# Topics: Recent topics in public health in Japan 2023

### < Review >

# Preventing tobacco use among young adults has significant implications for public health in the future

TANO Rumi 1), HIRANO Tomoyasu 2)

#### Abstract

Even though the age of adulthood was lowered in Japan in April 2022, the minimal age of legal access (MLA) for tobacco products is maintained at 20 years, because the earlier the age of smoking initiation, the more likely one is at risk for tobacco-related diseases such as cancer and cardiovascular disease and the higher the risk of premature death and individuals with younger age of smoking initiation are considered more likely to have difficulty quitting cigarettes. The smoking prevalence among junior and senior high school students has significantly decreased, whereas that among those in their 20s are high, and the downward trend of smoking prevalence is slow. In contrast to the dramatic drop of smoking prevalence of junior and senior high school students, the downward trend is not significant.

Smokers have been reported to have a combination of lifestyle disorders, such as an unbalanced diet and lack of physical activity, compared with nonsmokers. Given that the smoking behavior and attitudes of family members, friends, and others around smokers may be related to the smoking behavior of young people, it seems important to avoid smoking and showing cigarettes around children as a countermeasure against social factors.

In Japan, the minimum age of adulthood and the MLA have been separated by this revision of the Civil Code. Considering the adverse health effects, raising the age from 20 years old to higher age should be considered a public health policy option. Comprehensive tobacco prevention and control programs should reduce the number of smokers and incidence of tobacco-related diseases and deaths.

*keywords*: smoking initiation, young adults, tobacco products, raising the minimum age of legal access (accepted for publication, December 21, 2022)

#### I. Introduction

In April 2022, the age of adulthood was lowered in Japan. For approximately 140 years, from the Meiji Era to today, the age of majority in Japan was set by the Civil Code at 20 years of age [1]. This Civil Code was amended, and the age of majority changed from 20 to 18 years on April 1, 2022 [1].

Recently, the voting age for the referendum on the revision of the Constitution and the voting age for the Public Offices Election Law have been set at 18 years, and policies have been promoted to treat 18- and 19-year-old persons as

adults regarding decisions on important matters in national politics. On the basis of this policy, it has been argued that it is appropriate to treat persons 18 years of age or older as adults in the Civil Code, the basic law concerning civil life. Worldwide, it has become common to set the age of majority at 18 years, and lowering the age of majority to 18 years is considered respecting the right of self-determination of young people aged 18 and 19 years and encouraging their active participation in society.

Conversely, even if the age of majority under the Civil Code is lowered to 18 years, the minimal age of legal access

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(MLA) for tobacco and alcohol products is maintained at 20 years [2]. The age limit for public sports (horse, bicycle, auto, and motorboat racing) was also maintained at 20 years. These age limits are to be maintained as they were in the past because of concerns about health hazards and measures against gambling addiction [2, 3].

This paper aims to summarize the health hazards related to smoking among those less than 20 years of age, the current state of public awareness regarding smoking, and issues related to smoking among young people and to provide reference and information for the formulation of health promotion plans and public health policy studies.

## II. Smoking Initiation Age and Health Effects

There are reports indicating that developing cells are susceptible and adversely affected by carcinogens or develop atherosclerotic lesions, and a causal relationship between smoking and symptoms of cough, phlegm, shortness of breath, and decreased respiratory function has been confirmed in underage smokers [4]. Additionally, domestic and international studies have shown that the earlier the age of initiation of smoking, the more likely one is at risk of tobacco-related diseases, such as cancer and cardiovascular disease, and the higher the risk of premature death (Figure 1) [5, 6].

It has already been shown that the risk of cancer, especially lung cancer, varies greatly with the number of cigarettes smoked per day as well as the smoking years. Therefore, because the risk of lung cancer at a given age increases with the number of cigarettes smoked during

one's lifetime, i.e., the number of cigarettes smoked per day and the number of years the person has smoked the risk is expected to increase for those who started smoking early in their lives.

As shown in Figure 2, the risk of dying from lung cancer between the ages of 55 and 64 years is higher for those who smoke 21 to 30 cigarettes per day than for those who smoke 10 to 21 cigarettes per day, and in both cases, the earlier the age at which smoking starts, the higher the risk. In all cases, the health risk increases the earlier the age of initiation of smoking [7].

It has been reported that the risk of lung cancer deaths is approximately twice as high when smoking is initiated at less than 15 years of age than when it is initiated between 20 and 24 years of age [7].

# III. Age of Smoking Initiation and Intensity of Nicotine Dependence

An analysis of the intensity of nicotine dependence by age of habitual smoking initiation reports that the younger the age that one starts smoking, the more dependent one becomes. Those who started smoking in their teens are more dependent on nicotine than those who started smoking in their 20s, and those who started in their 20s are more dependent than those who started smoking in their 30s (Figure 3, left) [8]. A higher percentage of people are highly dependent on nicotine: among those who began smoking in their 30s or older, less than 30% have a dependence score of 9 or higher, whereas among those who began smoking in their teens, more than 50% have a score of 9 or higher

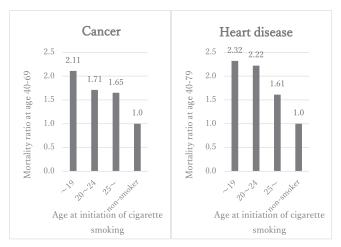


Figure 1 Cancer and heart disease death rates by age at initiation of cigarette smoking [5, 6]

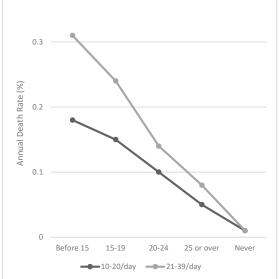
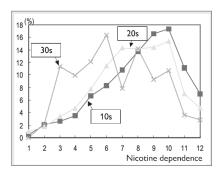


Figure 2 Relationship between age at starting regular cigarette smoking and lung cancer death rates at 55-64 years in US men [7]



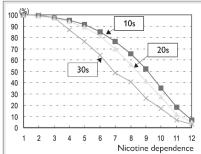


Figure 3 Nicotine dependence of current smokers by age of habitual smoking initiation

(Figure 3, right) [8]. Those who began smoking at a younger age are considered more likely to have more difficulty quitting cigarettes.

The figure on the right shows the percentage of people who have a dependency ratio of n points or more. The pink line represents the dependence level of those who initiated smoking in their teens, the yellow line represents those who initiated smoking in their 20s, and the blue line represents those who initiated smoking in their 30s or older [8].

#### IV. Smoking Prevalence on a Downward Trend

The smoking prevalence for men continues to decline but is still 27.1% in 2019, according to the most recent National Health and Nutrition Survey [9]. The smoking prevalence for women has leveled off to a slight downward trend, hovering at approximately 10%, and was 7.6% in 2019 (Figure 4) [9]. The combined smoking prevalence for men and women has been declining over the last 50 years but has recently shown a downward trend.

The definition of current smokers is the combination of

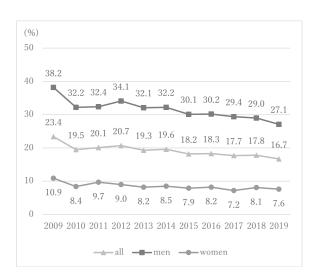


Figure 4 Annual trend in the smoking prevalence of current smokers (over 20 years old)

daily and occasional smokers. Prior to 2011, the definition was different [9].

The National Health Promotion Campaign, Healthy Japan 21 (second phase), set a target to reduce the smoking prevalence from 19.5% in 2013 (the base year) to 12% by 2022. However, in 2019, the most recent year of the survey, the smoking prevalence was 16.7%, a decrease of only 2.8% from the base year, making it difficult to achieve the numerical target at this rate [10].

The draft of the final report also states, "Since no high-impact measures have been implemented to reduce the smoking prevalence, the smoking prevalence has decreased by only 2.8% from the baseline, and it will be difficult to achieve the target of 12% at this rate. Further measures based on the Framework Convention on Tobacco Control will be required in the future." The report is rated as "very good" [10].

Recently, heated tobacco products (HTPs) such as IQOS, glo, and ploomTECH have become common. HTPs are used by more than 20% of smokers. The use of HTPs is particularly high among young smokers, reaching approximately 40% among men and 50% among women in their 20s and 30s [9].

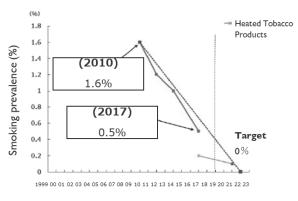
The appearance and spread of HTPs may be one of the reasons why smoking prevalence has been rapidly trending downward, and the appearance and rapid spread of HTPs represent a new threat to tobacco control.

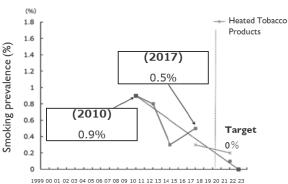
Under the second phase of Health Japan 21, the goal is to eliminate smoking among minors (0%) by 2022 by promoting efforts to improve lifestyle and social environment through a 10-year National Health Promotion Campaign.

In contrast, the Draft Final Evaluation Report of Health Japan 21 (second stage) states that "B: Target has not been reached, but is improving" and in part "B\*: Improvement is being made, but the achievement of the target by FY2022 is in jeopardy" [10]. The final evaluation report (draft) states that "B: Target has not been reached but is improving" and in some cases "B\* improving, but achievement of target by FY2022 is doubtful." In 2021, the smoking prevalence

# 1st-year junior high school boys

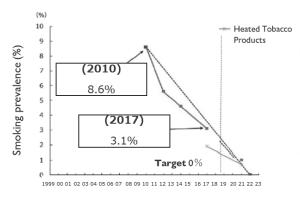
# 1st-year junior high school girls





# 3rd-year high school boys

# 3rd-year high school girls



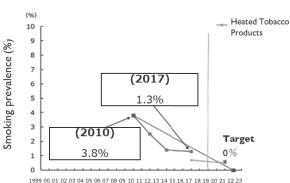


Figure 5 Recent trends of percentage of respondents who have smoked among junior and senior high school students

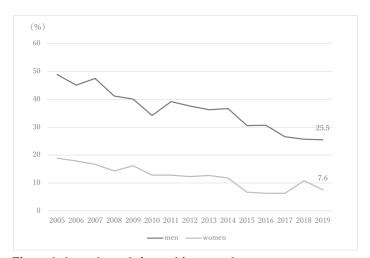


Figure 6 Annual trends in smoking prevalence among young people in their 20s [9]

among junior and senior high school students was 0.1% for first-year junior high school boys (Figure 5, top left), 0.1% for first-year junior high school girls (Figure 5, top right), 1.0% for third-year high school boys (Figure 5, bottom left),

and 0.6% for third-year high school girls (Figure 5, bottom right) [10]. The smoking prevalence among junior and senior high school students in 2010, when the target was set, was 1.6% for first-year junior high school boys, 0.9% for

first-year junior high school girls, 8.6% for third-year high school boys, and 3.8% for third-year high school girls, a significant decrease [10].

Conversely, smoking prevalence among those in their 20s is high, and its downward trend is slow: in 2019, the smoking prevalence among men and women in their 20s was 25.5% and 7.6%, respectively (Figure 6), a rate similar to the overall adult smoking prevalence rate (Figure 4) [9]. In contrast to the dramatic drop for middle and high school students, the downward trend for 20s is not significant.

It will be necessary to explore smoking behavior and its influential factors during this period, when smoking prevalence is low among middle and high school students but jumps among those their 20s, and to consider countermeasures.

#### V. Tobacco Sales Volume

Cigarette sales volumes have been on a downward trend since peaking in 1996, falling from 343.8 billion cigarettes per year in 1996 to less than half, 155.7 billion cigarettes, in the most recent year, 2019. In 2019, cigarettes accounted for 24% of tobacco products (sum of cigarettes and HTPs) (Figure 7) [11]. The downward trend in the sales volume of tobacco products, which includes both cigarettes and HTPs, has not changed significantly and is thus far considered a shift among tobacco products.

Excerpted from the report of the Council on Fiscal Institutions, Ministry of Finance, Japan [11]. Sales of HTPs began in 2012, but data were not taken prior to 2017.

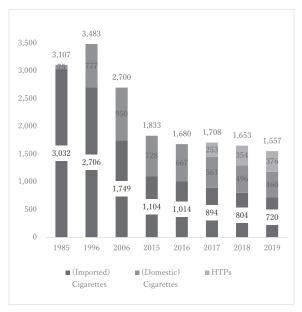


Figure 7 Trend of annual sales volume of cigarettes and HTPs

#### VI. Smoking Behavior among Young Adults

Smoking behavior among young people, including minors, is shaped by the interaction of personal and social factors. Not only personal factors such as knowledge, attitudes, confidence in one's own abilities, communication skills, and ability to manage stress possessed by the individual but also social factors such as the smoking status of family, friends, and others around them; the status of smoking restrictions; and the availability of cigarettes are relevant. To prevent smoking among young people, it is necessary not only to spread knowledge about the health hazards of smoking through antismoking education but also to create a social environment that makes a tobacco-free society the norm [4].

The sale of cigarettes to persons under 20 years of age is prohibited, and measures such as age verification at the time of sale are mandatory. Vending machines have introduced "taspo," an integrated circuit (IC) card for adult identification, and convenience stores have introduced age verification buttons [4]. In elementary, junior high, and high school education, guidance on the prevention of smoking, drinking, and drug abuse has been provided through health and physical education, moral education, integrated studies, and special activities [12]. The number of juvenile delinquents caught smoking has also been greatly reduced. In 2020, the number of juvenile delinquents arrested for smoking was less than one-third of the number in 2011 [13]. Thus, measures for minors are steadily and surely having an effect. In the future, efforts targeting young adults from high school graduation to those in their 20s are required.

To live life in good health, it is important to have a good lifestyle starting in your 20s. Smokers are susceptible not only to various diseases but also to other lifestyle problems. They are more likely than nonsmokers to have lifestyle problems such as poor diet and lack of physical activity. They have been reported to have a combination of lifestyle disorders, such as poor diet and physical inactivity, compared with nonsmokers [14]. Specifically, compared with nonsmokers, they are 2.5 times more likely to miss breakfast, 1.3 times more likely to be inactive, 2.3 times more likely to drink 40g alcohol or more, and 2.2 times more likely to intake highly salt [14].

Knowledge about the age of smoking initiation is not common. In a questionnaire that asked respondents to select what they knew about the effects of a low age of smoking initiation, even the most common response, "A low starting age for smoking increases the number of years smoked," was selected by 44.9% of respondents, less than half of the total (Figure 8) [15]. This was followed by 42.9% for "A lower age of smoking initiation increases the risk of disease," 40.7% for "A lower age of smoking initiation

increases nicotine dependence," 36.3% for "A lower age of smoking initiation increases the number of cigarettes smoked in later life," and 29.5% for "A lower age of smoking initiation increases the risk of early life" [15].

Another 29.9% responded "I don't know anything in particular," indicating that there is no significant widespread awareness among the public about the health risks associated with a younger age of smoking initiation. It is an important issue to spread awareness of the relationship between age of smoking initiation and health effects, especially among younger people [15].

When compared by smoking status, there were no major differences in perceptions for many items, but differences were seen in risk perceptions of disease and early life. Particularly, compared with 44.1% of nonsmokers, 35.8% of smokers perceived that "a younger age at which smoking starts increases the risk of disease." Also, smokers' perception of risk was higher than that of nonsmokers, with 24.2% of smokers and 27.4% of nonsmokers saying that "a younger age at which smoking starts increases the risk of premature deaths" [15].

It has been reported that the largest factor influencing

intention to smoke as an adult or prediction of one's future smoking behavior is the prediction of smoking behavior at age 20 years, followed by adult male attitudes toward smoking, gender, number of smokers in the family, and knowledge of the acute effects of smoking. The question of whether or not a person "wanted/thought of smoking cigarettes" at age 20 years, when smoking is legally allowed, is associated with subsequent smoking behavior.

In the 2022 survey, when those currently aged 20 years or older were asked whether they wanted to smoke cigarettes when they turned 20 years old, 27.3% of the respondents answered, "When I turned 20, I wanted to smoke cigarettes" and 59.7% responded that they "did not want to try smoking cigarettes when I turned 20" (Figure 9) [15].

Investigating whether respondents wanted to smoke cigarettes when they turned 20 years old, most smokers (61.3%) said they wanted to smoke cigarettes when they turned 20 years old, whereas 14.3% said they did not want to smoke cigarettes when they turned 20 years old (Figure 9) [15]. Most of the nonsmokers did not want to smoke cigarettes at the age of 20 years. Conversely, among nonsmokers, only 20.5% said they "wanted to smoke cigarettes

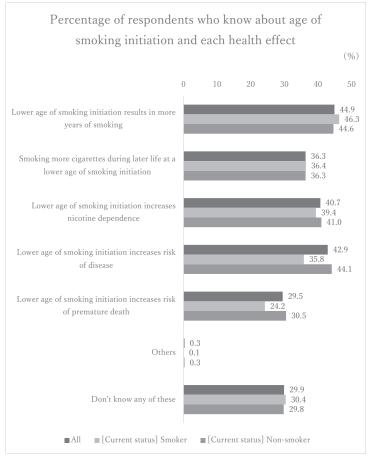


Figure 8 Knowledge about adverse health effects and the age of smoking initiation [15]

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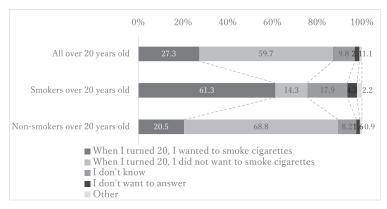


Figure 9 Responses to survey results on whether they wanted to smoke cigarettes when they turned 20 years old [15]

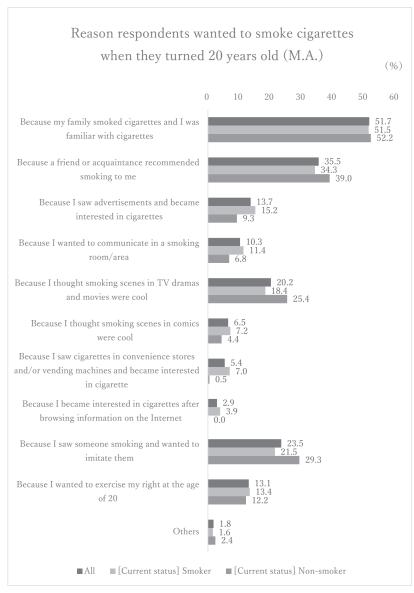


Figure 10 Responses to survey questions regarding the reason for wanting to smoke cigarettes (respondents who wanted to smoke cigarettes when they turned  $20~{\rm years~old}$ )

when I turned 20," and the majority, 68.8%, said they "did not want to smoke cigarettes when I turned 20" [15]. This suggests that there is a causal relationship between the intention to smoke at age 20 years and future smoking behavior. It is important to prevent people from thinking "I want to smoke cigarettes when I turn 20 years old," and therefore, antismoking education for minors and improvement of the social environment are required.

The most common reason given for wanting to smoke when they turned 20 years old was "Because my family smoked and cigarettes were around me," followed by "Because a friend or acquaintance recommended it," "Because I saw someone smoking and wanted to imitate them," and "Because I saw an actor smoking in a TV drama or movie and wanted to imitate him or her." Conversely, the most common answer was "because I was familiar with cigarettes." However, the percentages of "because I want to exercise the rights that come with turning 20" and "because I was interested in cigarettes after seeing cigarette advertisements" were not so high [15].

Nonsmokers were more likely to answer, "because I saw actors smoking in TV dramas and movies and thought it was cool" and "because I saw people smoking and wanted to imitate them," whereas nonsmokers were more likely to answer, "because I saw cigarette advertisements and was interested in cigarettes" and "because I saw cigarettes on display at convenience stores and vending machines and was interested in cigarettes." However, smokers tended to be more likely to respond, "because I was interested in cigarettes when I saw cigarettes on display or in vending machines at convenience stores" and "because I was interested in cigarettes when I saw information on the Internet" (Figure 10) [15].

Given that the smoking behavior and attitudes of family members, friends, and others around them may be related to the smoking behavior of young people, it seems important to avoid smoking and showing cigarettes around children as a countermeasure against social factors.

#### VII. Future Issues and Countermeasures

Young adults into emerging adulthood are in an age of more independence and exploring various life possibilities. Detailed research on and the study and implementation of smoking countermeasures are required.

In some countries and regions, the minimum age for smoking has been raised. Some countries are also aiming to change the law to ban smoking throughout the child's life. In Japan, raising the smoking age from 20 years should be considered one of the measures to be taken.

Singapore, the US state of Hawaii, and some other coun-

tries have raised the minimum legal smoking age from 18 to 21 years [16, 17]. In New Zealand, a bill is being proposed to raise this age continuously so that children will no longer be able to smoke as adults [18]. A committee in the US FDA concluded that raising the nationwide MLA for tobacco products would likely immediately improve the health of adolescents and young adults by reducing the number of those with adverse physiological effects such as increased inflammation and impaired immune functioning caused by smoking, as these effects could potentially lead to negative health consequences, including increased hospitalizations and lessened capacity to heal wounds. Adverse maternal, fetal, and infant outcomes - including preterm births, low birth weight, and sudden infant death – would also probably decrease because of reduced tobacco exposure in mothers and infants [19]. Raising the MLA will also lessen the population's exposure to secondhand smoke and its associated health effects, both at present and in the future. According to the Institute of Medicine projects of the Centers for Disease Control and Prevention, US Department of Health & Human Services, if the age of sale was raise at present to 21 years nationwide, then "there would be approximately 223,000 fewer premature deaths, 50,000 fewer deaths from lung cancer, and 4.2 million fewer years of life lost for those born between 2000 and 2019" [19].

In Japan, the minimum age of adulthood and MLA have been separated by this revision of the Civil Code [1-3]. Considering the health effects, raising the age to 20 years should be considered a public health policy option. As shown in the description of Figure 3, it is believed that those initiating smoking in their 30s and older would be less dependent on nicotine and were more likely to quit smoking early. Tobacco prevention and control activities are a public health "best buy." Evidence-based, nationwide tobacco control programs that are comprehensive, sustainable, and accountable have been shown to reduce the number of smokers and incidence of tobacco-related diseases and deaths [19].

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### <総説>

# 若年層のたばこ使用の防止による公衆衛生の意義

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#### 抄録

日本では2022年4月に成人年齢が引き下げられたにもかかわらず、法的にたばこ製品が購入可能で 喫煙できる最低年齢(MLA; Minimum age of Legal Access)は、20歳で維持された。これは、喫煙開始 年齢が早いほど、がんや循環器疾患などのたばこ関連疾患のリスクが高く、早世リスクが高いこと、および喫煙開始年齢が若い人ほどたばこをやめにくくなることが理由の一つとされている。厚生労働 科学研究費補助金の研究班による調査によると中高生の喫煙率は大幅に減少しているが、国民健康栄養調査などによる20代の喫煙率は依然として高い。中高生の喫煙率が劇的に低下しているのとは対照的に、その低下傾向は顕著ではない。

喫煙者は非喫煙者に比べて、偏った食事や運動不足などの生活習慣の乱れを併せ持つことが報告されている。また、若年喫煙者の周囲の家族、友人などの喫煙行動が、若年成人世代の喫煙開始に関係していると見られることを考えると、社会的要因への環境改善対策として、子どもの周囲で喫煙する機会、子どもが身近にたばこを目にする機会をなくしていくことが重要となる。

今回の民法改正で成人年齢(18歳)とMLA(20歳)が分離され、18歳で成人しても法的に喫煙できない年齢層が生じることとなった。たばこの健康への悪影響の大きさを考えたとき、喫煙は20歳のままで良いのか。現在のMLAを20歳から引き上げる必要があるのかを考える必要があるのではないか、外国では、MLAを引き上げる事例も報告されている。わが国においても、MLAの引き上げは公衆衛生政策の選択肢として考えるべきではないか。MLA引き上げを含めた包括的なたばこ予防・管理プログラムにより、喫煙者数、たばこ関連疾患および死亡の発生が減少することは明らかである。

キーワード: 喫煙開始, 若年層, たばこ製品, 喫煙可能最低年齢の引き下げ