

学年と問66 かなしばり経験と中学高校の別と性別のクロス表

性別	中学校の別	学年	1年	問66 かなしばり経験			合計
				ない	ある	無回答	
男性	中学	学年	1年	5488	1050	57	6595
			度数の %	83.2%	15.9%	.9%	100.0%
			2年	4985	1151	128	6264
			度数の %	79.6%	18.4%	2.0%	100.0%
	3年	4831	1420	68	6319		
	度数の %	76.5%	22.5%	1.1%	100.0%		
	無回答	120	23	4	147		
	度数の %	81.6%	15.6%	2.7%	100.0%		
	合計	15424	3644	257	19325		
	度数の %	79.8%	18.9%	1.3%	100.0%		
高校	学年	1年	1年	6460	2200	95	8755
			度数の %	73.8%	25.1%	1.1%	100.0%
			2年	5851	2336	103	8290
			度数の %	70.6%	28.2%	1.2%	100.0%
	3年	5299	2285	136	7720		
	度数の %	68.6%	29.6%	1.8%	100.0%		
	無回答	121	35	7	163		
	度数の %	74.2%	21.5%	4.3%	100.0%		
	合計	17731	6856	341	24928		
	度数の %	71.1%	27.5%	1.4%	100.0%		
女性	中学	学年	1年	5106	911	43	6060
			度数の %	84.3%	15.0%	.7%	100.0%
			2年	4589	1013	92	5694
			度数の %	80.6%	17.8%	1.6%	100.0%
	3年	4253	1308	31	5592		
	度数の %	76.1%	23.4%	.6%	100.0%		
	無回答	179	56	4	239		
	度数の %	74.9%	23.4%	1.7%	100.0%		
	合計	14127	3288	170	17585		
	度数の %	80.3%	18.7%	1.0%	100.0%		
高校	学年	1年	1年	6931	2570	65	9566
			度数の %	72.5%	26.9%	.7%	100.0%
			2年	6422	2801	58	9281
			度数の %	69.2%	30.2%	.6%	100.0%
	3年	5931	2950	114	8995		
	度数の %	65.9%	32.8%	1.3%	100.0%		
	無回答	221	131	5	357		
	度数の %	61.9%	36.7%	1.4%	100.0%		
	合計	19505	8452	242	28199		
	度数の %	69.2%	30.0%	.9%	100.0%		

学年と問67 この30日間のかなしばり経験と中学高校の別と性別のクロス表

性別	中学高校の別	学年	1年	2年	3年	無回答	問67 この30日間のかなしばり経験		合計		
							なかった	あった			
男性	中学	学年	1年	2年	3年	無回答	6141	389	65	6595	
		度数									
		学年の%						93.1%	5.9%	1.0%	100.0%
		度数						5672	461	131	6264
		学年の%						90.5%	7.4%	2.1%	100.0%
		度数						5725	516	78	6319
	学年の%						90.6%	8.2%	1.2%	100.0%	
	合計						129	15	3	147	
	学年の%						87.8%	10.2%	2.0%	100.0%	
	度数						17667	1381	277	19325	
	学年の%						91.4%	7.1%	1.4%	100.0%	
	女性	高校	学年	1年	2年	3年	無回答	7919	746	90	8755
度数											
学年の%								90.5%	8.5%	1.0%	100.0%
度数								7502	682	106	8290
学年の%								90.5%	8.2%	1.3%	100.0%
度数								6842	753	125	7720
学年の%							88.6%	9.8%	1.6%	100.0%	
合計							147	9	7	163	
学年の%							90.2%	5.5%	4.3%	100.0%	
度数							22410	2190	328	24928	
学年の%							89.9%	8.8%	1.3%	100.0%	
女性		中学	学年	1年	2年	3年	無回答	5668	331	61	6060
	度数										
	学年の%							93.5%	5.5%	1.0%	100.0%
	度数							5253	365	76	5694
	学年の%							92.3%	6.4%	1.3%	100.0%
	度数							5126	427	39	5592
	学年の%						91.7%	7.6%	.7%	100.0%	
	合計						208	27	4	239	
	学年の%						87.0%	11.3%	1.7%	100.0%	
	度数						16255	1150	180	17585	
	学年の%						92.4%	6.5%	1.0%	100.0%	
	女性	高校	学年	1年	2年	3年	無回答	8667	835	64	9566
度数											
学年の%								90.6%	8.7%	.7%	100.0%
度数								8390	821	70	9281
学年の%								90.4%	8.8%	.8%	100.0%
度数								7946	938	111	8995
学年の%							88.3%	10.4%	1.2%	100.0%	
合計							311	43	3	357	
学年の%							87.1%	12.0%	.8%	100.0%	
度数							25314	2637	248	28199	
学年の%							89.8%	9.4%	.9%	100.0%	

学年と問68 この30日間に日常を楽ししく送れたかと 中学高校の別と性別のクロス表

性別	中学高校の別	学年	問68 この30日間に日常を楽ししく送れたか						無回答	合計
			できた	いつもと変わらなかつた	できなかつた	まったくできなかった	無回答	合計		
男性	中学	1年	度数	3210	283	186	59	6595		
			学年の%	48.7%	4.3%	2.8%	.9%	100.0%		
		2年	度数	3047	330	218	120	6264		
			学年の%	48.6%	5.3%	3.5%	1.9%	100.0%		
	3年	度数	2956	359	267	52	6319			
		学年の%	46.8%	5.7%	4.2%	.8%	100.0%			
	無回答	度数	64	6	6	3	147			
		学年の%	43.5%	4.1%	4.1%	2.0%	100.0%			
	合計			8159	978	677	234	19325		
	女性	高校	1年	度数	4827	561	403	78	8755	
学年の%				52.8%	6.4%	4.6%	.9%	100.0%		
2年			度数	4371	543	356	89	8290		
			学年の%	52.7%	6.6%	4.3%	1.1%	100.0%		
3年		度数	3653	638	393	119	7720			
		学年の%	47.3%	8.3%	5.1%	1.5%	100.0%			
無回答		度数	76	11	5	7	163			
		学年の%	46.6%	6.7%	3.1%	4.3%	100.0%			
合計			12727	1753	1157	293	24928			
女性		中学	1年	度数	51.1%	7.0%	4.6%	1.2%	100.0%	
	学年の%			31.25	4.30	1.76	.38	6060		
	2年		度数	51.6%	7.1%	2.9%	.6%	100.0%		
			学年の%	2978	424	195	77	5694		
	3年	度数	52.3%	7.4%	3.4%	1.4%	100.0%			
		学年の%	2818	379	229	28	5592			
	無回答	度数	50.4%	6.8%	4.1%	.5%	100.0%			
		学年の%	92	16	13	5	239			
	合計			38.5%	47.3%	6.7%	2.1%	100.0%		
	女性	高校	1年	度数	9034	1249	613	148	17585	
学年の%				37.2%	7.1%	3.5%	.8%	100.0%		
2年			度数	4907	779	353	53	9566		
			学年の%	51.3%	8.1%	3.7%	.6%	100.0%		
3年		度数	4730	763	326	55	9281			
		学年の%	36.7%	51.0%	8.2%	3.5%	100.0%			
無回答		度数	3408	4392	778	100	8995			
		学年の%	37.9%	48.8%	8.6%	1.1%	100.0%			
合計			105	196	16	3	357			
合計			29.4%	54.9%	10.4%	.8%	100.0%			
合計			10394	14225	1012	211	28199			
合計			36.9%	50.4%	8.4%	.7%	100.0%			

学年と問69 この30日間にいつもより気が重く落ち込むと 中学高校の別と性別のクロス表

性別	中学高校の別	学年	問69 この30日間にいつもより気が重く落ち込む				合計		
			まったくなかった	あまりなかった	あった	たびたびあった			
男性	中学	1年	度数 2695	2159	1237	463	41	6595	
		学年の%	40.9%	32.7%	18.8%	7.0%	.6%	100.0%	
		2年	度数 2332	2074	1197	546	115	6264	
		学年の%	37.2%	33.1%	19.1%	8.7%	1.8%	100.0%	
	3年	度数 2122	2049	1487	630	51	6319		
	学年の%	33.6%	32.4%	23.2%	10.0%	.8%	100.0%		
	無回答	度数 64	40	32	9	2	147		
	学年の%	43.5%	27.2%	21.8%	6.1%	1.4%	100.0%		
	合計	度数 7213	6322	3933	1648	209	19325		
	学年の%	37.3%	32.7%	20.4%	8.5%	1.1%	100.0%		
	女性	高校	1年	度数 2188	3021	2477	997	72	8755
			学年の%	25.0%	34.5%	28.3%	11.4%	.8%	100.0%
2年			度数 2039	2827	2412	929	83	8290	
学年の%			24.6%	34.1%	29.1%	11.2%	1.0%	100.0%	
3年		度数 2131	2332	2276	871	110	7720		
学年の%		27.6%	30.2%	29.5%	11.3%	1.4%	100.0%		
無回答		度数 41	57	41	17	7	163		
学年の%		25.2%	35.0%	25.2%	10.4%	4.3%	100.0%		
合計		度数 6399	8237	7206	2814	272	24928		
学年の%		25.7%	33.0%	28.9%	11.3%	1.1%	100.0%		
女性		中学	1年	度数 1500	2120	1667	737	36	6060
			学年の%	24.8%	35.0%	27.5%	12.2%	.6%	100.0%
	2年		度数 1144	1962	1741	773	74	5694	
	学年の%		20.1%	34.5%	30.6%	13.6%	1.3%	100.0%	
	3年	度数 987	1870	1904	805	26	5592		
	学年の%	17.7%	33.4%	34.0%	14.4%	.5%	100.0%		
	無回答	度数 44	87	68	36	4	239		
	学年の%	18.4%	36.4%	28.5%	15.1%	1.7%	100.0%		
	合計	度数 3675	6039	5380	2351	140	17585		
	学年の%	20.9%	34.3%	30.6%	13.4%	.8%	100.0%		
	女性	高校	1年	度数 1175	3002	3760	1584	45	9566
			学年の%	12.3%	31.4%	39.3%	16.6%	.5%	100.0%
2年			度数 1101	2897	3648	1583	52	9281	
学年の%			11.9%	31.2%	39.3%	17.1%	.6%	100.0%	
3年		度数 1167	2748	3505	1484	91	8995		
学年の%		13.0%	30.6%	39.0%	16.5%	1.0%	100.0%		
無回答		度数 52	89	144	69	3	357		
学年の%		14.6%	24.9%	40.3%	19.3%	.8%	100.0%		
合計		度数 3495	8736	11057	4720	191	28199		
学年の%		12.4%	31.0%	39.2%	16.7%	.7%	100.0%		

学年と問70 この30日間に自信を失ったことがあったかと 中学高校の別と性別のクロス表

性別	中学校の別	学年	問70 この30日間に自信を失ったことがあったか					無回答	合計
			まったくなかった	あまりなかった	あった	たびたびあった	合計		
男性	中学	1年	度数	2775	1985	1329	466	40	6595
			学年の%	42.1%	30.1%	20.2%	7.1%	.6%	100.0%
		2年	度数	2428	1820	1342	565	109	6264
			学年の%	38.8%	29.1%	21.4%	9.0%	1.7%	100.0%
		3年	度数	2150	1793	1621	706	49	6319
			学年の%	34.0%	28.4%	25.7%	11.2%	.8%	100.0%
	無回答	58	42	33	12	2	147		
	合計	7411	5640	4325	1749	200	19325		
	高校	1年	度数	2325	2637	2632	1094	67	8755
			学年の%	26.6%	30.1%	30.1%	12.5%	.8%	100.0%
		2年	度数	2241	2440	2538	985	86	8290
			学年の%	27.0%	29.4%	30.6%	11.9%	1.0%	100.0%
3年		度数	2245	1955	2361	1048	111	7720	
		学年の%	29.1%	25.3%	30.6%	13.6%	1.4%	100.0%	
無回答	44	44	46	22	7	163			
合計	6855	7076	7577	3149	271	24928			
女性	中学	1年	度数	1692	2112	1608	617	31	6060
			学年の%	27.9%	34.9%	26.5%	10.2%	.5%	100.0%
		2年	度数	1222	1974	1713	708	77	5694
			学年の%	21.5%	34.7%	30.1%	12.4%	1.4%	100.0%
		3年	度数	1061	1686	1934	886	25	5592
			学年の%	19.0%	30.2%	34.6%	15.8%	.4%	100.0%
	無回答	50	85	70	30	4	239		
	合計	4025	5857	5325	2241	137	17585		
	高校	1年	度数	1421	2848	3734	1517	46	9566
			学年の%	14.9%	29.8%	39.0%	15.9%	.5%	100.0%
		2年	度数	1355	2698	3672	1506	50	9281
			学年の%	14.6%	29.1%	39.6%	16.2%	.5%	100.0%
3年		度数	1453	2502	3483	1464	93	8995	
		学年の%	16.2%	27.8%	38.7%	16.3%	1.0%	100.0%	
無回答	65	94	148	47	3	357			
合計	4294	8142	11037	4534	192	28199			
合計	15.2%	28.9%	39.1%	16.1%	.7%	100.0%			

中高生がタバコを吸わないようなタバコ価格とは

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要旨

中高生を対象にした 2007 年度実施の全国調査により (回答数 90,039 名)、中高生が吸い始めないと思うタバコ価格、喫煙者が止めると思うタバコ価格、ある値段になったときにとる行動が明らかになった。タバコを吸っている人がやめると思う価格、中高生が喫煙を開始しないと思う価格は、1000 円以上が多かった。

現在喫煙者がタバコを止めると回答する割合は、タバコが 1 箱 1000 円になったときに増加した。従って、中高生が喫煙を開始しないようにし、喫煙者がタバコを止めようとするような価格は 1 箱 1000 円以上であると推察される。平成 19 年度厚生労働科学研究費補助金 (循環器疾患等生活習慣病対策総合研究事業) : 未成年者の喫煙・飲酒状況に関する実態調査研究 (研究代表者 大井田隆 (日本大学医学部公衆衛生学分野 教授)) における「2007 年度タバコについての全国調査」より報告する。なお、本調査は (社) 中央調査社によるものである。

【目的】

未成年喫煙防止のためのタバコ価格、中高生の喫煙者が喫煙継続をあきらめるようなタバコ価格を明らかにする。

【対象と方法】

全国から中学校 130 校、高等学校 109 校を無作為抽出し、喫煙行動、ニコチン依存度、喫煙防止になるタバコ価格、喫煙者が喫煙継続をあきらめるタバコ価格について無記名自記式質問票による調査を実施した。学校調査協力率は、中学 89 校 (68.5%)、高校 79 校 (72.5%) であった。調査時期は 2007 年 12 月から 2008 年 2 月であった。調査票は 90361 通回収され、矛盾解答など不適切な調査票を削除した 90039 通を解析に供した。

【調査結果】

中高生の喫煙率 (経験率、現在喫煙率、毎日喫煙率) は男女とも調査のたびに、減少してきた。

図1 中学生、高校生の喫煙頻度の推移



中高生の考える、喫煙者がタバコを止めるとするタバコの価格：未成年の喫煙を減らすためにタバコ価格(20本あたり)をいくらにしたら、タバコを吸っている人がやめるとするかという問いに対して、中学男子 68.4%、中学女子 66.3%、高校男子 61.3%、高校女子 63.4%のものが 1000円以上と回答した。中高生をあわせて現在喫煙の有無(この30日間に1日でも喫煙したものを現在喫煙とする)でみると、現在喫煙のない者(85,493名)の47.3%、現在喫煙のある者(4,546名)の29.9%、合計で46.4%が1500円と回答し、1000円以上と回答したのは、それぞれ65.5%、44.7%、64.5%であった。

図2 未成年の喫煙を減らすために、吸っている人はタバコ1箱いくらならやめるとするか。

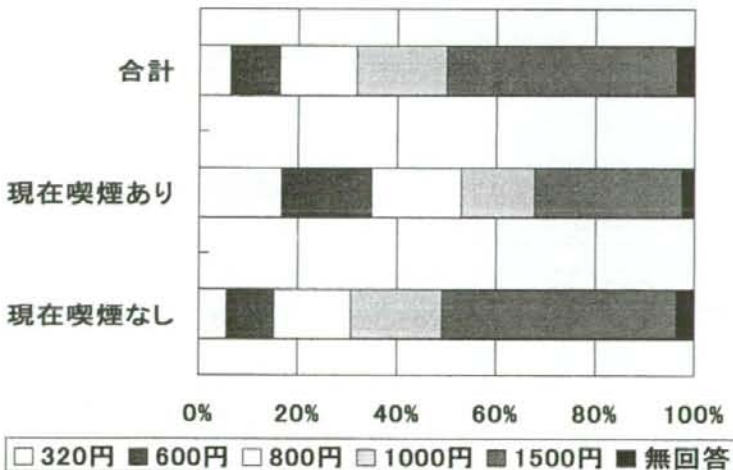
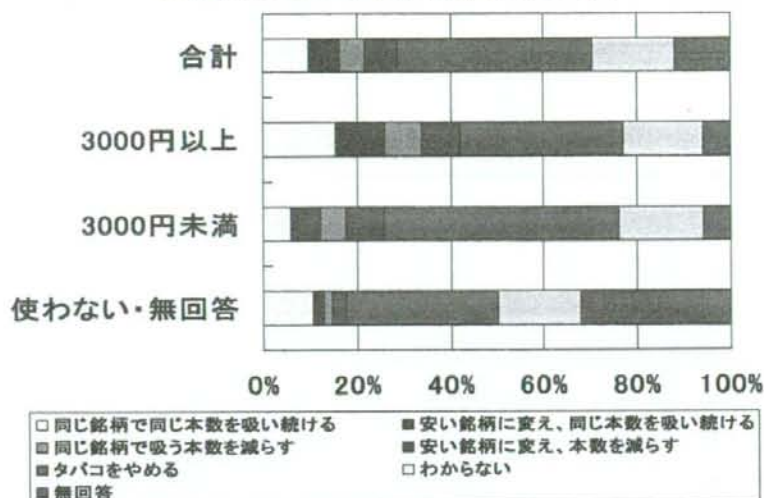


図8 この30日間のタバコ代別にみたタバコ1箱1000円になったときの対応(現在喫煙者)。



現在のこの30日間のタバコ代別に見たタバコ1箱が1000円になったときの対応は、現在タバコ代を多く使っている人ほど吸い続ける人の割合が高くなる。

【結論】

成人に対する調査(既報)によれば成人の喫煙者の5割が禁煙に踏み切るタバコ価格は550-700円である。中高生の喫煙者は、まだ喫煙習慣が成立していない者が含まれ、回答が不確かな者(態度を決めかねる者)が含まれている可能性があるが、中高生の喫煙者の過半数がタバコを止める価格は成人のそれと比較し同等か、それより高い可能性がある。従って、中高生が喫煙を開始しない、あるいは喫煙者が喫煙継続をあきらめるにはタバコ価格は少なくとも1000円程度にしたほうが良いと考えられる。それでも、中高生のうちに既にニコチン依存度が高度で、タバコ代を多く使っている人はなかなか喫煙を止めないと考えられる。

図4 タバコの値段が、1箱20円値上がりしたら、どうしますか(現在喫煙者)。

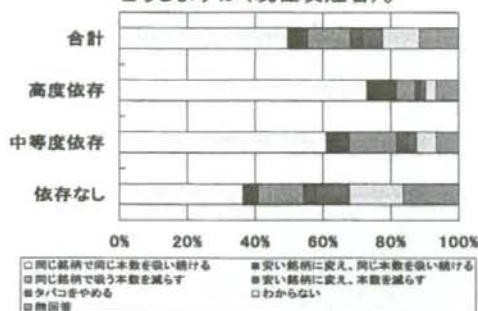


図5 タバコの値段が、2倍になったら(約600円)、どうしますか(現在喫煙者)。

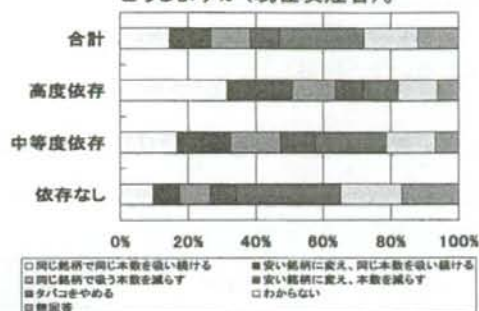


図6 タバコの値段が、1箱1000円になったら、どうしますか(現在喫煙者)。

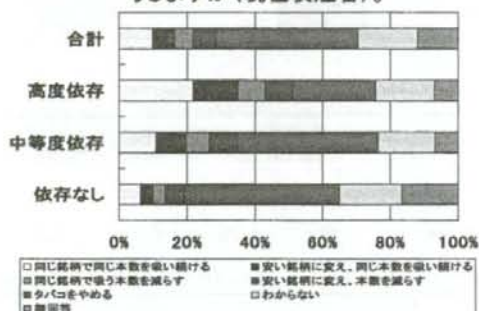
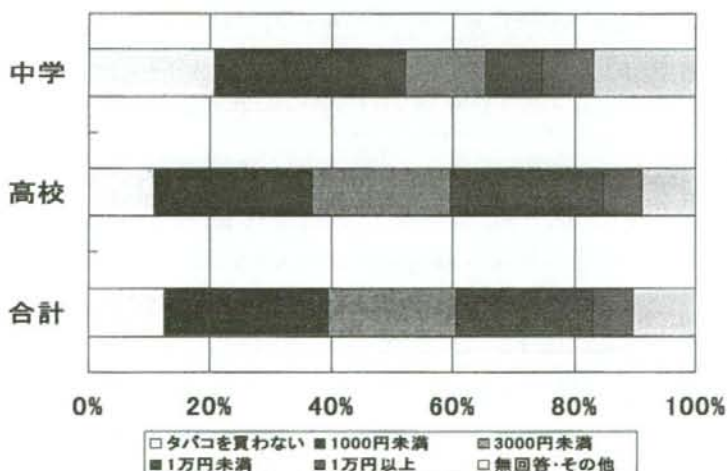


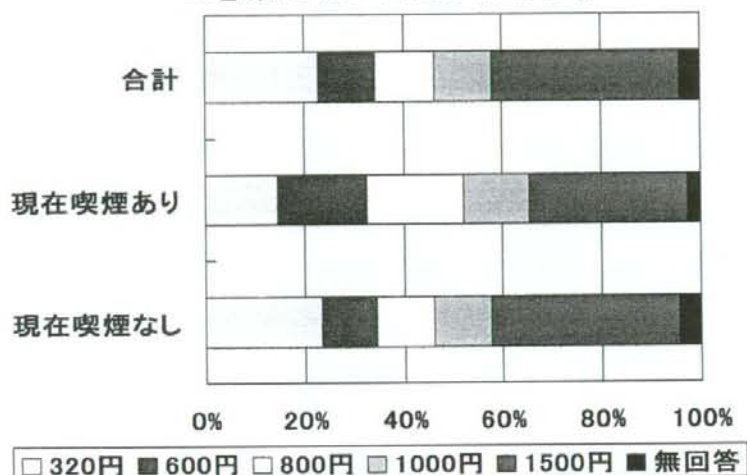
図7 この30日間のタバコ代(現在喫煙者)。



現在喫煙者のこの30日間のタバコ代をみると、一箱300円とすれば3日に1箱以上(30日に10箱以上)買うのは約3割認められた。

中高生が喫煙開始しないタバコ価格：タバコ価格がいくらなら、喫煙を開始しないと思うか、には、男女中高とも 1500 円と回答する者が最も多かったが、ついで 320 円が 2 割強みとめられた。1500 円と回答したのは、現在喫煙者の 32.0%、現在喫煙なしの 38.0%、合計 37.7%であり、1000 円以上と回答したのは、それぞれ 45.3%、49.7%、49.5%であった。

図3 タバコの値段(1箱)は、いくらになるとタバコを始めないと思いますか。



タバコ価格があがったときに中高生の喫煙者がとると思う対応：

タバコの価格が上がった場合の現在喫煙者の予測行動は、320 円なら「止める」と回答者は少なく（男子 6.7%、女子 5.6%）、600 円になると「止める」者は男子 27.4%、女子 20.8%と増加し、1000 円になると「止める」者は男子 44.6%、女子 37.3%であった。ニコチン依存度が高い者は、タバコ価格が高くなっても「止める」と回答した割合は低いが、1000 円だと、依存なしの 45.9%、中等度依存の 41.5%、高度依存の 24.7%（合計の 41.9%）がタバコを止めると回答した。

ニコチン依存度は、7 項目の質問から判定する、ファーストロームのニコチン依存スクリーニング調査票の青少年用変更版を用いて判定し、0-2 点を「依存なし」、3-5 点を「中等度依存」、6-9 点を「高度依存」とした。現在喫煙者のうち、2326 名が依存なし、1727 名が中等度依存、493 名が高度依存と分類された。

7 つの項目とは、①1 日喫煙本数、②煙を深く吸い込むか、③起床後喫煙までの時間、④朝のタバコを止めるのが難しいか、⑤喫煙が禁じられている場所での禁煙が難しいか、⑥病気で床に伏せていても吸うか、⑦朝の 2 時間のほうがその後の時間より多く吸うか、である。

資 料

School policy against smoking and high school student's smoking behavior: A national multi-level study in Japan.

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OBJECTIVES: The international evidence about the effectiveness of school policy against smoking among high school students is equivocal. The aim of the current study was to explore this in school clusters stratified according to school policy against smoking while adjusting for characteristics of individual students.

METHOD: This multi-level study was based on a cross-sectional self-reported anonymous national-wide data from 179 high schools, 102,451 students who participated in the 2004 National Smoking Survey among Japanese high school students. The main independent variables were school-level variables like school policies or educations against smoking which reported by teachers, and individual variables like gender, grade and alcohol behavior. Multi-level analysis was used to examine the influence variable at school-level as well as individual characteristics had on smoking status of high schools students.

RESULTS: Smoking experience and smoking rate among high school students were predicted by individual-level factors such as boys, grade and alcohol behavior, but it couldn't find strong significant differences between school-level variables and student's smoking behaviors.

CONCLUSIONS: We found that a school policy against smoking was less effective than individual characteristics among high school students. School smoking policy should be monitored as to the impact of policy to smoking and educational outcomes by national-wide data.

Key Words: School policy, High school students, smoking behavior, Japan

Trends in association between alcohol use and cigarette smoking in Japanese adolescents: Results from periodical nationwide cross-sectional surveys

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Abstract

Objectives: To assess trends in association between alcohol use and cigarette smoking among Japanese adolescents.

Methods: Nationwide cross-sectional surveys were conducted in 1996, 2000 and 2004. Survey schools were sampled randomly. Enrolled students were asked to fill up a self-reporting anonymous questionnaire on smoking behavior. Questionnaires were collected from 115,814 students in 1996, 106,297 in 2000, and 102,451 in 2004 through sampled junior and senior high schools throughout Japan. Current user was defined as those who had used at least once during the previous 30 days.

Results: Prevalence of alcohol use and cigarette smoking prevalence (lifetime, current, and daily) in 2004 was decreased in both sexes and in all school grades. Proportions of user of both, cigarette only, alcohol only, and abstinence were 12.7%, 4.5%, 25.5%, 57.3% in 1996, and 11.2%, 4.1%, 25.9%, 58.8% in 2000, and 7.0%, 2.4%, 22.5%, 68.1% in 2004. Prevalence of alcohol use among smoker has decreased survey by survey, whereas that among non smoker has not changed. When co-occurrence risk of smoking and alcohol use was analyzed using multiple logistic regression adjusted by gender and age, the odds ratio was 5.5 (95%CI, 5.3-5.7) in 1996, 5.4 (95%CI, 5.2-5.6) in 2000, and 7.8 (95%CI, 7.4-8.2) in 2004.

Conclusions: We observed that co-occurrence of smoking and drinking among Japanese adolescents. Although prevalence of smoking and drinking decreased in recent years, health-compromising behaviors have accumulated to selected adolescents.

Key words: Adolescence; Alcohol use, Cigarette use; Adolescent behavior; Japan

Decrease in the prevalence of smoking among Japanese adolescents and its possible causes: periodic nationwide cross-sectional surveys

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Abstract

Objectives To assess trends in smoking prevalence among Japanese adolescents and to analyze possible causal factors for the decrease in smoking prevalence observed in a 2004 survey.

Methods Nationwide cross-sectional surveys were conducted in 1996, 2000 and 2004. Survey schools, both junior and senior high schools, considered to be representative of the whole of Japan were sampled randomly. Enrolled students were asked to complete a self-reporting anonymous questionnaire on smoking behavior. The questionnaires were collected from 115,814 students in 1996, 106,297 in 2000, and 102,451 in 2004. School principals were asked about the policy of their respective school on smoking restrictions.

Results Cigarette smoking prevalence (lifetime, current, and daily smoking) in 2004, based on the completed questionnaires, had decreased relative to previous years in both sexes and in all school grades. The most important

trends were: a decrease in smoking prevalence among the fathers and older brothers of the students; an increase in the proportion of students who did not have friends; a decrease in the proportion of current smokers who usually bought cigarettes in stores decreased in 2004, in particular for the oldest boys. An association was found between a lower smoking rate at a school and a smoke-free school policy.

Conclusions Japan has experienced a decrease in the prevalence of smoking among adolescents. A decrease in smoking prevalence among the fathers and older brothers, limitations to minors' access to tobacco, an increase in the proportion of students without friends, and a school policy restricting smoking may have contributed to this decreasing trend.

Keywords Adolescence · Adolescent behavior · Cigarette use · Japan · Smoking behavior

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Introduction

Cigarette smoking increases the risk of many diseases. Given the difficulty of escaping nicotine dependence, the prevention of smoking among adolescents has been identified as a major public health measure [1, 2]. The monitoring of smoking prevalence among adolescents is thus an important means of clarifying the characteristics of this problem, establishing countermeasures, and evaluating public health efforts to reduce smoking prevalence. In the case of Japan, nationwide surveys on cigarette smoking among high school students conducted in 1996 and 2000 [3–5] revealed that many students had started smoking despite the various restrictions to prevent this established by the Act to Prohibit Minors from Smoking, enacted in 1900. To better understand trends in smoking prevalence, we conducted a third nationwide survey in 2004 and found a dramatic decrease in smoking prevalence among Japanese adolescents.

Many articles describe associated factors or predictors of adolescent smoking. Parental or sibling smoking status and peer networks are two well-known factors contributing to smoking among adolescents [6–9]. Therefore, an analysis of the trends in parental or sibling smoking status and peer networks is important for studying factors contributing to the change in smoking prevalence among adolescents. Although it was expected that a school's policy on limiting smoking by teachers would play a positive role in discouraging students from smoking, review papers have summarized that the effect of such school-based smoking control measures is small in Western countries [10, 11].

Here, we describe the trends in adolescent smoking prevalence in Japan and analyze the possible factors contributing to a decrease in smoking prevalence among the adolescent population, including parental or sibling smoking status, peer networks, and school regulations on teachers' smoking.

Methods

Subjects

The survey was a cross-sectional random sampling survey, which used the single-stage cluster sampling methodology [12]. The cluster unit of the sampling was schools. The survey targeted junior and senior high school students from schools selected throughout Japan using the National School Directory. All students enrolled in the sampled schools were subjects of the study.

The number of schools sampled in the 1996 survey was 122 of 11,274 junior high schools (selection rate: 1.1%)

and 109 of 5501 senior high schools (2.0%). The proportion of private schools was 4.9% for junior high schools and 28.4% for senior high schools. The proportion of general, vocational and mixed senior high schools was 38.5, 23.9, and 37.5%, respectively. The survey period was December 1996 to the end of January 1997. Respective values for the 2000 and 2004 surveys were 132 of 11,200 junior (1.2%) and 102 of 5,315 senior high schools (1.9%) from December 2000 to the end of January 2001, and 131 of 11,060 junior (1.2%) and 109 of 4,627 senior high schools (1.9%) from December 2004 to the end of January 2005. The proportion of private schools was 7.6% for junior high schools and 33.3% for senior high schools in 2000 survey; in the 2004 survey, the proportions were 6.9% and 26.6%, respectively. The proportion of general, vocational and mixed senior high schools was 48.0, 13.7, and 38.3%, respectively in the 2000 survey and 45.0, 22.9, and 32.1%, respectively, in the 2004 survey.

Procedures

We requested the cooperation of the principals of these schools and sent these individuals questionnaires for their respective school's student population. The teachers were asked to inform the students of the voluntary nature of their participation and to urge them to answer honestly. Anonymous questionnaires and envelopes were handed to the students for completion during school time. Upon completion, the questionnaires were sealed in the envelopes by the students themselves, collected by their teachers, and returned to our institute unopened. School regulations on smoking by teachers was determined using a school questionnaire completed by the school principal. This survey was approved by the Ethics Committee of the National Institute of Public Health.

Measures

The questionnaire focused on smoking experience, smoking frequency, age (by school grade) when the respondent first tried smoking, number of cigarettes consumed daily by smokers, sources for cigarettes, and smoking status of the student's family. Experimenting smokers, current smokers, and daily smokers were defined as those who had tried smoking at least once, those who had smoked at least once during the previous 30 days, and those who had smoked every day during the previous 30 days, respectively. Students were defined as having no friend who smoked if they responded that "I have no friend" in the question "Do you have a friend who is a smoker?"—yes/no/I have no friend.

School regulations on smoking by teachers was categorized into four groups, namely (1) completely smoke-free throughout the school site, including buildings and

grounds; (2) smoke-free in all school buildings but not the grounds; (3) appropriate separation of smoking (smoking room); (4) insufficient separation of smoking. Appropriate separation was defined as a completely partitioned smoking room with air exhaust facilities to the exterior.

Response rate

For the 1996 survey, responses were obtained from 80 junior (response rate 65.6%) and 73 senior high schools (67.0%), with a total of 115,814 responses accounting for 64.1% of all junior and 62.5% of all senior students enrolled in the sampled schools. In 2000, the respective values were 99 (75.0%) and 77 schools (75.5%), with 106,297 responses accounting for 66.1 and 59.3% of enrolled students, and in 2004, these were 92 (70.2%) and 87 schools (79.8%), with 102,451 responses accounting for 60.7 and 67.7% of students. The defining properties of the responding schools, such as the proportion of private schools, vocational schools, or general schools were chosen to be representative of the study population.

Data analysis

The percentages and 95% confidence intervals (95%CI) in the tables were calculated by a weighting method based on one-stage stratified cluster sampling [12]. Proportions in tables were compared using statistical testing for rate differences. Multiple logistic regression analyses were applied to calculate odds ratios and the population attributable risk percentage for a student's current smoking status with a family member's (father, mother, older brother, and older sister) smoking, and for a student's current smoking status with the absence of a friend. Data were analyzed using the SPSS FOR WINDOWS ver. 13.0 software (SPSS, Chicago, IL).

Results

Smoking prevalence

Lifetime smoking rate, current smoking rate, and daily smoking rate increased with age. Lifetime smoking rate in 2000 among junior high school boys fell compared with that in 1996, whereas the prevalence of regular smoking (current smoking and daily smoking) did not. In 2004, lifetime, current, and daily smoking rates had decreased—relative to 1996 and 2000—in both sexes and in every school grade (Table 1). The magnitude of the decrease was greater in boys than in girls.

Factors accounting for the decrease in smoking prevalence

The data were analyzed to identify the factors for this decreasing trend in smoking prevalence among Japanese adolescents. Reported smoking status of family members showed some decrease in family smoking, especially that by fathers, but smoking by older brothers, older sisters and friends also showed a significant and persistent decrease (Table 2). In contrast, smoking by mothers of junior high school boys and senior high school girls increased. The odds ratios of a student's current smoking status with the smoking by a family member were higher when it was the mother who smoked than when it was the father who smoked. The increasing tendency was observed in the odds ratios when both the father and mother smoked. The odds ratios of father and senior brother among boys were higher than those among girls, whereas the odds ratios of the mother and senior sister among girls were higher than those among boys. The population attributable risks of family's smoking were calculated at 7.7–18.1% in 1996, 8.4–21.7% in 2000, and 6.0–25.3% of the total current smoking rate in 2004; the estimated risk of the father was higher among boys and that of the mother was higher among girls (Table 2).

In our search for factors contributing to the change in smoking prevalence among adolescents, we discovered an increase in the proportion of students who had no friend. In the 1996 and 2000 survey, the proportion of students who reported that they had no friends was quite low; however, this abruptly increased in 2004. Since the smoking prevalence among students who had no friend was lower than that among students who did have a friend, the odds ratios of having no friend were calculated for the values that were smaller than 1.0. The magnitude of the effect was smaller than that of family's smoking but significant for senior high school students (Table 2).

The most common sources of cigarettes for current smokers are cigarette vending machines, stores (convenience store, supermarket, or gas station), and someone else. When the results for 2000 and 2004 were compared, the proportion students getting cigarettes from stores and someone else had decreased in 2004, especially for boys (Table 3).

When the association between the prevalence of smoking among students and the respective school's regulations on smoking by teachers were analyzed, we found that smoking by students in smoke-free schools tended to be lower in both junior and senior high schools. The difference was statistically significant in junior high school girls and in senior high school boys for regular smoking (Table 4). However, smoking prevalence of junior high school students and senior high school girls in the schools

Table 1 Smoking prevalence by sex and school grade (1996, 2000, 2004)

Sex	High school	Year (grade)	Lifetime smoking (%)			Current smoking (%)			Daily smoking (%)			Sample size		
			1996 CI	2000 CI	2004 CI	1996 CI	2000 CI	2004 CI	1996 CI	2000 CI	2004 CI	1996	2000	2004
Male	Junior	1st (7th)	29.9 ± 0.5	22.5 ± 0.4	13.3 ± 0.3	7.5 ± 0.3	5.9 ± 0.2	3.2 ± 0.1	0.7 ± 0.1	0.5 ± 0.0	0.4 ± 0.0	7,211	8,248	6,917
		2nd (8th)	35.1 ± 0.5	28.0 ± 0.4	18.1 ± 0.3	10.8 ± 0.4	8.2 ± 0.3	4.8 ± 0.2	1.9 ± 0.1	1.9 ± 0.1	1.3 ± 0.1	7,152	8,541	6,845
		3rd (9th)	38.7 ± 0.5	35.4 ± 0.5	23.1 ± 0.4	14.4 ± 0.5	14.0 ± 0.4	7.3 ± 0.2	4.6 ± 0.3	5.2 ± 0.2	2.2 ± 0.1	7,108	8,559	6,917
	Senior	Subtotal	34.6 ± 0.4	28.7 ± 0.4	18.2 ± 0.3	10.9 ± 0.3	9.4 ± 0.2	5.1 ± 0.1	2.4 ± 0.1	2.6 ± 0.1	1.3 ± 0.1	21,471	25,348	20,679
		1st (10th)	47.7 ± 0.8	45.0 ± 0.6	30.9 ± 0.6	24.7 ± 0.9	24.3 ± 0.7	11.3 ± 0.4	10.8 ± 0.6	12.4 ± 0.6	4.7 ± 0.2	12,079	10,590	12,235
		2nd (11th)	52.6 ± 0.8	51.3 ± 0.5	35.9 ± 0.7	31.0 ± 1.0	29.5 ± 0.7	15.4 ± 0.5	18.3 ± 0.8	18.0 ± 0.6	8.2 ± 0.4	12,645	9,662	12,241
Female	Junior	3rd (12th)	55.6 ± 0.8	55.7 ± 0.6	42.0 ± 0.7	36.9 ± 1.0	36.9 ± 0.8	21.7 ± 0.6	25.4 ± 0.9	25.9 ± 0.7	13.0 ± 0.5	10,921	8,976	10,843
		Subtotal	51.9 ± 0.8	50.3 ± 0.6	36.0 ± 0.6	30.7 ± 1.0	29.9 ± 0.7	15.9 ± 0.5	18.0 ± 0.8	18.4 ± 0.6	8.5 ± 0.3	35,645	29,228	35,319
		1st (7th)	16.7 ± 0.4	16.0 ± 0.3	10.4 ± 0.3	3.8 ± 0.2	4.2 ± 0.2	2.4 ± 0.1	0.4 ± 0.0	0.4 ± 0.0	0.2 ± 0.0	7,158	7,124	6,229
	Senior	2nd (8th)	20.4 ± 0.4	20.5 ± 0.3	14.8 ± 0.3	5.4 ± 0.2	5.7 ± 0.2	3.7 ± 0.1	0.7 ± 0.1	1.0 ± 0.1	0.5 ± 0.0	6,966	7,375	6,234
		3rd (9th)	22.7 ± 0.4	23.5 ± 0.4	16.6 ± 0.4	5.5 ± 0.2	6.9 ± 0.2	4.8 ± 0.2	1.0 ± 0.1	1.8 ± 0.1	1.2 ± 0.1	7,203	7,399	6,243
		Subtotal	19.9 ± 0.3	20.0 ± 0.2	13.9 ± 0.3	4.9 ± 0.1	5.6 ± 0.1	3.6 ± 0.1	0.7 ± 0.0	1.0 ± 0.0	0.6 ± 0.0	21,327	21,898	18,706
Senior	1st (10th)	29.2 ± 0.6	30.6 ± 0.6	20.5 ± 0.5	9.2 ± 0.4	10.9 ± 0.4	6.5 ± 0.3	2.4 ± 0.1	3.0 ± 0.2	1.7 ± 0.1	12,617	10,552	9,580	
	2nd (11th)	33.6 ± 0.7	34.2 ± 0.6	24.6 ± 0.6	13.3 ± 0.5	13.0 ± 0.4	8.5 ± 0.4	4.5 ± 0.2	5.3 ± 0.2	3.3 ± 0.2	12,771	9,938	9,289	
	3rd (12th)	38.5 ± 0.7	36.7 ± 0.6	27.0 ± 0.7	15.6 ± 0.5	15.8 ± 0.5	9.7 ± 0.4	7.1 ± 0.3	8.2 ± 0.3	4.3 ± 0.2	11,983	9,333	8,878	
Subtotal	33.5 ± 0.6	33.7 ± 0.5	24.0 ± 0.6	12.6 ± 0.4	13.1 ± 0.4	8.2 ± 0.3	4.6 ± 0.2	5.4 ± 0.2	3.1 ± 0.2	37,371	29,823	27,747		

CI, 95% Confidence interval

Lifetime smoking. Students who had tried smoking at least once; Current smoking. Students who smoked ≥ 1 day of the 30 days preceding the survey; Daily smoking. Students who smoked every day of the 30 days preceding the survey

Table 2 Smoking prevalence among family members and prevalence of students who have no friend, as reported by students, and the odds ratio and population attributable risk of a student's current smoking with smoking by a family member

Sex	High school	Family friend	Smoking prevalence (%)		P value vs. 2004	Odds ratio ^a		Population attributable risk (%)							
			1996 CI	2000 CI		2004 CI	2000 vs. 2004	1996 CI	2004 CI	1996	2000	2004			
Male	Junior	Father	55.2 ± 0.3	52.6 ± 0.4	46.2 ± 0.4	**	1.30	1.19–1.42	1.39	1.27–1.52	1.54	1.33–1.74	14.2	17.0	20.0
		Mother	13.5 ± 0.3	16.1 ± 0.3	16.9 ± 0.3	**	1.62	1.45–1.81	1.91	1.72–2.11	2.20	1.91–2.54	7.7	12.8	16.9
		Older brother	11.6 ± 0.2	10.8 ± 0.2	7.9 ± 0.1	**	2.72	2.45–3.02	2.80	2.52–3.11	2.90	2.47–3.40	16.6	16.3	13.1
		Older sister	4.5 ± 0.1	4.5 ± 0.1	3.8 ± 0.1	**	2.85	2.45–3.32	3.03	2.62–3.49	2.69	2.19–3.31	7.7	8.4	6.0
	Proportion of students who have no friend														
			3.9 ± 0.1	4.1 ± 0.1	6.5 ± 0.1	**	0.89	0.71–1.11	0.79	0.63–1.00	0.88	0.68–1.14	-0.4	-0.9	-0.8
	Senior	Father	54.7 ± 0.4	53.1 ± 0.4	43.8 ± 0.3	**	1.33	1.27–1.40	1.38	1.31–1.46	1.70	1.60–1.80	15.3	16.8	23.5
		Mother	14.6 ± 0.5	15.6 ± 0.4	14.5 ± 0.3	**	1.77	1.67–1.89	1.76	1.64–1.88	2.01	1.87–2.17	10.1	10.6	12.8
		Older Brother	19.0 ± 0.4	17.3 ± 0.3	13.9 ± 0.2	**	2.16	2.05–2.28	2.11	1.98–2.25	2.36	2.20–2.53	18.1	16.1	15.9
		Older sister	7.7 ± 0.2	8.0 ± 0.2	6.3 ± 0.2	**	2.31	2.13–2.51	2.46	2.25–2.69	2.59	2.36–3.25	9.2	10.5	9.1
Proportion of students who have no friend															
		3.5 ± 0.1	3.5 ± 0.1	6.7 ± 0.1	**	0.43	0.37–0.49	0.31	0.26–0.38	0.36	0.31–0.43	-2.0	-2.5	-4.5	
Female	Junior	Father	56.1 ± 0.3	55.4 ± 0.2	48.9 ± 0.3	**	1.17	1.02–1.34	1.30	1.14–1.47	1.17	0.99–1.80	8.7	14.3	7.7
		Mother	14.6 ± 0.3	18.0 ± 0.3	15.4 ± 0.3	**	2.18	1.88–2.52	2.54	2.24–2.89	3.20	1.87–2.17	14.7	21.7	25.3
		Older brother	11.7 ± 0.2	11.9 ± 0.1	8.7 ± 0.1	**	2.44	2.10–2.83	2.76	2.41–3.17	2.59	2.20–2.53	14.4	17.3	12.2
		Older sister	5.1 ± 0.1	5.5 ± 0.1	4.7 ± 0.1	**	3.56	2.98–4.25	3.43	2.91–4.04	3.31	2.36–2.86	11.5	11.8	9.8
	Proportion of students who have no friend														
			2.6 ± 0.1	2.8 ± 0.0	4.0 ± 0.1	**	1.81	1.33–2.44	0.70	0.47–1.05	0.85	0.56–1.28	2.1	-0.8	-0.6
	Senior	Father	54.5 ± 0.3	53.9 ± 0.3	45.7 ± 0.4	**	1.23	1.15–1.31	1.38	1.28–1.48	1.49	1.36–1.63	11.1	17.0	18.3
		Mother	14.0 ± 0.3	15.9 ± 0.3	16.3 ± 0.4	**	2.22	2.06–2.39	2.24	2.07–2.43	2.59	2.35–2.86	14.6	16.5	20.6
Older brother		18.6 ± 0.3	17.8 ± 0.2	14.4 ± 0.3	**	1.75	1.63–1.88	1.76	1.62–1.91	1.88	1.70–2.09	12.2	11.9	11.2	
Older sister		8.5 ± 0.2	8.8 ± 0.2	6.7 ± 0.2	**	3.02	2.77–3.29	2.80	2.54–3.07	2.87	2.54–3.25	14.7	13.7	11.1	
Proportion of students who have no friend															
		2.3 ± 0.0	2.5 ± 0.0	4.1 ± 0.1	**	0.57	0.44–0.73	0.31	0.22–0.45	0.44	0.32–0.60	-1.0	-1.8	-2.3	

*P < 0.05; **P < 0.01; result of statistical testing between 2000 and 2004

CI, 95% Confidence interval

^a Odds ratios were calculated using multiple logistic analysis to make adjustments with other family members and with school grade

Table 3 Usual sources of cigarettes reported by current smokers

Sex	High school	Year	Searching in house (%) CI	Getting from someone CI	Tobacconist shop CI	Stores CI	Vending machine CI	Number of current smokers
Male	Junior	1996	24.2 ± 0.3	33.4 ± 0.2	17.0 ± 0.2	17.8 ± 0.3	60.3 ± 0.4	2,453
		2000	21.4 ± 0.2	37.1 ± 0.2	13.4 ± 0.2	21.3 ± 0.2	64.6 ± 0.2	2,389
		2004	22.1 ± 0.5	30.6 ± 0.8 **	12.0 ± 0.2	13.5 ± 0.2 **	61.1 ± 0.4	1,049
	Senior	1996	15.1 ± 0.1	30.9 ± 0.2	27.3 ± 0.3	42.6 ± 0.5	84.3 ± 0.1	11,869
		2000	14.0 ± 0.1	33.1 ± 0.1	26.2 ± 0.3	49.4 ± 0.3	85.8 ± 0.1	8,818
		2004	13.2 ± 0.4	29.2 ± 0.4 **	20.8 ± 0.2 **	41.5 ± 0.3 **	82.5 ± 0.1 **	5,625
Female	Junior	1996	39.4 ± 0.4	41.6 ± 0.3	11.7 ± 0.2	16.1 ± 0.3	54.0 ± 0.4	1,048
		2000	27.8 ± 0.3	47.5 ± 0.3	9.0 ± 0.1	17.9 ± 0.3	60.7 ± 0.3	1,206
		2004	31.5 ± 1.3	40.8 ± 1.6 **	8.9 ± 0.3	12.7 ± 0.3 *	59.4 ± 0.4	677
	Senior	1996	18.5 ± 0.2	35.1 ± 0.2	13.2 ± 0.3	28.4 ± 0.5	76.6 ± 0.2	4,696
		2000	15.4 ± 0.1	35.8 ± 0.2	10.2 ± 0.1	36.2 ± 0.3	80.3 ± 0.2	3,824
		2004	17.0 ± 0.6	32.6 ± 0.8 **	9.9 ± 0.2	34.2 ± 0.3	77.8 ± 0.2	2,263

CI, 95% Confidence interval

* $P < 0.05$, ** $P < 0.01$; result of statistical testing between 2000 and 2004

Percentages add up to more than 100% as some students mentioned more than one source of cigarettes

Table 4 Association between variables of students' smoking and school smoking regulation

Sex	High school	School policy	Number of schools	Lifetime smoking		Current smoking		Daily smoking		Number of students
				OR	CI	OR	CI	OR	CI	
Male	Junior	Insufficient separation of smoking	23	1.0		1.0		1.0		5,380
		Separate smoking areas	23	1.04	0.94–1.14	1.05	0.88–1.26	1.09	0.77–1.55	4,992
		Smoke-free in school buildings	19	0.99	0.89–1.09	1.23	1.03–1.47	1.44	1.02–2.02	4,275
		Smoke-free throughout school site	27	0.94	0.85–1.03	1.01	0.85–1.20	0.98	0.69–1.38	6,032
	Senior	Insufficient separation of smoking	19	1.0		1.0		1.0		8,569
		Separate smoking areas	28	0.91	0.86–0.96	0.89	0.82–0.96	0.88	0.80–0.97	10,649
		Smoke-free in school buildings	13	0.80	0.74–0.86	0.70	0.63–0.77	0.64	0.56–0.73	4,590
		Smoke-free throughout school site	27	0.87	0.79–0.89	0.76	0.70–0.82	0.69	0.63–0.77	11,511
Female	Junior	Insufficient separation of smoking	23	1.0		1.0		1.0		4,606
		Separate smoking areas	23	1.15	1.02–1.29	1.06	1.02–1.29	1.69	1.02–2.81	4,558
		Smoke-free in school buildings	19	1.16	1.03–1.31	1.31	1.03–1.31	1.33	0.76–2.32	3,882
		Smoke-free throughout school site	27	0.87	0.78–0.98	0.75	0.78–0.98	0.84	0.48–1.48	5,660
	Senior	Insufficient separation of smoking	19	1.0		1.0		1.0		5,222
		Separate smoking areas	28	0.81	0.75–0.88	0.92	0.81–1.04	0.83	0.68–1.00	10,139
		Smoke-free in school buildings	13	1.12	1.01–1.23	1.30	1.12–1.50	1.05	0.84–1.32	3,782
		Smoke-free throughout school site	27	0.87	0.81–0.95	0.93	0.82–1.06	0.85	0.69–1.03	8,604

OR, Odds ratio; CI, 95% confidence interval adjusted by school grade and school policy on teachers' smoking in school

of smoke-free buildings was rather higher than that in the schools who had an insufficient separation of smoking-free/smoking areas.

Discussion

This study provides the first evidence of a dramatic decrease in smoking prevalence among Japanese adolescents. The

2000 survey showed a decrease in lifetime smoking rate among junior high school boys only and no decrease in prevalence among girls or in regular smoking prevalence among boys. In recent years there has been a trend towards a decreased prevalence of smoking among adolescents in a number of western countries, including the USA [13], England [14], Australia [15], Canada [16], and in adolescent boys in Sweden and Finland [17], but not in a number of other European countries, such as Italy, Russia [18],