

# **SMOKE-FREE HOMES PROGRAMME: PAST, PRESENT AND FUTURE**

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## **Abstract**

### **Introduction**

Childhood exposure to Environmental Tobacco Smoke (ETS) is associated with serious health problems. Despite the recognised severity of childhood exposure to environmental tobacco smoke (ETS), several studies show high prevalence of exposed children in the world and also in Portugal. In order to protect children of this serious health hazard an ETS type preventive programme, “Smoke free-homes”, was developed and tested in Portugal. Its main purpose is to increase the number of parents who do not smoke and / or to reinforce the norm of not allowing smoking at home and in the car, enabling “participant students” to proactively promote parents’ behaviour change and effectively reduce or avoid ETS home exposure. This is a school based programme, to be applied in the classroom by teachers.

### **Objectives**

To evaluate the effectiveness of the "Smoke-free homes" programme, directed to 4<sup>th</sup> grade children and their parents or carers, aiming to reduce their exposure to ETS at home and in the family car.

### **Methodology**

This is a pre-test and post-test study with 795 students belonging to 32 schools of the 1<sup>st</sup> cycle of basic education, at the Braga council. A self-administered and structured questionnaire was applied to 795 students at school year 2007/08, in the context of the classroom, before and after the intervention. To analyze the data, chi-square was used for the categorical variables.

### **Results**

The prevalence of children exposed to daily or occasional ETS (at least one of co-inhabitants smokes at home), dropped from 42.2% in the pre-test to 32.6% in the post-test ( $p = 0.001$ ).

### **Conclusion**

Based on the data, we can conclude that the programme “Smoke-free homes” was effective in reducing the tobacco smoke of parents and other co-inhabitants at home, and therefore helped to reduce the prevalence of children exposed to ETS in

about 10%. However, it appears that there is still about a third of children exposed, which highlights the need for more interventions in this area.

Thereby trying to discover the reality of Portuguese children's exposure to ETS and understand the determinants of smoking by fathers and mothers at home, a project entitled "Prevention of children's exposure to Environmental Tobacco Smoke (ETS) at home", is ongoing, funded by the FCT (Foundation for Science and Technology).

The tasks of this project include a study involving the gathering of qualitative and quantitative data of parents, to get a better knowledge of the motives which lead them to smoke inside their home. Based on the knowledge of the determinants of such behavior, the program "Smoke Free Homes" will be updated and then evaluated once more, using an experimental design with experimental and control groups.

**Keywords:** Environmental Tobacco Smoke (ETS); Smoking prevention; Health Education.

## PROGRAMA “DOMICÍLIOS LIVRES DE FUMO”: PASSADO, PRESENTE E FUTURO

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### Resumo

#### Introdução

A exposição das crianças ao Fumo Ambiental do Tabaco (FAT) está associada a graves problemas de saúde.

Apesar da evidência científica sobre a gravidade da exposição das crianças ao FAT, muitos estudos mostram que existe uma elevada percentagem de crianças expostas ao FAT no Mundo (aproximadamente 50%) e também em Portugal (40% segundo alguns estudos realizados).

Com o objectivo de proteger as crianças desta agressão, foi desenhado em Portugal o programa de prevenção denominado “Domicílios Livres de Fumo”. A sua principal finalidade é aumentar a prevalência de pais e mães que não fumam (e/ou não permitam que se fume) em casa e no carro. O programa foi desenhado para ser aplicado nas salas de aulas, pelos professores.

#### Objectivo

Avaliar a eficácia de uma intervenção preventiva, dirigida a alunos do 4º ano e aos seus pais/encarregados de educação, com a finalidade de reduzir a exposição das crianças ao fumo ambiental do tabaco, no domicílio.

#### Metodologia

Trata-se de um estudo, do tipo pré-teste e pós-teste, com 795 alunos pertencentes a 32 escolas do 1º Ciclo do Ensino Básico, de cinco Agrupamentos de Escolas do Concelho de Braga. No ano lectivo 2007/08 foi aplicado um questionário de auto-relato, em contexto de sala de aula, antes e depois da intervenção. Na análise de dados foi utilizado o teste Qui-Quadrado por se tratar de variáveis categoriais.

#### Resultados

A prevalência de crianças expostas diária ou ocasionalmente ao FAT, pelo facto de pelo menos um dos conviventes fumar em casa, desceu dos 42.2% para os 32.6% ( $p=0.001$ ).

#### Conclusão

Os resultados sugerem que o “Programa Domicílios Livres de Fumo” foi efectivo, diminuindo o consumo dos pais e outros conviventes em casa, tendo por isso

ajudado a reduzir a prevalência de crianças expostas ao fumo ambiental. No entanto, verifica-se que ainda há cerca de um terço de crianças expostas, o que releva a necessidade de investimento em intervenções nesta área.

Neste sentido, para tentar conhecer a realidade da exposição das crianças Portuguesas ao FAT e compreender os determinantes do consumo de tabaco pelos pais/mães no domicílio, está em curso um projecto denominado “Prevenção da exposição de crianças ao Fumo Ambiental de Tabaco (FAT) no seu domicílio”, financiado pela FCT (Fundação para a Ciência e Tecnologia).

As tarefas compreendidas neste projecto envolvem um estudo qualitativo e um estudo quantitativo com pais, para conhecer as razões/motivações do seu consumo no interior do domicílio. Com base no conhecimento dos determinantes desse comportamento, o Programa “Domicílios Livres de Fumo” será actualizado e posteriormente avaliado, segundo um desenho experimental do tipo pré-pós teste, com grupo experimental e de controlo.

**Palavras-chave:** Fumo Ambiental de Tabaco (FAT); Prevenção do Tabagismo; Promoção da Saúde; Educação para a Saúde.

## **Introduction**

Childhood exposure to Environmental Tobacco Smoke (ETS) is associated with serious health problems – more frequent lower respiratory tract infections, higher risk of recurrent respiratory infections, asthma induction and exacerbations (USDHHS, 2006).

Recently an additional health hazard has been documented – “third-hand smoke” or “residual smoke”, e.g. smoke particles that stick to clothing, carpets, curtains, car seats, etc. These materials act as deposits of carcinogenic and irritating products that affect children’s health (Winickoff *et al.*, 2009).

Despite the recognised severity of childhood exposure to environmental tobacco smoke (ETS) several studies show high prevalence of exposed children.

The World Health Organization (WHO) estimates that half of the world’s children breath ETS contaminated air and that this exposure occurs mainly at home (WHO, 1999).

A study conducted in 2002/2003 in a sample of 1141 students from 12-15 years of age, (children attending the 7<sup>th</sup> to 9<sup>th</sup> grades), in Portugal, revealed that 38% were exposed to ETS because their closest family members (father, mother and/or siblings) smoked daily or occasionally at home (Precioso, Calheiros, & Macedo, 2005).

These results lead also to the conclusion that home tobacco consumption by parents and by mothers is a relevant microsocial risk factor associated with future tobacco consumption by children (Precioso, Macedo, & Rebelo, 2007).

A large populational study (Third National Health and Nutrition Examination Survey, NHANES-III), conducted in the U.S. between 1988 and 1994, involving 11,728

children aged between 2 months and 11 years, showed that 38% were exposed to ETS, because of parents' smoking habits, 23% had been exposed to passive smoking during pregnancy and 19% were exposed to both (smoking and gestational FAT) (Jarvis *et al.*, 2000).

In 2008, another study conducted, based on a sample of 525 students from Rio Tinto-Portugal, 4th year students, showed similar results - high prevalence of childhood exposure to passive smoking because of their parents smoking behaviour at home. It also was found that 51.2% of mothers, who smoke, smoked daily or occasionally at home and that 56% of fathers had the same behaviour (Campos, Precioso, Pereira, & Samorinha, 2008).

In order to reduce ETS exposure among children of Braga, the programme "Smoke-Free Homes" was developed and implemented.

It is an ETS exposure among children prevention program, based on the strategy developed by the U.S. Environmental Protection Agency (2004) – "The ABCs of Secondhand Smoke." Its main purpose is to increase the number of parents who do not smoke and / or to reinforce the norm of not allowing smoking at home and in the car, enabling "participant students" to proactively promote parents' behaviour change and effectively reduce or avoid ETS home exposure.

The programme "Smoke-Free Homes" aims to do so that the fathers / mothers do not smoke nor allow that one smokes at house and in the car. The program was designed to be applied in the school, in the classroom by teachers.

It consists of five sessions:

1. A small approach to the resulting problems of active and secondhand smoke;
2. Role playing exercises, in which a student plays his/her role of child and another (or the teacher) plays the role of the father, mother or another smoking relative;
3. Preparation of small works (letters, leaflets, or fundamentally a distich of not smoker) to be sent by school to the smoking parents. The distich must be affixed at home or/and in the car;
4. Signature of a declaration between father/mother and son/daughter, in which the first is committed to the creation of a home without smoke;

## 5. Information leaflets to parents.

After receiving training in the school, students acted at their homes to create smoke-free homes and cars. They apply the knowledge acquired in the role-playing trying to persuade parents not to smoke at home and / or do not allow to smoke. They posted a sign stating that their homes are smoke-free and signed a commitment with their parents, committing them not to smoke at home.

The main objective of this study is to evaluate the effectiveness of the programme "Smoke-Free Homes", directed to 4<sup>th</sup> grade children and their parents or carers, aiming to reduce their exposure to ETS at home and in the family car.

### **Methods**

This pilot study was conducted in 4th year students of 32 schools of the 1st cycle of basic public education, integrated into five clusters of schools in the municipality of Braga, during the academic year 2007/2008. It was a pre-experimental study, which included two assessments (before and after implementation of the programme).

Students completed a questionnaire self-report (pre-test) in the context of the classroom, used in other studies by Precious, Calheiros and Macedo (2005). This questionnaire consists of questions regarding demographics (age and gender) and eight multiple-choice questions, designed to assess: the prevalence of smoking in the Fathers, the prevalence of Fathers, siblings or other cohabiting smoking at home, the attitude of children before the smoke, tobacco, tobacco use children and their intention to smoke. Then, we proceeded to the implementation of the programme "Smoke-Free Homes", by teachers of the classes. At the end – about two months later, however varied from school to school –, the same questionnaire was applied as pos-test.

The data collected were processed through the statistical analysis program Statistical Package of Social Sciences (version 15.0 for Windows). Comparisons between periods were made using the chi-square, with category variables.

## Results

### Sample

At pre-test, 795 students completed the questionnaire; 48.6% were female and 51.4% were male. The average age is 9.14 years $\pm$ 0.65 years. At post-test, there was sample mortality of 7.3% (n=58), then, 737 participants completed the questionnaire, of which 47% were female and 53% were male. The average age is 9.63 years $\pm$ 0.70 years (Table 1).

**Table 1. Sample demographic characterization**

	Pre-test n= 795		Post-test n= 737	
	n (%)	Mode	n (%)	Mode
<b>Gender</b>				
1-Female	374 (48.6%)	(Male)	333 (47.0%)	2 (Male)
2-Male	396 (51.4%)		375 (53.0%)	
	Mean (SD)	Min.-Max.	Mean (SD)	Min.-Max.
<b>Age</b>	9.14 (0.65)	7-13	9.63 (0.70)	8-14

### Parents' smoking

As can be seen in table 2, at pre-test, there are 15.5% of the sample students perceiving their mothers smoked and 37.0% that their fathers were smokers. These percentages have not changed significantly in the post-test (15.9% for women and 35.3% for fathers).

**Table 2. Prevalence of smoking mothers and fathers, according to the sample students**

Parent		Smoker				Non Smoker			p
		n	%	CI (95%)	f	%	CI (95%)	f	
Mother	Pre	(760)	15.5	(13.0 – 18.3)	118	84.5	(81.7 – 87.0)	642	0.886
	Post	(706)	15.9	(13.2 – 18.8)	112	84.1	(81.2 – 86.8)	594	
Father	Pre	(745)	37	(33.6 – 40.6)	276	63	(59.4 – 66.4)	469	0.511
	Post	(697)	35.3	(31.7 – 39.0)	246	64.7	(61.0 – 68.3)	451	

### Smoking at home, in the total sample

Based on data in Table 3 and Chart 1, we note that, in the pre-test, 14.2% of children reported that at least one of cohabiting (father, mother, siblings or another) is daily smoker at home. 28.0% reported that one of them is occasionally smoker at home. Thus, approximately 42.2% of students are daily or occasionally exposed to the ETS, because at least one of cohabiting is smoking at home. In the post-test, the percentage of children who declared that at least one of cohabiting smoke daily or occasionally declined from 42.2% to 32.6%, being these results statistically significant ( $p = 0.001$ ). We can see that the prevalence of children daily or occasionally exposed to ETS, because at least one of cohabiting smoke at home, reduced about 10%.

Regarding only parents smoking at home, we observed that at the pre-test, 5.1% of students stated that their mothers smoked daily at home and 6.3% reported that they did it occasionally, which means that 11.4% of students perceived their mothers smoke daily or occasionally, at home. In the post-test, the percentage of students stating their mothers smoked everyday reduced to 3.2% and that of occasionally smoking mothers increased to 6.8%. These differences are not statistically different ( $p = 0.191$ ).

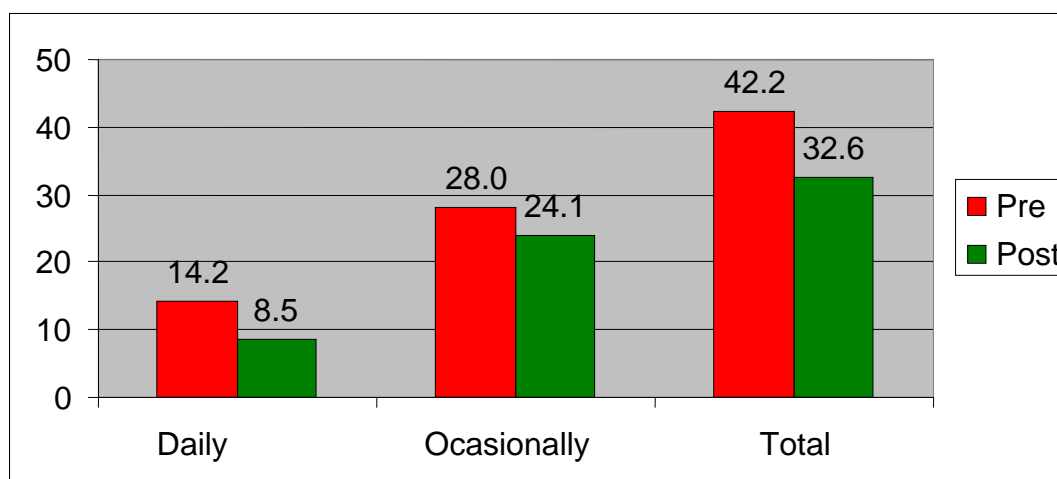
Regarding fathers' smoking at home, 9.2% of students said that they smoked daily at home and 16.6% occasionally. In the post-test, the percentage of students stating that the father smokes daily or occasionally was, respectively, 5.6% and 13.2%, being these differences statistically significant ( $p = 0.003$ ).



**Table 3. Prevalence of regular and occasional smokers at home, at pre and post-test, according to the sample students**

Parent		Daily smokes at home				Occasionally smokes at home			Doesn't smoke or doesn't smoke at home			p
		n	%	IC (95%)	f	%	IC (95%)	f	%	IC (95%)	f	
Mother	Pre	729	5.1	(3.6 – 7.0)	37	6.3	(4.7-8.3)	46	88.6	(86.1-90.8)	646	0.191
	Post	692	3.2	(2.0 – 4.8)	22	6.8	(5.0-9.0)	47	90.0	(87.6-92.2)	623	
Father	Pre	727	9.2	(7.2 – 11.6)	67	16.6	(14.0-19.6)	121	74.1	(70.8-77.3)	539	0.003
	Post	696	5.6	(4.0 – 7.6)	39	13.2	(10.8-16.0)	92	81.2	(78.1-84.0)	565	
Mother or Father or siblings or other	Pre	793	14.2	(11.9-16.9)	113	28.0	(24.9-31.3)	222	57.8	(54.2-61.2)	458	0.001
	Post	729	8.5	(6.6-10.8)	62	24.1	(21.1-27.4)	176	67.4	(63.8-70.7)	491	

**Chart 1. Prevalence of daily or occasionally smokers at home (father, mother, siblings and/or other), in the total sample, at pre and post-test, according to the sample students**



## **Conclusions**

We can conclude that the programme “Smoke-Free Homes” had no effect on prevention of smoking by parents, noting that the prevalence of smoking fathers/mothers has not changed after application.

However, the results of this study show that the implementation of this Programme was effective in reducing in 10% the prevalence of children exposed to ETS at home.

We noted however that it seemed easier for fathers stop smoking at home than it was to mothers.

Next studies should include the introduction of a control group, since its absence doesn't allow concluding that the reduction of smoking at home prevalence is exclusively due to the programme. Other variables that may have played a role were not controlled, especially the introduction of the law n° 37/2007- 14 de August of tobacco control and all the public discussion about the consequences of second-hand smoke that it caused.

Despite the results indicating its effectiveness, this Programme was developed without a thorough understanding of the determinants of tobacco consumption by parents, mothers and other relatives. Therefore, we consider that further studies should be conducted to expand our understanding of the factors that lead parents to smoke at home, once this knowledge is essential for the design of effective preventive interventions.

For this purpose we designed a project entitled “Prevention of the Environmental Tobacco Smoke (ETS) exposure among children at home”, which will be ongoing soon, funded by the FCT (Foundation for Science and Technology)<sup>1</sup>.

This research project aims to evaluate the extent of the problem at national level, to characterize the determinants of tobacco consumption by parents at home and to design and evaluate the effectiveness of a preventive intervention, based on the development of children skills.

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<sup>1</sup> The project referred to in this text, “Prevention of the Environmental Tobacco Smoke (ETS) exposure among children at home” (PTDC/CPE-CED/098281/2008), has the financial support of the Portuguese Foundation for Science and Technology (FCT).

To determine the prevalence of Portuguese children exposure to passive smoking and understand the factors associated with occasional and daily consumption by kin, a cross-descriptive will be conducted. The study population will be a stratified sample of students enrolled in the 4<sup>th</sup> year of the first cycle (basic education) of the Norte, Centro, Lisboa and Vale do Tejo, Alentejo, Algarve, Madeira and Açores (n=5000). A self-completed anonymous questionnaire will be applied.

To characterize the determinants of tobacco consumption by parents at home, a qualitative study will also be conducted, which will consist of a series of interviews with smoker fathers and mothers of 4<sup>th</sup> year first cycle students.

The results of these studies will allow:

1. To pre-test evaluation (the development of a questionnaire to be administered to parents and children);
2. To improve the programme “Smoke-Free Homes”, which will then be applied.

To evaluate the effectiveness of this programme, a third study, of a *quasi*-experimental type (pre-test and post-test with an experimental group and control) will be conducted during the academic year 2010/2011. We consider this to be an innovative project, involving children themselves in protecting their health, by using methods associated with the development of common action, in order to develop skills of persuasion to change their parent’s behaviour.

The main result of this project will be the development of an educational intervention expected to modify parent’s behaviour and reduce ETS exposure of this particularly vulnerable population. Best practices guidelines for smoking control and prevention among children and adolescents for physicians, psychologists, teachers, caregivers, and others, will be developed.

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