RESEARCH PAPER

The effectiveness of tobacco sales ban to minors: the case of Finland

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Objective: To evaluate the effects of the 1977 and 1995 tobacco sales bans on tobacco acquisition of minors.
Design: Biennial nationwide postal surveys (adolescent health and lifestyle survey, AHLS) in 1977–2003; annual classroom surveys (school health promotion survey, SHPS) in 1996–2003.
Setting and participants: Entire Finland—12, 14, 16, and 18 year olds (AHLS, n = 80 282); eighth and ninth graders (14–16 year olds) (SHPS, n = 226 681).
Main outcome measures: Purchase of tobacco from commercial sources during the past month, purchase from different commercial (shop, kiosk, other outlet) and social sources, ease of buying tobacco, overall acquisition of tobacco products, daily smoking, tobacco experimenting.
Results: Decrease in tobacco purchase from commercial sources was small and short term after 1977 but large and permanent after 1995: purchase rate among 14 year old smokers diminished from 90% to 67% in 2003, 16 year olds from 94% to 62%. Purchases in shops decreased most (14 year olds: from 39% to 14%; 16 year olds: from 76% to 27%); purchases in kiosks less. An increase was observed in obtaining tobacco from other outlets and friends (social sources). Only 2–3% of 14–16 year old smokers used commercial sources exclusively when obtaining tobacco. Daily smoking began to decrease after 2001, following an earlier decrease in those experimenting. No changes were observed among age groups not targeted by the ban.
Conclusions: Legislation appears to have permanently changed tobacco sales practices and decreased purchases from commercial sources. Social sources need to be taken into account when controlling access to tobacco. Sales bans should be accompanied by other health promotion measures.

Internationally, research on and critical evaluation of the impact of sales bans started at the end of the 1980s.[1–6] Since then several studies have assessed the effectiveness of tobacco sales bans[7–10] as well as the effectiveness of interventions to reduce underage access to tobacco by deterring shopkeepers from making illegal sales.[11–18] Most studies have been conducted in the USA, some in Canada or Australia, and very few in Europe. A general conclusion has been that legislation and its active enforcement can reduce youth tobacco purchase but the effects on tobacco use are inconclusive.[17 18] Critical voices have suggested abandoning youth access tobacco programmes for this reason.[19]

In the assessment of the effects of tobacco sales ban, Finland is of particular interest due to over 20 years' experience in comprehensive health oriented tobacco legislation. As part of the legislation tobacco sales ban to children ''apparently under age 16'' had already been introduced on 1 March in 1977.[20] An increase in adolescents' smoking at the end of the 1980s led to a critical discussion on the success of anti-smoking policies and in this context also the implementation of the sales ban was assessed.[21] The retailers found the wording ''apparently'' in the Tobacco Act as the critical issue in the implementation. In 1995, in a more comprehensive amendment of the tobacco legislation the Cabinet proposed the exact age limit of 16 years for the sales ban, but during the parliamentary debate the age limit was raised to 18 years.[20] The amendment came into force on the 1St of March 1995. In March 2000, a further revision of the Act required a business entrepreneur to draw up and implement a ''Plan for own control'' in order to prevent assignment of tobacco products to underage children.[20]

The Tobacco Act from 1977 emphasised research and monitoring and included an obligation to set aside an annual budgetary appropriation of the estimated revenue from tobacco excise taxes for the purpose of smoking control. Based on this a national monitoring system for adolescents' health and health behaviours was started in 1977 just before the Tobacco Act came into force. Access to tobacco as an indicator of the effectiveness of the law was included.

Recent studies have shown that social (non-commercial) sources of obtaining tobacco are important when considering youth access to tobacco.[22–26] Obtaining tobacco from friends or parents is outside the reach of the legislation. Taking into account this double nature of youth access to tobacco, the evaluation framework is ideally built up to cover both commercial and social sources (fig 1). The *intended effect* of the sales ban is to reduce access to tobacco from commercial sources. The *unforeseen consequence* is that adolescents start to use non-commercial sources instead. The ultimate aim of a tobacco sales ban is to prevent initiation or stop continuation of tobacco use and, where this is not achieved, to diminish tobacco consumption. In our evaluation framework relevant indicators of success are those measuring the commercial access to tobacco products. Prevalence of tobacco use, experimenting with tobacco, and diminishing consumption are presented here, too; however, they are not considered as indicators of the first choice as many other factors affect them and because the Tobacco Act in both years included several other measures than the sales ban.

The aim of the study is to assess the effects of the tobacco sales bans in Finland from 1977 to 2003 in a quasi-experimental design using tobacco purchase from commercial sources as well as from friends as indicators. The

Abbreviations: AHLS, adolescent health and lifestyle survey; SHPS, school health promotion survey

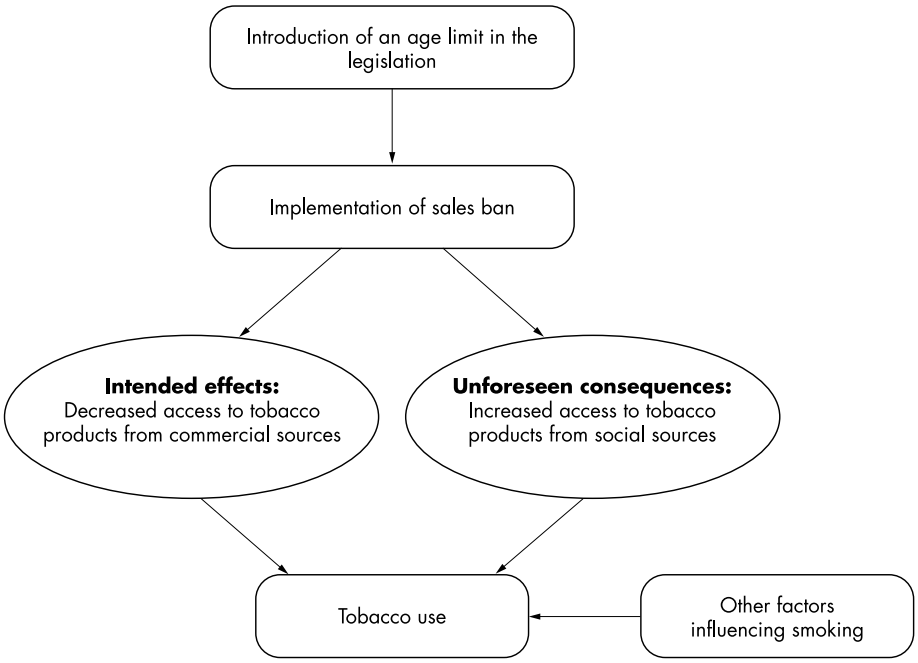

Figure 1 Framework for evaluating the effectiveness of tobacco sales ban.

legislation concerned the entire nation, which explains why no traditional control groups are available. Changes in the indicators are studied before and after the legislative interventions in the age groups targeted by the interventions. Changes in the control age groups (16 and 18 year olds in 1977 and 18 year olds in 1995) not affected by the intervention are compared to the target age groups. Ease of buying tobacco is measured from 1996 to 2003, and the overall acquisition of tobacco products in 1999.

MATERIAL AND METHODS

Adolescent health and lifestyle survey (AHLS)

Every second year since 1977, a self administered 12 page questionnaire has been mailed to nationally representative samples of 12, 14, 16, and 18 year olds with two re-inquiries to non-respondents. The samples were obtained from the Population Register Centre. All Finns born on the sample days were included. The sample days were consecutive, or nearly consecutive, dates in July, in some years also in August or June. Data were collected during February to April. Most responses were received before the Tobacco Act or its amendment came into force on the 1 March 1977 and 1995, respectively. Comparability of results over time was ensured by maintaining the data collection method, timing of survey, size of questionnaire, and questions as similar as possible throughout the years. The 12 year olds are excluded from the analyses of daily smokers because of the small number of daily smokers.

Table 1 shows the numbers of respondents (n = 80 282) and response rates (%) by age and sex. Questions on tobacco purchase were not included in 1985. Response rates decreased in all age groups, especially among older boys. Tobacco purchase of non-respondents was assessed by dividing the daily smokers of 2001 into three groups according to how promptly they answered and returned the questionnaire. It was assumed that the later the person answered (the original questionnaire, the first re-inquiry, the second re-inquiry) the more he/she resembled a non-respondent. The purchase rates did not vary systematically, suggesting that the purchase rate of non-respondents does not differ from that of respondents. Concerning daily smoking this method gave results similar to other studies analysing the non-respondents in that there were more daily smokers among non-respondents than respondents.[27] It would therefore appear that the late responders resembled non-responders and that there would be no major differences between non-respondents and respondents in purchase patterns.

School health promotion survey (SHPS)

A classroom survey focusing on health and health behaviours in schools has been carried out annually since 1996 in all eighth and ninth grades (age 14.3–16.3 years) of secondary schools at municipality level. In 1996, 96 municipalities joined the study and today the study covers more than 80% (361 municipalities) of the Finnish municipalities. Municipalities or provinces decided on the participation and paid part (40%) of the costs. In 1996, 1998, 2000 and 2002 the city of Helsinki, southwest, eastern and central Finland, and Lapland participated; in 1997, 1999, 2001, and 2003 the rest of the country. Usually all classes in the eighth and ninth grades in the participating municipalities were included. Schools participating in all four years were included in our study in order to maximise the comparability (n = 226 681).

MEASURING TOBACCO PURCHASE

Tobacco purchase from different sources during the past month was asked in every AHLS survey, except in 1985, with a question ''Have you bought tobacco for yourself during the past month?'' (alternatives No/Yes). Those who answered Yes were further asked ''From where?'' and, depending on the survey year, given 4–9 categories (alternatives No/Yes). The internal consistency of the main question and the categories was good, yet some respondents left one or more categories empty. If there was an answer in at least one category, the missing answers in the other categories were coded as No.

In each survey one of the categories was ''from friends'' (social source) of which the variable *purchase of tobacco from friends* was formed. Of the other sources (commercial sources) three variables comparable over the years were formed: *purchase of tobacco from 1) shop, 2) kiosk, 3) other outlets*. The first

Table 1 Numbers of respondents and response rates (%) by age and sex (AHLS).

	1977	1979	1981	1983	1987	1989	1991	1993	1995	1997	1999	2001	2003
Age 12													
Boys													
Respondents (n)	369	491	483	450	414	406	426	399	395	427	442	351	368
Response rate (%)	90	88	88	85	81	76	77	73	78	76	79	72	69
Girls													
Respondents (n)	341	540	514	440	367	430	399	437	424	440	407	425	390
Response rate (%)	91	90	92	91	83	82	82	84	86	87	85	82	75
Age 14													
Boys													
Respondents (n)	345	565	488	429	1128	361	1196	1203	1177	1168	1187	1251	1092
Response rate (%)	88	86	87	78	81	75	74	74	75	69	74	66	66
Girls													
Respondents (n)	367	535	548	482	433	431	1337	1299	1301	1347	1313	1485	1245
Response rate (%)	94	91	92	86	90	90	86	86	85	84	85	79	78
Age 16													
Boys													
Respondents (n)	386	528	535	413	1183	362	1008	1168	1232	1126	1110	892	1003
Response rate (%)	85	83	85	75	77	70	68	70	72	68	68	62	59
Girls													
Respondents (n)	347	579	529	509	1284	380	1272	1389	1469	1379	1333	1138	1296
Response rate (%)	89	91	91	91	89	82	86	87	88	87	85	82	79
Age 18													
Boys													
Respondents (n)	347	523	519	489	1134	328	893	1029	1071	1088	1112	774	570
Response rate (%)	83	78	81	75	69	63	61	66	67	60	63	53	50
Girls													
Respondents (n)	330	512	524	509	1401	407	1103	1265	1313	1415	1315	976	797
Response rate (%)	88	85	88	87	84	80	82	83	86	83	80	76	74

two were included in all surveys. The third comprised different items in different surveys, the widest series being in 2003: shop, kiosk, service station, bar, vending machine, cross boarder shopping between Finland and Estonia/Finland and Sweden, street purchase, and internet. Before 2003 internet was not included, and before 2001 street purchase and cross boarder shopping were not included, and from 1987 to 1997 vending machines were left out. Adding more categories probably increased the number of positive answers, as it is easier to identify the source when it is explicitly mentioned. The variable *purchased tobacco from commercial sources during the past month* got the value Yes if the respondent gave at least one positive answer to commercial items.

Somebody else purchased tobacco for the respondent with the respondent's money. The question (included in 1977–1983 and in 1997–2003) was addressed to smokers and phrased ''Has somebody else (like friends, brothers, sisters, parents) bought you tobacco during the past month with the money you gave them?'' (alternatives No/Once/Several times). The last two alternatives were coded as Yes.

Purchase of tobacco for friends. In 1977, 1979, 1997, and 1999, purchasing for friends was asked by ''Have you bought tobacco for your friends during the past month with the money they gave you?'' (No/Once/Several times). The last two alternatives were coded as Yes.

Profile of overall acquisition of tobacco products during the past month. A new variable was formed using several questions, all of them included in the 1999 survey (AHLS). Eight categories were formed using three dimensions: (1) purchased tobacco from commercial sources, (2) somebody else purchased tobacco for the respondent with the respondent's money or the respondent bought tobacco from friends, and (3) obtained tobacco in other ways. The value of the variable remained missing, if the answer was missing in any of the three dimensions. Dimension 3 was based on the question ''Have you obtained tobacco during the past month in some other ways?'', placed after the questions concerning purchase of tobacco, and followed by six response categories (No/Yes alternatives): mother or father, other adults, sisters, friends, took from home, elsewhere. If the respondent answered any of the categories, the empty categories were defined as No.

Ease of buying tobacco was asked in the SHPS by ''According to your own opinion, how easy is it to buy tobacco from shops, kiosks, service stations or vending machines nearby your home?'' (Very easy/Fairly easy/Rather difficult/Very difficult).

Statistical method

Significance of differences between the survey years was assessed by means of Pearson's χ^2 test with its p values presented.

RESULTS

Purchase from commercial sources

The 1977 sales ban

The proportion of the 14 year old daily smokers who had bought tobacco for themselves during the past month decreased slightly (p = 0.033) between 1977 and 1981 (table 2). No change was seen in the age groups 16 years (p = 0.266) and 18 years (p = 0.613) that were not targeted by the law.

The 1995 sales ban

An explicit downward turn in the proportion of tobacco purchasers among 14 (p = 0.005) and 16 year olds (p = 0.000) was observed between 1995 and 2001 (table 2). The downturn continued between 2001 and 2003 among 14 (p = 0.003) and 16 year olds (p = 0.000). However, the overall proportion of those who had bought tobacco remained high. No change was observed among 18 year olds not targeted by the law.

Purchase from specific commercial sources

The 1977 sales ban

Before the first sales ban shops were the most common places where 16 and 18 year old daily smokers bought tobacco, followed by kiosks (fig 2); 14 year olds used kiosks more often than shops. From 1977 until 1981 the proportion of 14 year olds who had bought tobacco from shops decreased (p = 0.002). A decrease was also seen among 16 year olds (p = 0.000) not targeted by the law. Concerning purchases from kiosks there was a temporary but not significant decrease among 14 year olds (p = 0.302) in 1977–1979 and an increase among 16 year olds (p = 0.000) that also continued afterwards. There was a significant decrease in purchasing from other outlets from 1977 to 1981 in 14 year olds (p = 0.000), followed by a slow increase in the 1980s in all age groups.

Purchase from vending machines was asked in 1977–1983 and 1999–2003. From 1977 until 1983 purchase from vending machines decreased among 14 (p = 0.101), 16 (p = 0.033), and 18 year olds (p = 0.014).

The 1995 sales ban

Between 1995 and 2001 there was a notable decrease in the proportion of 14 (p = 0.000) and 16 year olds (p = 0.000) who had bought tobacco from shops (fig 2). The decline continued between 2001 and 2003 among both 14 (p = 0.174) and 16 year olds (p = 0.024). In 2003, 14% of 14 year old and 27% of 16 year old daily smokers had used this source. In both age groups purchase from kiosks decreased notably (p = 0.000) between 1995 and 2001. Between 2001 and 2003 purchase from kiosks further diminished among 14 (p = 0.037) and 16 year olds (p = 0.000). In 2003, 36% of 14 year olds and 43% of 16 year olds had bought tobacco from kiosks. Among the non-targeted age group purchases from shops or kiosks remained nearly unchanged (fig 2).

Between 1995 and 1997 purchase of tobacco from other outlets increased in all age groups—14, (p = 0.000), 16 (p = 0.000), and 18 year olds (p = 0.024). From 1999 until 2003 purchase from other outlets diminished significantly among 14 (p = 0.000) and 16 year olds (p = 0.000) but not among 18 year olds (p = 0.179).

Concerning purchases from vending machines no change was observed between 1999 and 2003 among 14 (p = 0.916) and 16 year olds (p = 0.446). In 2003, 14 year old daily smokers used vending machines more often (9%) than other age groups (5% of 16 year olds and 4% of 18 year olds).

Acquisition of tobacco from social sources

Purchase of tobacco from friends increased among 14 year olds (p = 0.058) between 1977 and 1979 (fig 2), although the change was not significant. No change was observed in the older age groups. Buying tobacco from friends was more common among 14 year olds than in the older age groups, particularly after the 1977 ban.

Between 1995 and 1997 there was an increase in the purchase of tobacco from friends among both 14 (p = 0.103) and 16 year olds (p = 0.005), but this was a steady continuation of an increase that had started already in the beginning of the 1990s. From 2001 until 2003 purchases from friends remained steady among 16 year olds (p = 0.206) and started to decrease among 14 year olds (p = 0.982). In 2003, 48% of 14 and 32% of 16 year old daily smokers had bought tobacco from friends. No changes were observed among 18 year olds.

Purchase of tobacco for friends was measured only in 1977–1979 and 1997–1999. This was not common among 14 year olds and remained unchanged during the study period (table 3) (to view table 3 go to http://www.tobaccocontrol.com/supplemental). Among 16 year olds purchase for friends was more common, but no change was seen here, either. However, 18 year olds reported purchasing tobacco for friends more often in 1999 than 20 years earlier.

The proportion of 14 year olds for whom somebody else had purchased tobacco increased in 1977–1981 (p = 0.063) (table 4) (to view table 4 go to http://www.tobaccocontrol.com/supplemental). Any immediate change after the 1995 ban cannot be directly estimated (this question was not included in 1985–1995), but there was a notable increase between 1983 and 1997 among both 14 (p = 0.000) and 16 year olds (p = 0.000) that continued even after 1999. No change among 18 year olds was observed. Between 2001 and 2003 figures remained nearly unchanged in all age groups.

Profile of the overall acquisition of tobacco products

The ways in which underage daily smokers obtained tobacco were diverse (table 5). As few as 2% of 14 year olds and 3–5% of 16 year olds purchased all their tobacco from commercial sources. Most used social sources too (purchased from friends; somebody else bought for them; they got tobacco from somebody). The overall acquisition profile of 18 year olds differed from the younger age groups in that they purchased tobacco more often from commercial sources.

Table 2 Proportion (%) of daily smokers who had purchased tobacco for themselves from commercial sources during the past month, by age and study year (AHLS)

	Proportion of daily smokers (%)												
Age (years)	1977	1979	1981	1983	1987	1989	1991	1993	1995	1997	1999	2001	2003
14	87	85	83	83	87	93	92	89	90	86	77	78	67
16	95	95	91	98	97	97	96	95	94	84	78	78	62
18	96	96	95	97	98	98	99	97	98	98	97	99	98

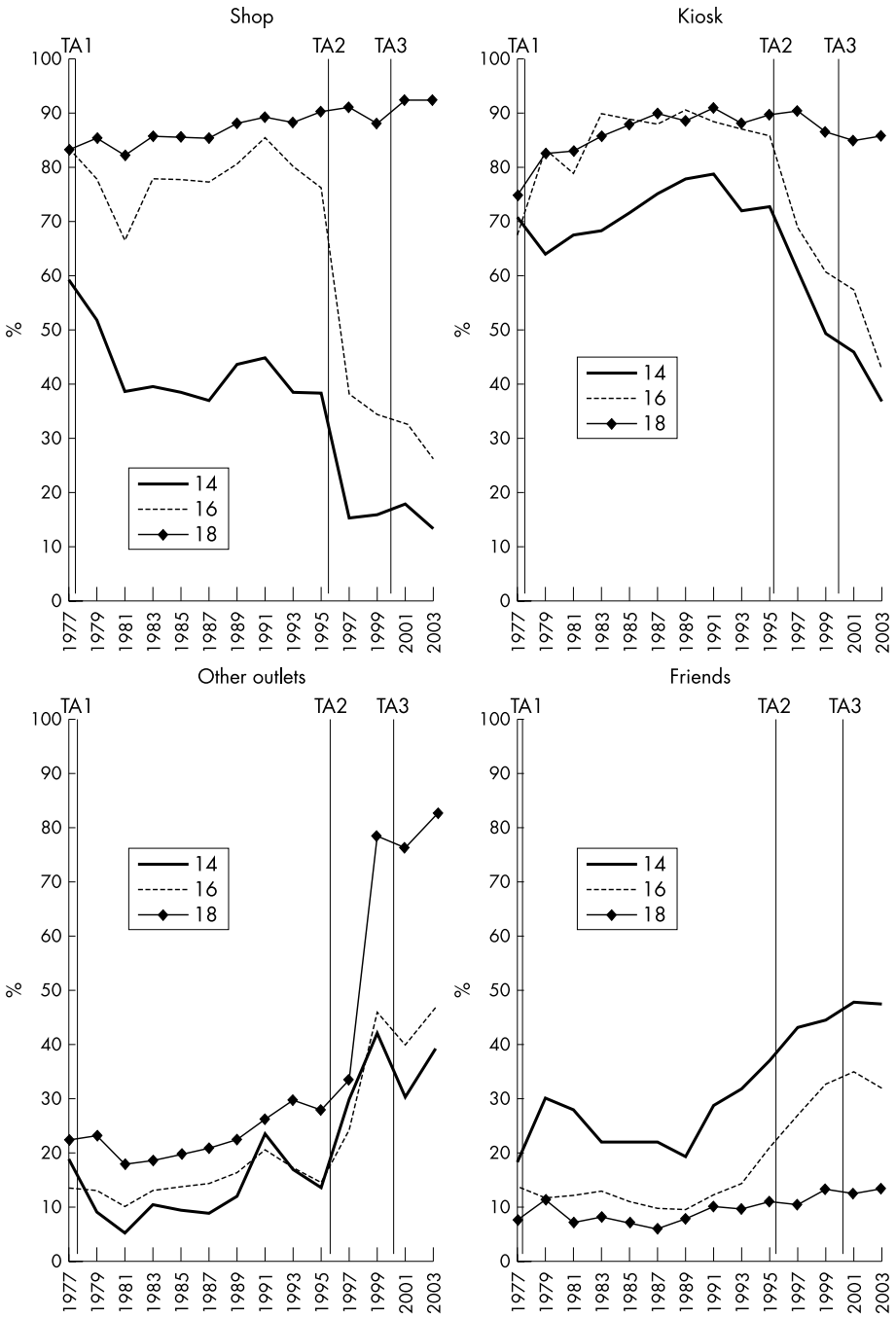

Figure 2 Proportion (%) of daily smokers who had purchased tobacco for themselves during the past month from shops, kiosks, other outlets and friends, by age and study year (AHLS). TA1 = 1977 sales ban; TA2 = 1995 sales ban; TA3 = 2000 Tobacco Act.

Ease of buying tobacco

In 2002–2003, 72% of schoolchildren reported that it was very or fairly easy to buy tobacco from commercial sources near their homes (table 6) (to view table 6 go to http://www.tobaccocontrol.com/supplemental). The proportion of those reporting that it was rather or very difficult to buy tobacco was larger than in earlier years.

Tobacco use

After the 1977 Tobacco Act daily smoking decreased in all age groups, but the effect was short term (table 7). No immediate decrease in daily smoking after the 1995 ban was seen, but between 2001 and 2003 there was a notable decrease among 14 ($p = 0.000$) and 16 year old ($p = 0.004$) boys and 14 year old girls ($p = 0.000$). Daily smoking among 18 year olds remained stable during the entire period. Tobacco experimenting did not diminish after the 1977 ban, but a downward trend started before the 1995 ban, and between 2001 and 2003 the decrease was significant among 14 year old boys ($p = 0.000$) and girls ($p = 0.000$), 16 year old boys ($p = 0.004$) and 12 year olds ($p = 0.000$) (table 7). Among 12 year old boys experimenting dropped from 50% (1977) to 17% (2003), while no change was observed among 18 year olds. Daily consumption of cigarettes did not diminish after the sales bans (table 7).

DISCUSSION

The sales bans of the Finnish tobacco control legislation, particularly the 1995 ban, had a pronounced impact on tobacco purchase of underage children. The effect was strongest on purchase from shops and kiosks and weaker on the overall tobacco purchase from commercial sources. No

Table 5 Distribution (%) of 14–18 year old daily smokers by profile of overall acquisition of tobacco products, by age and sex (AHLS, 1999)

	Girls			Boys		
Profile of overall acquisition of tobacco products	**14 (%)**	**16 (%)**	**18 (%)**	**14 (%)**	**16 (%)**	**18 (%)**
Buys all tobacco him/herself from commercial sources	2.3	2.6	17.2	1.4	4.8	13.1
Somebody else buys all tobacco for the respondent with the respondent's money or buys tobacco from friends	–	1.5	–	0.7	0.3	–
Obtains all tobacco in other ways (e.g. family, friends)	8.2	7.9	2.8	8.6	4.5	2.1
Buys him/herself from commercial sources + obtains tobacco in other ways (e.g. family, friends)	25.0	19.7	54.1	32.9	34.6	62.3
Buys him/herself from commercial sources + somebody else buys for the respondent with the respondent's money or buys from friends	1.8	1.5	0.8	–	1.0	0.8
Somebody else buys for the respondent with the respondent's money or buys from friends + obtains tobacco in other ways (e.g. family, friends)	15.5	18.4	0.3	12.1	7.4	0.3
Buys him/herself from commercial sources + somebody else buys for the respondent with the respondent's money or buys from friends + obtains tobacco in other ways (e.g. family, friends)	45.5	47.1	24.1	42.9	44.9	19.5
Does not acquire tobacco	–	–	0.5	–	0.3	0.3
Total	100	100	100	100	100	100
n = 1802	(n = 220)	(n = 391)	(n = 390)	(n = 140)	(n = 312)	(n = 374)

change was seen among older age groups suggesting that the effect resulted from implementation of the legislative measures.

The follow up time in our study was longer than in any previous research. Some of the effects of the 1977 ban (lower purchase rate in shops) were observable even over 20 years later, and the effects of the 1995 ban persisted until the latest survey in 2003. We may conclude that implementation of the sales ban made a permanent change on tobacco sales practices.

However, the observed impact was not as wide as expected. The proportion of children who had bought tobacco during the past month was rather high still in 2003, and three out of four children reported that it was easy to buy tobacco from shops, kiosks, and service stations nearby home. Thus, we may also conclude that the implementation was not effective enough to have a major impact on the overall access from commercial sources. These findings are in agreement with previous studies, which have shown some positive effects after the sales ban although not as extensive as expected.

After the 1995 ban the changes were more prominent than after the 1977 ban. This is probably explained by better implementation instructions and information campaign. In 1977, the sales ban was part of the new comprehensive tobacco control legislation. In the implementation the emphasis of the control measures was on the total ban of

Table 7 Percentage of those who have tried tobacco, daily smokers, and daily numbers of cigarettes among daily smokers by age and sex (AHLS)

	1977	1979	1981	1983	1987	1989	1991	1993	1995	1997	1999	2001	2003
Tried tobacco (%)													
Boys													
12	50	47	47	45	35	32	41	35	33	33	30	30	17
14	68	71	67	66	62	61	67	64	62	63	59	56	47
16	80	78	83	81	78	74	80	76	81	75	78	73	67
18	84	86	85	87	83	81	85	81	85	84	83	82	82
Girls													
12	32	27	27	24	20	17	24	24	26	24	21	23	12
14	60	58	60	60	57	52	63	59	63	66	64	59	50
16	77	76	76	78	77	72	78	78	78	78	81	78	75
18	79	83	81	80	82	80	84	79	82	81	83	81	82
Daily smokers (%)													
Boys													
14	11	9	15	15	14	16	14	15	12	14	12	13	7
16	30	25	30	27	33	36	32	29	30	26	28	29	24
18	41	33	36	34	37	38	36	35	36	33	34	33	35
Girls													
14	15	9	12	13	10	13	15	13	13	17	17	15	11
16	27	25	25	23	28	29	27	26	26	27	29	31	30
18	32	26	26	25	32	29	28	25	27	28	29	31	36
Number of cigarettes (mean)													
Boys													
14	7.5	7.4	7.7	7.9	9.5	9.6	10.0	9.3	9.1	9.7	9.5	9.5	11.0
16	10.2	10.8	10.4	11.5	11.6	12.7	13.2	11.5	11.7	11.5	11.8	11.7	12.1
18	13.7	13.6	13.2	13.2	14.2	14.7	14.5	13.3	12.5	13.5	13.6	13.3	13.3
Girls													
14	5.4	7.3	6.3	7.0	7.4	8.8	9.5	7.6	7.4	7.4	9.1	8.2	8.7
16	8.0	8.3	7.5	8.9	8.5	9.0	10.4	8.8	9.1	8.8	9.4	9.8	9.9
18	9.4	9.2	9.2	10.2	10.7	9.7	11.1	11.4	10.4	10.0	10.0	10.1	10.0

tobacco advertising and fight against the tobacco industry's attempts to circumvent the advertising ban, and on the prohibition of smoking in public places.[28] Banning sales to minors was not an issue.

In 1995, the amendments of the tobacco control legislation dealt with the restriction of smoking in workplaces and raising the age limit of the sales ban. A massive information campaign for the public was accompanied by negotiations with retailers' associations and representatives of major store chains. These participated in the implementation by spreading information through their own channels, which, from the retailers' point of view, provide an important and appreciated source of information.

Compliance with the sales ban, measured by the tobacco purchase of minors, was much better in shops than in kiosks. Being retail outlets where people buy their everyday commodities shops are an important source of tobacco. Shops can be small with only a few employees or large supermarkets. Kiosks are smaller retail outlets selling mainly confectionaries, magazines, and newspapers, and nowadays increasingly most common everyday commodities like milk and bread. The smallest kiosks have only one person responsible for selling. Compared with major store chains the organisation and associations of kiosks lack efficiency as well as comprehensive information channels. As the proportion of tobacco sales in their total turnover is more important than in shops, their interest in actively checking the age of young customers might be limited.

The geographical position of Finland next to Estonia and Russia where tobacco sales are practically unrestricted to adolescents simplifies access to tobacco products. Frequent ferry connections to Estonia attract enormous numbers of Finns every year, being considered a convenient source of low priced alcohol and tobacco. Adolescents who travel may act as dealers, reselling tobacco to friends.

Why the success of the sales ban has not completely fulfilled the expectations is partly explained by the complicated mechanisms of punishment in tobacco sales violations. If selling tobacco to underage adolescents is observed, local authorities (usually health inspectors) issue a warning, setting a time limit by which the activity shall be terminated. If disobedience continues, the authority should notify the public prosecutor, but only in case of repeated violations can the retailer be sentenced to a fine. Since tobacco sales violations can be reported to the public prosecutor by the local authority only, this mechanism effectively limits lay people or parents from action. Indeed, no penalties have been reported so far. Although health inspectors show interest in promoting the sales ban, their motivation is often low due to an overload of work.[29] Easier mechanisms for penalties together with tightening of control measures (for example, licensing of selling) would probably improve the effectiveness of the ban.

Changes in the patterns of minors' pursuit of tobacco were partly unforeseen. From the adolescents' point of view purchasing tobacco from commercial sources is just one form of access to tobacco. Like some previous studies our study indicated a shift from commercial sources to social sources after the bans. In the overall acquisition of tobacco products the social sources are much more important than expected. Only 2–3% of the underage daily smokers obtain all tobacco by buying it him/herself from commercial sources. Most adolescents use other channels, too; they give money to someone else, or they get tobacco from friends, parents or sisters. These mechanisms detract from the effectiveness of the ban.

A reduction in the access to tobacco products can succeed only by considering both commercial and social mechanisms of availability. Even in the case of best possible legislation and complete implementation, the fact is that only the commercial part of tobacco provision can be controlled by a ban. The mechanisms for decreasing the availability of tobacco from social sources are not well developed and it can be questioned whether such a strategy would be worth trying.

A decrease in smoking as a direct effect of the sales ban could be expected only after 1995 when the tobacco purchase rates decreased. Our study showed a sharp decrease in daily smoking between 2001 and 2003, confirmed by the school health promotion survey.[30] The timing of the change is somewhat late compared to the enforcement of the ban. Tobacco experiments started to decrease already before 1995 although continued also afterwards. However, the changes concerned only the age groups targeted by the ban.

The decrease in smoking cannot be attributed to the sales ban alone.[31] New smoking restrictions in work places and restaurants[20] were actively discussed in the media, too. In the latter half of the 1990s negative trends in several indicators of schoolchildren's health[30] launched active public discussion and national activities. The school health promotion survey, started in 1996, produced fresh local data for schools and municipalities[30] thus activating local health promotion activities. Simultaneously with smoking, use of alcohol decreased, although less than smoking.[27] In judging the effects of the tobacco sales bans, the effects of other health promotion activities should also be observed. Our conclusion is that the tobacco sales ban is most effective when combined with other health promotion activities and wide enough public discussion on smoking and health.

This study has the limitations related to postal surveys with self administered questionnaires, the main question here being how a decrease in the response rate affected the comparability over time. Indirect analysis of non-response in 2001 did not show a difference in tobacco purchasing, suggesting that the decrease in response rate over time may not have affected the trends. If there was a response bias, comparisons over time are still valid if the bias persists in a similar manner over time. There is no reason to assume that it has changed. The comparability of the surveys over time was also guaranteed by keeping data collection, sampling and questionnaires as similar as possible over the years. Although we cannot exclude the under- or over-reporting of purchase this would affect the trends only if it had changed over time, which is unlikely. Finally, the changes in tobacco purchasing are so substantial that they cannot be explained entirely by changes in reporting.

What this paper adds

Tobacco sales ban and its active enforcement can reduce youth access to tobacco products from commercial sources over a few years' follow up. Most studies are conducted in the USA.

Our study has a much longer follow up than the previous ones. It was conducted in a country (Finland) with a comprehensive tobacco legislation of 26 years, including two different tobacco sales bans. The sales ban appears to have permanently changed tobacco sales practices in some types of commercial outlets, decreased tobacco purchase and may have contributed to a recent decrease in smoking. The unforeseen consequence was a shift from commercial to social sources. Social sources of tobacco beyond the legislative control were more important than expected; only 2–3% of the underage daily smokers obtain all their tobacco from commercial sources.

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To view tables 3, 4, and 6 visit the *Tobacco Control* website—http://www.tobaccocontrol.com/supplemental

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