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Current state and evolution of the tobacco epidemic in Portuguese and European school-aged adolescents by sex, between the years 1998 and 2014

To prevent tobacco consumption among adolescents, Portugal and other countries have implemented policies such as the development of curriculum-based programmes, environmental changes (e.g., smoke-free schools; bans on smoking in public places); parental involvement and restrictive strategies for tobacco access (e.g., restriction of tobacco purchase age, creation of specific places for selling).[1] However, despite the global progress in tobacco control, more than one third of the world's population is still unprotected from the level recommended by the MPOWER approach adopted by WHO.[1]

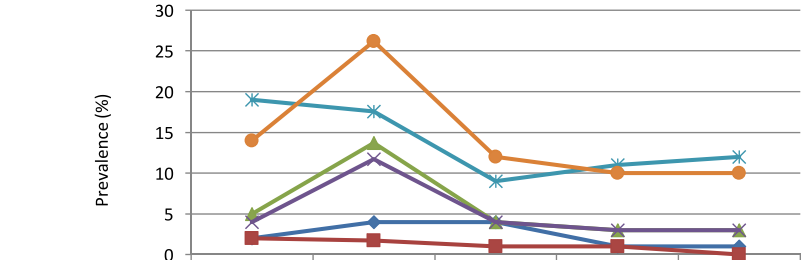
Monitoring the tobacco epidemic is necessary to evaluate the effectiveness of the preventive measures developed to control tobacco consumption by adolescents and adults. This study aimed to characterize the current state and evolution of tobacco epidemic in Portuguese school-aged adolescents and to compare it with other European countries, by sex, based on data from the Health Behaviour in School-Aged Children (HBSC) reports from 1997/1998[2] (the date on which Portugal became integrated into this report) to 2013/2014, the latest study.[6] These reports are based on data collected by self-report questionnaires applied to adolescents aged 11, 13 and 15 years old, from 19 European countries.[2–6] For this study, daily and weekly smoking was grouped as regular smoking (including those who smoke ''at least one cigarette per week''). According to the most recent HBSC report,[6] the prevalence of regular smokers aged 15 years old in Portugal is 12% among boys and 10% among girls, which is similar to the European mean prevalence (12% among boys and 11% among girls).

Regarding the evolution of tobacco consumption in Portugal, between 1997/1998 and 2013/2014,[2–6] the prevalence of regular smoking among adolescents aged 15 years old has decreased from 19% to 12% in boys and from 14% to 10% in girls; at 13 years old, the smoking prevalence has decreased from 5% in boys and 4% in girls to 3% for both sexes; at 11 years old a decrease was also observed from 2% in boys and girls to 1% in boys and 0% in girls (Fig. 1).

Concerning the evolution of regular smoking prevalence in the 19 European Union countries from 1997/1998 to 2013/2014,[2–6] oscillations occurred over time in both males (Fig. 2a)) and females (Fig. 2b)). Among male adolescents, a decrease in the prevalence of regular smokers was observed in the majority of the European countries between the 1997/1998 and 2009/2010 (Fig. 2a)). Between 2009/2010 and 2013/2014, a decrease in the smoking prevalence was registered in all countries with the exception of Portugal, which registered an increase of 1 percentage point in relation to the previous four years. According to data from the HBSC reports between 1997/1998 and 2013/2014, the prevalence of female smoking adolescents (Fig. 2b)) in Europe has been decreasing in a general and accentuated way, especially in the last four years.

In the majority of the countries that participated in the HBSC study, gender differences in prevalence were found; for example Hungary, France, Slovakia, Czech Republic, Germany, Denmark and Sweden present higher prevalence among girls. The rise in consumption among girls, particularly in Central and Eastern Europe, is a cause for concern and specific aspects related to female smoking should be reflected in preventive measures, such as the risk of thromboembolic complications when consumption occurs simultaneously with hormonal contraceptives.

Like Portugal, the majority of the European countries have opted for partial smoking bans in public places, however some countries have gone further, opting for complete bans in enclosed public places, public transport and workplaces, and these factors can help to explain the differences in prevalence registered among the countries in the HBSC study. Those countries with a lower prevalence of regular smoking among adolescents (Norway and Sweden) have



	1997/1998	2001/2002	2005/2006	2009/2010	2013/2014
Boys 11 years old	2	4	4	1	1
Girls 11 years old	2	2	1	1	0
Boys 13 years old	5	14	4	3	3
Girls 13 years old	4	12	4	3	3
Boys 15 years old	19	18	9	11	12
Girls 15 years old	14	26	12	10	10

Figure 1 Evolution of regular smoking prevalence among Portuguese adolescents according to age and sex (*Source*: HBSC 1997/1998; 2001/2002; 2005/2006; 2009/2010; 2013/2014).

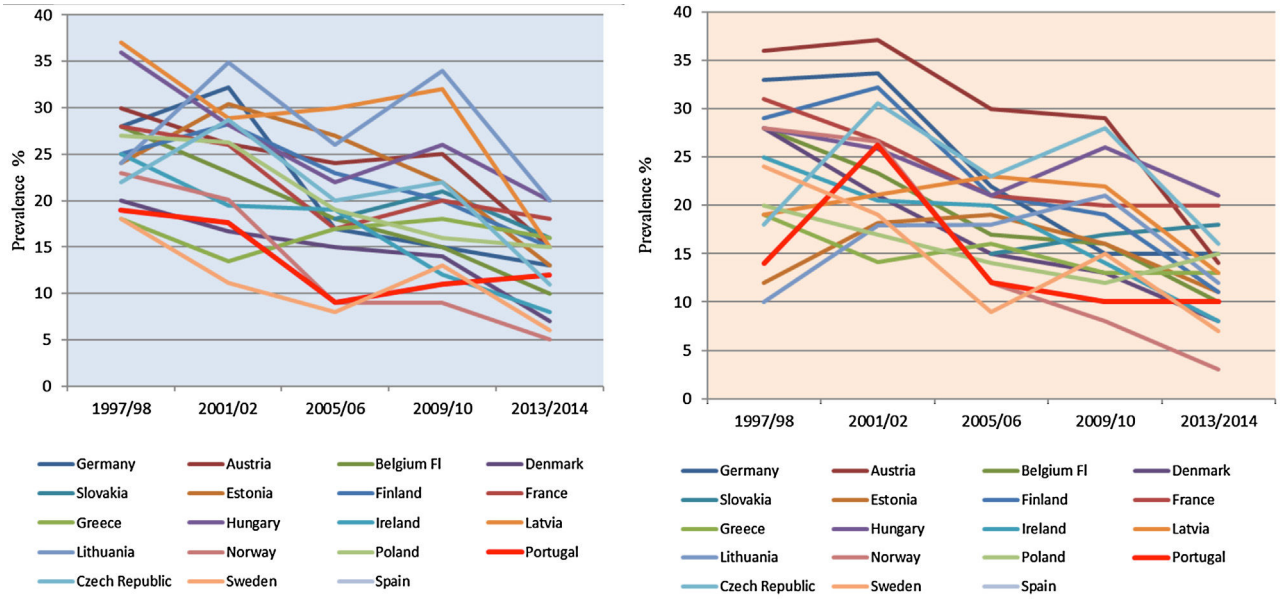


Figure 2 Evolution of regular smoking prevalence among European adolescent boys (a) and girls (b) aged 15 years old (*Source*: HBSC 1997/1998; 2001/2002; 2005/2006; 2009/2010; 2013/2014).

developed preventive measures such as smoking prevention programmes at schools, besides legislative policies banning smoking in public places and all outdoor areas of kindergartens, primary and secondary schools, and areas close to the entrances of health institutions and public companies.

The combined effect of public awareness interventions and strategies and bans to control smoking (e.g., restrictions on tobacco vending and purchase age) with strict policies implemented in many countries and regions (including the increase in prices and tobacco taxes, bans on smoking in public places and restrictions in advertising), along with the implementation of school-based programmes with parental and community involvement seems to be associated with a reduction of tobacco consumption in adolescence.

At a moment in which the smoking epidemics seem to be stabilized, the investment in preventive measures at school, through health promotion and education, is essential. In Portugal, the ''SmokeOut'' curriculum-based programme constitutes a validated and available resource for implementation in school context, presenting promising results in improving student attitudes and knowledge about smoking and in preventing tobacco consumption.[7] Afterwards, longitudinal evaluation of these interventions is essential to produce evidence-based knowledge on smoking prevention.

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Conflicts of interest

The authors have no conflicts of interest to declare.

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