Hungary, and Latvia [17]. The magnitude of decrease found in our 2004 survey was one of the largest reported to date and is the first decrease reported in an Asian country.

In our analysis of the possible factors accounting for the decrease, we identified a decrease in smoking prevalence among family members and an increased proportion of students who had no friends. Parent and sibling smoking is one of the most important predictors of adolescent smoking [6–9, 19, 20]. We observed considerably high odds ratios and population attributable risk of a student's current smoking status with smoking by a family member: the reported decreases in the prevalence of smoking by a father and older brother probably contributed to the decrease among students. However, the prevalence of smoking by mothers of junior high school boys has increased significantly, and this influence on students' smoking behavior should be monitored by periodic surveys. We also observed that having no friend was a protective factor on smoking behavior among senior high school students. Peer smoking is a well-known predictor of adolescent smoking [20]. The increased proportion of students who reported having no friends indicates a decrease in the human network of students. This may also have contributed to a decrease in peer pressure to start smoking [21].

A governmental measure, called the Act to Prohibit Minors from Smoking, was enacted in 1990 in Japan. According to this law, adults who sell a cigarette to a minor will be punished. However, the number of arrests made under this law has been extremely low, and the law has not had the intended effect. The proportion of current smokers who bought their cigarettes in a store decreased in the 2004 survey, especially for senior high school boys. This may be due to the governmental obligation for sellers to confirm a customers' age (from December 2001, due to a revision of the Act to Prohibit Minors from smoking). However, a significant number of adolescent smokers still buy their cigarettes in stores, and most of the current smokers purchase their cigarettes using cigarette vending machines. The proportion of smokers who buy their cigarettes from vending machine is much higher than that in other countries [22]. Since the number of cigarette vending machines has not decreased [5], banning vending machine and enforcement of age confirmation in stores are important measures to prevent smoking by minors in Japan.

This study also identified the possible efficacy of school regulations on smoking by teachers. Based on the Health Promotion Law issued in 2002, there is a movement by local governments to encourage a smoke-free school site policy with the aim of preventing passive smoking in schools. We observed that a total ban on smoking at a school (entire school site) can be an effective measure in preventing adolescent smoking. Some researchers have emphasized the importance of school smoking restrictions [23, 24], whereas review papers have summarized that the effect of school-based smoking control measures is small [10, 11]. For cultural reasons, the magnitude of the effectiveness of school-based smoking control may be greater in Japan than in Western countries. The inappropriate influence of teachers who smoke outside the school buildings in the view of students may contribute to the relatively higher smoking prevalence in the schools with smoke-free buildings only.

One interesting observation was the contrasting relationship between sexes and school categories (junior or senior) in terms of the increase in smoking by mothers and the effectiveness of school policy. We speculate that smoking by the mother may offset the effect of a school policy on restricting smoking.

In the period 1996 through 2004, cigarette prices in Japan were raised on two occasions, in 1998 and 2003, each time by 20 yen (US $ 0.18) per pack (20 cigarettes). It is therefore difficult to explain that the decrease in prevalence after 2000 was the result of higher prices. Since adolescent smoking is also influenced by tobacco industry promotions, such as advertising [25–27] and smoking in TV programs or movies [28], we plan to assess the role of cigarette advertizing and smoking scenes in TV programs or movies in Japan.

A limitation of this study is the possibility of misclassification of the smoking status among students. Although this study is an anonymous questionnaire survey, the respondents may have been reluctant to report their actual smoking status due to the more active anti-smoking policies in recent years. However, we considered that the influence of misclassification of reported smoking status was not large because the number of questionnaires with an invalid answer or a contradictory answer did not increase during this study period. Confirmation of the persistence of this decrease in prevalence will require periodic monitoring of adolescent smoking prevalence and related factors.

Conclusion

In recent years, a number of Western countries have experienced a decrease in the prevalence of smoking among adolescents. The results of the 2004 survey reported here showed a dramatic decrease in smoking prevalence among Japanese adolescents. The current findings demonstrate that possible factors contributing to this decrease is a decreased prevalence of smoking by a father and older brother, restriction in the access of minors to tobacco, an increase in the proportion of students without friends, and a school policy restricting smoking.

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わが国の中高生の喫煙防止のためには、タバコ価格はいくらがいいのか？

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【目的】中高生の考える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。

【結果と考察】未成年の喫煙を減らすためにタバコ価格(20 本あたり)をいくらにしたらよい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。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 割強認められた。現在喫煙の有無別にみると中高生の喫煙者がタバコを止めると思うタバコ価格は、男女中高ともに 1500 円の割合が最も高かった。50%以上の者がタバコを止める価格は 800 円以上（男子 56.9%、女子 59.1%）であった。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」と回答し者は少なく（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、このような者でも未成年者の喫煙防止のためには価格を思い切って高くしてもよいと回答していた。【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 円であるが、中高生ではむしろそれより高く 800-1000 円くらいであった。中高生の喫煙率を 0 にする目標からするとタバコ価格 1000 円より高くてもいいくらいである。

（平成 19 年度厚生労働科研　未成年者の喫煙・飲酒状況に関する実態調査研究班（研究代表者大井田隆）による研究である。）

Symposium 1: Factors or policy measures that may cause the change in alcohol consumption and related harm: experiences in the Asian-Pacific Region

TRENDS IN ADOLESCENT ALCOHOL USE AND RELATED FACTORS IN JAPAN

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We conducted periodical nationwide survey on alcohol use among junior and senior high school students in Japan in 1996, 2000, and 2004. Self-reporting anonymous questionnaires were collected from 115,814 students in 1996, 106,297 in 2000, and 102,451 in 2004 through randomly sampled high schools throughout Japan.

Drinking prevalence in 2004 was decreased compared with that in 1996 and 2000 in both sexes and in all school grades. Current drinking rate (monthly drinker) among junior high school boys was 29.4% in 1996, 29.0% in 2000, and 20.5% in 2004, while that among senior high school boys was 49.7%, 48.7%, and 36.2%, respectively. Respective prevalence among junior and senior girls was 24.0%, 25.5%, and 20.0%, and 40.8%, 42.1%, and 34.1%. Proportion of drinkers who get their alcohol beverages from stores (convenience store, supermarket, or gas-stand), liquor shop, vending machine, or bar decreased with year of survey. Analysis of reasons for this decrease identified a decrease in drinking prevalence in students' families, especially by fathers and older brothers. This change means that relatively Japanese low drinking prevalence comparing with that of western countries had lowered more. A decrease in drinking prevalence of male family member, a limitation of sources of alcohol beverages, and an increase in the proportion of students without friends may contribute to the decrease.

Japan is the only country where alcohol can be purchased from vending machines. In 1996, approximately 186,000 alcohol vending machines were in operation throughout the country. Due to voluntary regulation by the alcohol beverage industry and retailers, this number had dropped to 59,000 in 2004. This may contribute to the decrease in adolescent drinking rate In spite of relatively high liquor tax (47% for beer, 18% for sake, around 35% for shochu and 23% for whisky and brandy), the price of alcohol beverages are very cheap because of discount price by the fierce price competition. There are no restrictions on advertising of alcoholic beverages. Since youth is more likely to be affected by attracting advertisements, this is a serious problem.

Therefore, changes in prevalence of alcohol use were observed in recent years. A part of the changes may contribute to some regulations. However, these were voluntarily regulated by alcohol beverage industry. The establishing and enforcing governmental strong policies for reducing alcohol consumption is necessary in Japan.

SY15 10:00-11:30 601
Alcohol Consumption and Related Harm in the East Asian Region
Co-organized by Japanese Society of Psychiatric Research on Alcohol
Chairpersons: Toshikazu Saito, Sapporo Medical University, Japan
Dong-Yul Oh, Kwandong University, Korea

SY15-1 Social Cost Estimation Associated with Alcohol Use in Jinan, Shandong Province, China in 2006
Wei Hao, Central South University, China

SY15-2 Prevalence and Patterns of Alcohol-use Disorders in Thailand
Sawitri Assanangkornchai, Prince of Songkla University, Thailand

SY15-3 Alcohol Consumption, Related Harm and National Alcohol Policy, Blue Bird Plan 2010 in Korea
Dong-Yul Oh, Kwandong University, Korea

SY15-4 Trends in Alcohol Use and Related Problems among Japanese Adolescents
Yoneatsu Osaki, Tottori University, Japan

TRENDS IN ALCOHOL USE AND RELATED PROBLEMS AMONG JAPANESE ADOLESCENTS

Yoneatsu Osaki, Susumu Higuchi, Takashi Ohida, Hideyuki Kanda, Yoshitaka Kaneita, Kenji Suzuki, Takeo Tanihata, Keniji Hayashi

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Purpose: Trends in alcohol drinking prevalence and alcohol-related problems were assessed among Japanese adolescents, and possible reasons for a decrease in drinking prevalence observed in 2004 survey, special reference to recent alcohol policies in Japan.

Methods: Cross-sectional nationwide surveys were conducted periodically. High schools were randomly sampled from throughout Japan in 1996, 2000, and 2004. All enrolled students in sampled schools were asked to fill up self-reporting anonymous questionnaires. The questionnaires were collected from 115,814 students in 1996, 106,297 in 2000, and 102,451 in 2004. Questions about drinking prevalence of students and family members, sources of alcohol and experience of alcohol-related problems were included.

Results: The drinking prevalence in 2004 was decreased in comparison to that in 1996 and 2000 in both sexes and in all school grades. The current drink rate (monthly drinker) among junior high school boys was 29.4% in 1996, 29.0% in 2000, and 20.5% in 2004, while that among senior high school boys was 49.7%, 48.7%, and 36.2%, respectively. The respective prevalence among junior and senior high school girls was 24.0%, 25.5%, and 20.0%, and 40.8%, 42.1%, and 34.1%. The proportion of drinkers who get their alcoholic beverages from store, liquor shop, vending machines, or bars decreased indicating an effectiveness of alochol policies on limitation of sources to minors. A decrease in drinking prevalence among male family members may contribute to the decrease in prevalence. Among surveyed

alcohol-related problems, namely vomiting, fighting, blacked out, trouble with police, and scolding by parents, prevalent problems were vomiting and blacked out. The proportion slightly decreased in 2004 in comparison to 2000.

Conclusion: Prevalence of alcohol use among adolescents decreased after 2000. Family drinking and recent alcohol policies may contribute to the decrease. However, the proportion of problems, such as binge drinking, alcohol-related problems, and co-morbidity of smoking among current drinkers did not change.

未成年者に対する喫煙・飲酒・薬物乱用防止教育の現状と課題

薬物使用の疫学調査

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1．未成年者の喫煙行動の実態

1996、2000、2004 年度に中高生の喫煙及び飲酒行動に関する全国調査を実施した。2004 年調査により男女、中高ともに喫煙率の劇的減少が認められた。月喫煙率（この 30 日に 1 日でも喫煙した者の割合）は、男子では中学 5.1%、高校 15.9%、女子ではそれぞれ 3.6%、8.2%であった。喫煙率の低下に寄与したと考えられる要因は、家族の喫煙率の低下（父、兄）、入手方法の制限（対面販売での入手の減少）、友達のいない生徒の増加（タバコを勧められるような人間関係の減少）、学校の敷地内禁煙などであった。一方で、中学男子、高校女子での母の喫煙率の増加、健康関連生活習慣の格差拡大（喫煙者の飲酒率は不変で非喫煙者の飲酒率が低下）等の問題も存在しており、今後の動向に注意が必要である。

2．未成年者の飲酒行動の実態

2004 年調査において飲酒率も喫煙率同様に減少した。減少に寄与したと考えら得る要因には、父、兄の飲酒率の低下、酒の自動販売機の減少、対面販売の減少、飲酒経験年齢の上昇が考えられた。しかし、飲酒者の飲酒量、酒による失敗経験などは減少しておらず、今後も監視が必要である。中高生が良く飲む酒の種類は、短期間のうちに変化し、男女とも果物味の甘い酒や焼酎類が増えている。未成年者は広告や新製品等に敏感に反応している恐れがあり、広告などに規制が必要である。

3．未成年者の薬物乱用の実態

中学生の有機溶剤乱用経験率は、男子 1.0%、女子 0.7%で、男子は 1998 年以降減少傾向にあり、女子は 2006 年にそれまでの増加傾向から転じて減少した。大麻や覚せい剤の経験率は、低いが横ばいである。有機溶剤乱用経験は、大麻、覚せい剤乱用と強い結びつきがあり、喫煙経験との関係も認められた。2004 年の高校生調査では、薬物乱用経験率（有機溶剤、覚せい剤、大麻、MDMA のいずれか）は、男子 19%、女子 1.2%であった。高校生でも薬物乱用は喫煙、飲酒と強く関連している。特に男子では喫煙がその後の問題飲酒、薬物乱用の入門薬（Gateway drug）になっていることが示唆されている。これらを考慮した対策が重要であろう。

School policy against smoking and high school student's smoking behavior

A national multi-level study in Japan

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BACKGROUND

The international evidence about the effectiveness of school policy against smoking among high school students is equivocal.

OBJECTIVES

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

A cross-sectional national-wide data among Japanese high school students aged 13-18 yr

Self-reported anonymous questionnaire

From 179 high schools, 102,451 students who participated in the 2004 National Smoking Survey

Statistical Analysis

Multi-level analysis

Dependent variables:

Smoking behavior among students (last 30days/ in their life)

Independent variables:

1st level: independent variables : individual factors

Grade and Alcohol behavior in each Gender

2nd level: independent variables : school factors

Educations against smoking in school, Public/Private

RESULT 1 Characteristics of Students and Schools

	Boys	Girls
Smoking Rate (one or more smoking during last 30days)	11.9%	6.3%
Smoking experience rate (one or more smoking in his/her life)	29.4%	19.9%

School policy against smoking Response: 160 schools

Educations against smoking in a school: 112 schools (70.0%)

Public schools: 135 schools (84.4%)

RESULT 2 Multi-level analysis for smoking behaviors among students during last 30days

< Boys >

parameter	estimate	S. E..	t	p-value	95% C. I.	
					lower	upper
Grade (1grade up)	0.025	0.002	15.033	< 0.01	0.021	0.028
Alcohol drinking during last 30 days	0.202	0.010	19.987	< 0.01	0.182	0.223
Public school (private=0, public=1)	−0.007	0.020	−0.356	0.72	−0.047	0.033
Education against smoking	−0.022	0.021	−1.041	0.30	−0.064	0.020
Interaction factor (public × Edu. Smoking)	0.033	0.022	1.487	0.14	−0.011	0.077

< Girls >

parameter	estimate	S. E..	t	p-value	95% C. I.	
					lower	upper
Grade (1grade up)	0.010	0.001	7.726	< 0.01	0.007	0.012
Alcohol drinking during last 30 days	0.148	0.009	16.741	< 0.01	0.130	0.165
Public school (private=0, public=1)	−0.029	0.015	−1.959	0.05	−0.058	0.000
Education against smoking	−0.038	0.016	−2.330	0.02	−0.069	−0.006
Interaction factor (public × Edu. Smoking	0.036	0.017	2.136	0.03	0.003	0.070

Note) Dependent variable: Smoking during last 30 days

RESULT 3 Multi-level analysis for smoking experiences in student's life

< Boys >

parameter	estimate	S. E..	t	p-value	95% C. I.	
					lower	upper
Grade (1grade up)	0.035	0.002	15.550	< 0.01	0.031	0.040
Alcohol drinking in his life	0.275	0.010	27.759	< 0.01	0.256	0.295
Public school (private=0, public=1)	0.010	0.030	0.331	0.74	−0.049	0.069
Education against smoking	−0.036	0.031	−1.142	0.25	−0.097	0.026
Interaction factor (public × Edu. Smoking)	0.042	0.033	1.296	0.20	−0.022	0.107

< Girls >

parameter	estimate	S. E..	t	p-value	95% C. I.	
					lower	upper
Grade (1grade up)	0.018	0.002	8.932	< 0.01	0.014	0.022
Alcohol drinking in her life	0.216	0.010	21.149	< 0.01	0.196	0.236
Public school (private=0, public=1)	−0.054	0.025	−2.128	0.04	−0.103	−0.004
Education against smoking	−0.055	0.027	−2.037	0.04	−0.109	−0.002
Interaction factor (public × Edu. Smoking	0.076	0.029	2.645	0.01	0.019	0.133

Note) Dependent variable: Smoking during in student's life

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.

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