

TABLE 2—Quit Proportions and Differences at the Ninth Month of Pregnancy and Postpartum

	At Ninth Month	Postpartum
Multiple Component (N = 72)	.111 (.039, .183)	.069 (.010, .128)
Risk Information (N = 70)	.071 (.011, .131)	.071 (.011, .131)
Usual Care (N = 77)	.026 (-.009, .062)	.000 (0.00, 0.00)
Total (N = 219)	.068 (.035, .101)	.046 (.018, .074)

Note: 95% CI in parentheses

	Difference	95% CI
At Ninth Month		
MC vs UC	.085	(.004, .166)
RI vs UC	.045	(-.025, .115)
MC vs RI	.040	(-.054, .134)
Postpartum		
MC vs UC	.069	(.011, .128)
RI vs UC	.071	(.012, .130)
MC vs RI	.002	(-.082, .086)

ACKNOWLEDGMENTS

The views and opinions expressed herein do not reflect the position of the General Accounting Office. This work was completed as the doctoral disser-

tation of the first author at the Department of Psychology, Michigan State University. We thank William Davidson, PhD, Charles Johnson, PhD, Robin Redner, PhD, and Jeffrey Taylor, PhD, who served on the first author's dissertation committee. Another version of this work was presented at the annual meeting of the American Evaluation Association in Boston, October 1987.

REFERENCES

1. National Center for Health Statistics, OT Thornberry, RW Wilson, P Golden: Health promotion and disease prevention: Provisional data from the National Health Interview Survey. Advance Data From Vital and Health Statistics, No. 119, DHHS Pub. No. (PHS) 86-1250. Hyattsville, MD: NCHS, Public Health Service, 1986.
2. Ershoff DH, Mullen PD, Quinn VP: A randomized trial of a serialized self-help smoking cessation program for pregnant women in an HMO. *Am J Public Health* 1989; 79:182-187.
3. Sexton M, Hebel JR: A clinical trial of change in maternal smoking and its effect on birth weight. *JAMA* 1984; 251:911-915.
4. Baric L, MacArthur C, Sherwood M: A study of health educational aspects of smoking in pregnancy. *Int J Health Educ* 1976; 19:(2)1-17.
5. Windsor RA, Cutter G, Morris J, Reese Y, Manzella B, Bartlett EE, Samuelson C, Spanos D: The effectiveness of smoking cessation methods for smokers in public health maternity clinics: A randomized trial. *Am J Public Health* 1985; 75:1389-1392.
6. Sexton M, Nowicki P, Hebel JR: Verification of smoking status by thiocyanate in unrefrigerated, mailed saliva samples. *Prev Med* 1986; 15:25-34.
7. Bliss RE, O'Connell KA: Problems with thiocyanate as an index of smoking status: A critical review with suggestions for improving the usefulness of biochemical measures in smoking cessation research. *Health Psychol* 1984; 3:563-581.

Eight-Year Follow-Up Results of an Adolescent Smoking Prevention Program: The North Karelia Youth Project

ERKKI VARTIAINEN, MD, PhD, UNTO FALLONEN, PhD, ALFRED L. McALISTER, PhD, AND PEKKA PUSKA, MD, MPOLSCI

Abstract: In the North Karelia Youth Program five to 10 classroom sessions over two years taught skills to resist pressures to start smoking to 13 to 15 year old students. Compared to students from comparison schools, the treatment groups reported less smoking immediately after the intervention and in a four-year follow-up survey. At the eight-year follow-up, there was consistent evidence of possible preventive effects only among those who had been non-smokers when the program began. (*Am J Public Health* 1990; 80:78-79.)

Introduction

From 1978 to 1980, a study to demonstrate methods for reducing cardiovascular risk factors in 13-year-old students

Address reprint requests to Erkki Vartiainen, Department of Epidemiology, National Public Health Institute, Mannerheimintie 166, 00300 Helsinki Finland. Dr. Puska is also with that department at the Institute; Dr. Pallonen is with the Division of Epidemiology, University of Minnesota School of Public Health; Dr. McAlister is with the Center for Health Promotion Research and Development, University of Texas Health Science Center at Houston. This paper, submitted to the *Journal* July 11, 1988, was revised and accepted for publication June 8, 1989.

© 1990 American Journal of Public Health 0090-0036/90\$1.50

was carried out in the province of North Karelia, Finland. One of the main aims was to prevent the onset of smoking.¹ Although many studies of the effectiveness of persuasive and behavioral approaches to smoking prevention have been carried out,² long-term follow-up is rare.^{3,4} Details of the methods and the outcome of the intervention immediately after the program¹, after half a year⁵, and two years after the program⁶ are reported elsewhere. This brief report describes the follow-up results eight years after the program ended.

Methods

In brief, three pairs of matched schools were chosen for the program. In two "direct" program schools, 10 sessions were carried out during a two-year period from 1978 to 1980 by the project health educator and trained peer leaders. In two "county-wide" program schools, five behavioral sessions were to be carried out by health education teachers at the schools who were trained as part of an effort to disseminate new curricula throughout North Karelia. Two schools were chosen for controls from another province in eastern Finland. In each matched pair, one school was chosen from the capital of the county and the other from a rural village. The program began in 1978 among the seventh graders and finished with the ninth grade in autumn 1980. During the persuasive-behavioral sessions, students were taught about

social pressures that may lead to smoking (peer, adults, and mass media) and were trained to deal with such pressures through role playing and other active learning techniques. Older peer leaders assisted in implementing the program at school. The short-term and long-term health hazards were also discussed during the program. At the pretest, there were 897 students in the seventh grade in the three pairs of matched schools. At the posttest, the participation rate varied from 92–97 percent, in the eight-year follow-up from 72–79 percent. In all the surveys, the smoking habits of students were asked by the following question: Do you smoke now? Multiple choice responses: 1) Not at all; 2) Less than once a month; 3) One to two times a month; 4) One–two times a week; 5) Daily.

Results

When the youth were in the seventh grade, the proportion who reported smoking at least once a month varied in schools from 4–9 percent. Immediately after the program, there were one-third fewer smokers in both types of intervention schools compared to control schools. One half year and two years later, the difference was about the same, although smoking increased during the follow-up. In 1986, six years after the program had terminated, an increase in smoking between ages 16 and 21 was seen (Figure 1). The differences between the direct program (38 percent smokers) and reference schools (42 percent smokers) were minimal, while the differences between the county-wide program and control schools were more impressive (31 vs 42 percent). When only those students who reported they were nonsmokers in the pretest were included in the analyses, the proportion of nonsmokers was lower in both the direct and teacher-led schools than in the controls at the eight-year follow-up (Table 1). If attrition is taken into account by assuming all dropouts to be smokers, smoking rates in the two treatment groups are more similar (48–49 percent) but they remain

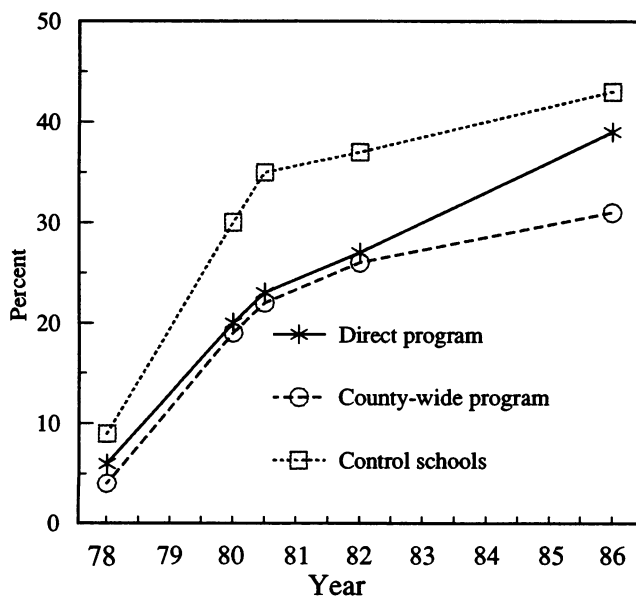


FIGURE 1—Proportion of Students Who Reported Smoking at least Once a Month in Different Surveys

TABLE 1—Proportion of Smokers (any smoking) by School Group in the Surveys among Nonsmokers in the Beginning of the Program

	Direct Program (%) (N)	County-wide Program % (N)	Control Schools % (N)	Difference (95% CI)	
				Direct vs Control %	County-wide vs Control %
Pretest	0 (249)	0 (243)	0 (251)		
Posttest	19 (248)	19 (242)	29 (250)	10 (3,17)	10 (3,17)
Two-and-one-half-year follow-up	23 (213)	22 (216)	38 (231)	15 (7,23)	16 (8,24)
Four-year follow-up	28 (230)	26 (225)	41 (238)	13 (4,21)	15 (7,23)
Eight-year follow-up	37 (200)	31 (182)	47 (209)	10 (1,19)	16 (6,25)

CI = confidence interval

lower than the rate of smoking in the campaign group (59 percent). This adjustment probably overestimates smoking prevalence.

Discussion

The interpretation of these results is complicated by several factors. Implementation evaluation of the project indicated that students at the urban school in the county-wide condition received only one or two anti-smoking sessions as part of the regular health education curriculum. The urban junior high school in the control condition shared its school yard with a senior high school whose students were allowed to smoke in the school yard. The primary difference that was observed, lower smoking rates, could be attributed to the overall community program in North Karelia rather than the specific programs that were carried out in the study schools. Given these qualifications, we cannot conclude from this study that preventive programs at school have long-term effects on smoking. On the other hand, our findings are consistent with the hypothesis that community and school programs can influence youthful nonsmokers to avoid tobacco.

ACKNOWLEDGMENTS

This research was supported by the Finnish National Board of Health.

REFERENCES

1. Puska P, Vartiainen E, Pallonen U, Salonen JT, Poyhia P, Koskela K, McAlister A: The North Karelia Youth Project: Evaluation of two years of intervention on health behavior and CVD risk factors among 13 to 15 year old children. *Prev Med* 1982; 11:550–570.
2. McAlister A, Perry C, Maccoby N, *et al*: Pilot study of smoking, alcohol and drug abuse prevention. *Am J Public Health* 1980; 70:719–721.
3. Flay BR: Psychosocial approaches to smoking prevention: A review of findings. *Health Psychol* 1985; 4:449–488.
4. Murray DM, Davis-Hern M, Goldman AI, Pirie P, Leupker RV: Four and five year follow-up results from four seventh grade smoking prevention strategies. *J Behav Med* 1988; 11:395–405.
5. Vartiainen E, Pallonen U, McAlister A, Koskela K, Puska P: Effect of two years of educational intervention on adolescent smoking: The North Karelia Youth Project. *Bull WHO* 1983; 61:529–532.
6. Vartiainen E, Pallonen U, McAlister A, Koskela K, Puska P: Four year follow-up results of the smoking prevention program in the North Karelia Project. *Prev Med* 1986; 15:692–698.