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Original Research

Do school-based tobacco prevention programmes pay off? The cost-effectiveness of the 'Smoke-free Class Competition'

David Hoeflmayr, Reiner Hanewinkel*

Institute for Therapy and Health Research, IFT-Nord, Düsternbrooker Weg 2, 24105 Kiel, Germany

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Summary *Objective:* The objective of this study was to determine the cost-effectiveness of a school-based tobacco prevention programme.
Study design: Using data from a previous effectiveness study of the 'Smoke-free Class Competition' (SFC), an economic analysis was conducted to determine the cost-effectiveness of the SFC. Cost data were collected from financial statements of the operating agency, surveys of regional co-ordinators and participating classes (direct and productivity costs). The benefit was the product of the number of students prevented from becoming established smokers, based on a stochastic progression model extending the programme's outcome evaluation, and the (direct and indirect) value per prevented smoker.
Intervention: To take part in the SFC, classes make the decision to be a non-smoking class for 6 months (from autumn to spring). The pupils themselves and their teachers monitor the smoking status of the pupils and report on it regularly. Classes that refrain from smoking can win a number of attractive prizes. In the school year 2001/2002, 150,566 German students participated in the SFC, representing approximately 4% of the total target population of 11–14-year-old German students. The effectiveness evaluation is based on 2,142 students who participated in the programme in the school year 1998/1999.
Results: In the school year 2001/2002, it is estimated that the SFC prevented 3,076 students from becoming established smokers, with net benefits of 5.59 Mio. Euro (direct net benefits) and 15.00 Mio. Euro (total net benefits). The direct benefit/cost ratio was 8.2 and the total benefit/cost ratio was 3.6.
Conclusions: Data suggest that the SFC is a cost-effective school-based intervention.

*Corresponding author. Tel.: +49 431 570 29 20; fax: +49 431 570 29 29.
E-mail address: hanewinkel@ift-nord.de (R. Hanewinkel).

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Introduction

Smoking is a risk factor for mortality from several medical causes.[1] It is estimated that in 2000, 4.83 million premature deaths in the world were attributable to smoking,[2] and current global patterns of youth smoking suggest little abatement of cigarette use.[3] The prevalence of smoking in Germany is approximately 37% for adult men and 28% for adult women.[4] Of particular concern is the high prevalence of smoking in German children and adolescents.[5]

There is a strong positive correlation between starting to experiment with smoking at an early age and the probability of becoming a regular smoker.[6] Therefore, great hope is placed on primary prevention. In the past decades, numerous school-based primary prevention programmes aiming to reduce tobacco use among young people have been developed and implemented. These programmes can be an effective means of preventing tobacco use among adolescents, especially programmes that aim to counteract the social influences that may facilitate tobacco use by adolescents.[7]

As resources to fund school-based smoking prevention programmes are limited, determining that a programme is effective may not be sufficient to justify its implementation. To date, few studies have examined the cost-effectiveness of school-based smoking prevention programmes.[8–10] The objective of this study is to determine the cost-effectiveness of the 'Smoke-free Class Competition' (SFC). The SFC is a school-based smoking prevention programme, currently implemented in 20 European countries, with a participation rate of approximately 750,000 students in the school year 2006/2007.

The aim of the SFC is to re-inforce non-smoking behaviour. Non-smokers are rewarded if they stay smoke-free.[11] In this way, non-smoking becomes a popular and worthwhile behaviour, and social norms within the peer groups are influenced in a way that non-smoking remains more common in classes than smoking. The general rules are as follows: (a) classes make the decision to be a non-smoking class for 6 months (from autumn to spring); (b) the pupils themselves and their teachers monitor the smoking status of the pupils and report on it regularly; and (c) regular smoking is not accepted. Classes that refrain from smoking can win a number of attractive prizes, with the main prize being a trip to another European country. A detailed description of the intervention is published elsewhere.[12]

Two controlled and two randomized controlled studies with a total number of 12,812 adolescents have been performed to evaluate the intervention. These studies were carried out in Finland, Germany and the Netherlands.[13–17] An overall analysis of these four studies showed that from baseline to follow-up 12–24 months later, smoking increased by 21.78% in the control group compared with an increase of 16.02% in the intervention group. At follow-up, 27.57% of the pupils from the intervention group and 35.91% of the pupils from the control group were smokers [odds ratio (OR) 1.61; 95% confidence interval (CI) 1.43–1.81; $P<0.001$].[18]

The effectiveness study carried out in Germany,[17] which was reviewed by an expert in the field,[19] was of particular interest for the present study. In order to evaluate the effectiveness of the SFC, a sample of 131 participating and non-participating classes ($n = 2{,}142$ pupils, mean age 12.9 years, standard deviation 0.98) was compared with regard to their smoking behaviour. Smoking status (4-week prevalence) was assessed on three occasions: (a) before the competition; (b) 1 month after the competition; and (c) 1 year after the start of the competition. From pre-test to post-test, smoking increased by 7.5% in the comparison group and decreased by 0.2% in the intervention group (OR 2.19; 95% CI 1.69–2.85; $P<0.001$). At follow-up, a clear increase in smoking prevalence was seen in both groups; however, the increase in smoking was significantly lower for pupils in the intervention group (OR 1.45; 95% CI 1.15–1.82; $P<0.01$).

The following limitations of this study should be noted: (a) classes in the experimental group were pre-selected in two German cities (Hamburg and Berlin), while the classes in the control group were chosen at random from a different city (Hanover); (b) at 1 year follow-up, there was 53% attrition in the intervention group and 45% attrition in the control group (total n at baseline = 4372); and (c) 16.2% of the retention sample and 21.5% of the attrition sample were 4-week smokers (OR 1.42; 95% CI 1.21–1.67; $P<0.001$). However, no significant interaction could be found for smoking status and group condition (OR 0.93; 95% CI 0.78–1.10; P = n.s.).

The present study adds to the literature on the cost-effectiveness of school-based smoking prevention programmes using actual, rather than modelled, cost data from an established (real-world) large-scale prevention programme.

Methods

The cost/benefit analysis was performed in three basic steps adapted from an earlier cost-effectiveness study.[10] Based on the outcome evaluation