucsf.edu/tid/xng78d00>
- [13] Peto R, Darby S, Deo H, Silcocks P, Whitley E, Doll R. *Smoking, smoking cessation, and lung cancer in the UK since 1950: combination of national statistics with two case-control studies*. *BMJ* 2000;321:323-9.
- [14] Bjartveit K, Tverdal A. *Health consequences of sustained smoking cessation*. *Tob Control* 2009;18:197-205.
- [15] Najem GR, Batuman F, Smith AM, Feuerman M. *Pattern of smoking among Inner-City teenagers: smoking has a pediatric age of onset?* *J Adolesc Health* 1997;20:226-31.
- [16] Grimshaw G, Stanton A. *Tobacco cessation interventions for young people (Review)*. Copyright © 2009. The Cochrane Collaboration. Published by John Wiley & Sons, Ltd. 2009 - <http://www.thecochranelibrary.com>
- [17] Mermelstein R. *Teen smoking cessation*. *Tobacco Control* 2003;12:25-34.
- [18] Peretti-Watel P, Seror V, Constance J, Beck F. *Poverty as a smoking trap*. *Int J Drug Policy* 2009;20:230-6.
- [19] Caiazzo A, Cardano M, Cois E, Costa G, Marinacci C, Spadea T, et al. *Inequalities in health in Italy*. *Epidemiol Prev* 2004;28(3 Suppl):1-161.
- [20] Ferketich AK, Gallus S, Colombo P, Pacifici R, Zuccaro P, La Vecchia C. *Hardcore smoking among Italian men and women*. *Eur J Cancer Prev* 2009;18:100-5.

■ Received on January 19, 2009. Accepted on July 3, 2009.

■ Correspondence: Paolo Contu, Department of Public Health, SS 554 (km 4.500), 09042 Monserrato (CA), Italy - Tel. +39 070 6754658 - Fax +39 070 6754658 - E-mail: [pcontu@unica.it](mailto:pcontu@unica.it)