



## Challenges and opportunities for greater tobacco control in Japan

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### ABSTRACT

Japan is a high tobacco burden country with over 20 million smokers in 2017. Tobacco control measures in Japan has been criticised as largely inadequate and ineffective despite ratifying the World Health Organization's Framework Convention on Tobacco Control in 2004. Numerous factors such as pro-tobacco legislators, regulatory oversight of the primary Japanese tobacco company from the Ministry of Finance and industry interference on the policy-making process in Japan have prevented aggressive tobacco control efforts. Given the intricate challenges in Japan, it is important to develop feasible and effective smoking cessation strategies. In this paper, we have analysed the trends in tobacco prices, sale and smoking prevalence, major tobacco/smoking policies and some of the industry-related challenges that have prevented the development of effective tobacco control measures in Japan. We have emphasised the need for stronger implementation of the World Health Organization's Framework Convention on Tobacco Control and its MPOWER policy package and to separate the tobacco industry from the tobacco control policymaking process to promote cessation and abstinence from smoking and better sensitisation against exposure to second-hand smoke.

### Introduction

Japan was the fifth largest tobacco-consuming country globally with > 20 million adult smokers in 2017 (Japan Tobacco Inc., 2017a). Tobacco smoking caused 11% of deaths in 2016 (Institute for Health Metrics & Evaluation, 2016) and is the single largest cause of death from non-communicable diseases and injuries in Japan (Ikeda et al., 2012). Japan has one of the worst smoking-related death rates in the world (118 vs. 85 deaths globally per 10,000 people) (Institute for Health Metrics & Evaluation, 2016). Cigarettes accounted for 99.5% of all tobacco products sold in Japan in 2015 (National Tax Agency, 2015).

Despite ratifying the World Health Organization's Framework Convention on Tobacco Control (WHO-FCTC) in 2004, tobacco control in Japan have been criticised as largely inadequate (Sato, 1999; Sobue, 2017; K. Yamada et al., 2015). An analysis of WHO's MPOWER (Monitoring, Protect, Offer, Warn, Enforcement and Raise) policy implementation in Japan highlighted an urgent need to raise cigarette prices to increase cessation, develop a multi-component cessation programme, implement effective measure to protect from second-hand smoke (SHS) and rebuild the administrative structure to denormalise tobacco industry activities (Katanoda et al., 2014). In 2017 WHO report

on the global tobacco epidemic, Japan received poor ratings for smoke-free policy, health warnings on cigarette packages, anti-tobacco campaigns in mass media and bans on advertising, promotion and sponsorship (WHO, 2017).

Numerous local factors, mainly political, legislative and industry structure such as pro-tobacco legislators, regulatory oversight of the primary Japanese tobacco company from the Ministry of Finance (MOF) and industry interference in the policy-making process have prevented aggressive anti-tobacco movement as seen and successively implemented in other high-tobacco burden countries such as the Philippines (Department of Health & the Philippine Statistics Authority, 2015). In this commentary, we have argued that tobacco industry-government interaction is a key barrier to the development of effective tobacco control measures in Japan. We have also argued that the price of cigarettes is very low for a high-income country and is easily accessible to substantially discourage smoking and that the tobacco surveillance data lacks consistency and reliability.

### Tobacco control policies and legislation in Japan

Due to the growing international and local pressure, Japan has slowly managed to implement some policy changes in the past two

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decades (Supplementary Table 1). The most recent policy is the Health Japan 21 under the Ministry of Health, Labour and Welfare (MHLW) that aims to promote a healthy lifestyle in Japan, including reducing tobacco use (Supplementary Table 1) (MHLW, 2012a, 2008). This policy also aims to curb exposure to SHS at home, workplace and restaurants as mandated by Article 8 of the WHO-FCTC (WHO, 2003).

The Health Promotion Act (2002), MHLW's Directive to Prefectural Undersecretaries (2003), Health Service Bureau notification (2010) and the Industrial Safety and Health Act (2014) does provide legal foundation to prevent exposure to SHS at work and public place (Supplementary Table 1) (Government of Japan, 2016b, Aman & Sato, 2003; Government of Japan, 2002; Tobacco Control Laws, 2017). However, these policies leave large discretionary powers to the organisations and carry little or no penalty for violations preventing effective implementation. For example, the Health Promotion Act was Japan's first and only major legislation that attempted to curb smoking in public places such as streets, hotels, restaurants and workplaces (MHLW, 2012b). This law requires the caretaker or manager of public facilities to merely try to (*tsutomeru*) take some measures to prevent exposure to SHS with no strict guidelines (MHLW, 2003). Similarly, the recently amended Industrial Safety and Health Act only require managers to “make an endeavour” to prevent exposure to SHS at the workplace (Supplementary Table 1).

Further, the policy on package labelling and display of health warnings on tobacco packaging are extremely weak to substantially discourage smoking in Japan compared to other countries such as the U.S, Canada, Australia, Thailand and Malaysia that have enacted legislation in accordance to Article 11 of the WHO-FCTC (Packaging and labelling of tobacco products) (Bekki, Inaba, & Kunugita, 2015). Current policies in Japan only regulate statements “to avoid confusion among consumers” (Supplementary Table 1) (Tobacco Control Laws, 2017). These policies partly adhere to Article 11 of WHO-FCTC but do not enforce Article 11.1.b that mandates the display of health warnings on the package in the form of pictures/pictograms that are large, clear, visible, legible and occupy at least 30% of the display area (WHO, 2003).

Furthermore, tobacco control efforts are impeded by inadequate restrictions on tobacco advertising (Supplementary Table 1). The MOF's guidelines of 2004 on advertisements concerning tobacco restricts excessively widespread and aggressive advertising of tobacco products and emphasise prevention of advertising to minors but does not ban tobacco advertising (Supplementary Table 1). While article 13 of WHO-FCTC mandates a comprehensive ban of all tobacco advertising, promotion and sponsorship, it does provide provisions to signatory parties that are unable to undertake a comprehensive ban due to its constitutional principles to apply strong restrictions on all tobacco advertising, promotion and sponsorship (WHO, 2003).

Japanese government adopted a new tobacco buying system in 2009 and raised the tax on tobacco in 2010 as a result of WHO-FCTC (MHLW, 2003). Concerns have been raised about Japan's stand during the drafting of the historic FCTC. Negotiations to develop the FCTC were based on consensus and all countries were required to agree on the lowest acceptable common denominator in clause development. Japan's success in arguing for extensive optional language (e.g. “appropriate”, “may”, “according to national law”, etc) has seriously weakened the FCTC (Assunta & Chapman, 2006). Further, a survey of nationally representative Japanese respondents showed low public trust in government policies on banning smoking by minors and tax on tobacco that likely also reduces political support for the policies (Nakayachi & Cvetkovich, 2010).

## Challenges for better tobacco control measures in Japan

### *The relationship between the Japanese tobacco industry and the government*

Japan's tobacco problem is strongly linked with the history of the

tobacco industry. After the Meiji Restoration in 1868, taxation on tobacco became one of the most important sources of revenue for the government. Subsequently, leaf cultivation was monopolized in 1898 and tobacco manufacturing in 1905 after enacting the tobacco monopoly law (*Tabaco sembai ho*) under the jurisdiction of the MOF (M. Levin, 1997; Sato, 1999). This monopoly system remained essentially unchanged in pre-war and wartime Japan (M. Levin, 1997). In 1949, the Japan Public Monopoly Law No. 101, very similar to the 1905 monopoly law, established the Japan Public Monopoly Corporation under the supervision of the MOF which subsequently became the Japan Tobacco and Salt Public Corporation (JTSPC; *Nippon Senbai Kōsha*) (M. Levin, 1997; Sato, 1999). However, this had a negligible effect on MOF's influence on the tobacco business (M. Levin, 1997). JTSPC evolved into Japan Tobacco Incorporated (JT; *Nihon Tabaco Sangyo Kabushiki Gaisya*) in 1985 but remained under the supervision of the National Treasury Bureau in the MOF which is its major shareholder (Sato, 1999; Yorifuji, Tanihara, Takao, & Kawachi, 2011). The MOF's regulatory oversight of JT was evident by the fact that three out of five Presidents of JT since the 1985 privatisation were people who had been senior administrators at the MOF and both organizations have been exchanging their young employees for short-term postings to maintain a strong organisational relationship (M. Levin, 1997). Currently, JT deals in 60% share of domestic cigarettes (Japan Tobacco Inc., 2017b) and is the only company that is allowed to produce cigarettes in Japan (Government of Japan, 2016a).

Over the years, JT has also been involved in high profile lawsuits in Japan (M. Levin, 2016). In the 1998 Tokyo tobacco-related diseases lawsuit (*Tokyo Tabaco-Byo Sosyo*), seven plaintiffs, who had previously been heavy smokers, sued the Japanese government and JT for health damages from JT cigarettes they smoked (Tokyo District Court, 2006). This lawsuit was important as it was the first time ex-smokers legally challenged JT for health damage and the Japanese government for liability to control JT and failure to implement strict legislation on cigarettes (Tokyo District Court, 2006). The plaintiffs also demanded a ban on the sale of cigarettes through vending machines, a comprehensive ban on advertising through mass-media and promotion of public and sports events and more stringent warning labels printed on cigarette boxes. The Supreme Court of Japan announced its final verdict in 2005 after two appeals, rejecting all arguments. The verdict added that cigarettes alone could not be held liable for the diseases when other factors such as residential environment were not eliminated as confounding factors in tobacco-related diseases. Importantly, the judgement conceded that cigarettes were socially accepted luxury items with lower addictive profile than other drugs that disrupt normal lives (Tokyo District Court, 2006). In another landmark case, three ex-smokers challenged JT and the government in Yokohama local court in 2005 using similar arguments as the Tokyo tobacco-related diseases lawsuit (Katayama, 2010). Although the claims of the plaintiffs were rejected in 2012, the judgement stressed that the addictive properties of cigarettes cannot be ignored and the way to produce and sell cigarettes should be discussed nationwide and decided in the National Diet (Tokyo High Court, 2010). Another high-profile case where Mr Koichi Yasui, a non-smoker taxi driver, filed a case against JT in 2008 for health damages due to years of exposure to SHS while driving a taxi in the Tokyo metropolitan area was struck down by Tokyo District court in 2013, the High court in 2014 and the Supreme court in 2015 (M. Levin, 2016). Surprisingly, the High court reverberated JT's long-standing view on the lack of evidence linking passive smoking with diseases, endorsing highly controversial research (Iida & Proctor, 2018; M. Levin, 2016).

JT has been criticised for indirectly influencing some of these lawsuits. For example, the primary expert witness for the Tokyo tobacco-related diseases lawsuit was a recipient of research grants from the Smoking Research Foundation, an industry body established under the MOF with over 90% sponsorship from JT (Iida & Proctor, 2004, 2018). The tobacco industry and JT, in particular, have also been criticised for

distortion of scientific data through affiliate researchers and research institutions (Bialous, Mochizuki-Kobayashi, & Stillman, 2006; Iida & Proctor, 2004, 2018; Yano, 2005).

Naturally, the biggest hurdle in bringing about positive policy changes in Japan is the active involvement of the government, particularly the MOF, in the tobacco business through its regulatory oversight of the tobacco industry. Additionally, the enactment of tobacco control policies is adversely affected by the involvement of Japan's political parties with the tobacco industry. The Liberal Democratic Party (LDP; *Jimintou*), the ruling party in Japan, has been in power since 2012. Within the LDP are a group of pro-tobacco legislators popularly known as LDP tobacco parliamentary group (自民たばこ議員連盟; *Jimin Tabaco Giin Renmei*), which consists of about 280 representatives. Unfortunately, the list of members has not been disclosed since 2014 (子どもに無煙環境を推進協議会 / 日本禁煙学会FCTC監視委員会プロジェクト [Smokeless environment for children promotion council / Japan smoking council-FCTC Monitoring Committee], 2017). LDP has reportedly received 105 million Japanese yen (JPY; 861,000 United States dollars (USD) in 2015) as campaign contributions from the tobacco industry between 2010–2015 (Nogami, 2017). Many members of the association have also received private contributions from the tobacco industry and producers (子どもに無煙環境を推進協議会 / 日本禁煙学会FCTC監視委員会プロジェクト [Smokeless environment for children promotion council / Japan smoking council-FCTC Monitoring Committee], 2017). The association aims to protect the livelihood of tobacco sellers, preventing them from becoming small-scale and to contribute to Japanese economic growth and development activity by increasing the revenue from the tobacco industry (Noda Takeshi Official Website (2019)). Additionally, enjoying smoking is considered to be a part of the right to self-determination which is guaranteed by the constitution (Noda Takeshi Official Website (2019)).

However, the economic outcomes of the tobacco industry and the right to self-determination will have to weigh in along with the loss of life and human productivity as a direct result of tobacco-induced death and disability and the resulting loss of revenue. Studies in Japanese adults have shown that current smokers have significantly higher absenteeism, activity impairment, overall work impairment, work productivity loss costs and indirect costs than never smokers (Suwa et al., 2017). Smoking cessation was also shown to reverse most of the economic and health burden of former smokers (Suwa et al., 2017). This is particularly significant in Japan where the job market is already stretched due to labour shortage (Ganelli & Miake, 2015). Smoking also significantly contributes to the national economic burden. The estimated total cost of smoking was over JPY6.3 trillion in 2005 (USD61.4 billion in 2005) (Institute of Health Economics & Policy, 2010).

### Industry interference in policymaking

There have been numerous instances of the tobacco industry's interference in the policymaking process. For example, JT helped Minato and Chiyoda wards in Tokyo establish designated smoking areas (DSA) and was able to successfully lobby Chiyoda ward to change the slogan of its local ordinance on street-smoking ban – “From manners to rules” to “From manners to rules. Then to manners” (Kashiwabara & Armada, 2013). Furthermore, JT has been actively involved in setting up DSA in association with municipalities and businesses nationwide (Japan Tobacco Inc., 2016). In its recent report on health effects of smoking, the MHLW also notes the ineffectiveness of policymakers to prevent interference from the tobacco industry and recognises this as a major barrier to the implementation of FCTC guidelines (MHLW, 2016a). The hospitality industry, in particular, is known to strongly advocate against tobacco control legislation along with the tobacco industry by arguing that the complete ban on smoking in hotels and restaurants will have a devastating economic impact (Kashiwabara, Armada, & Yoshimi, 2011; K. Yamada et al., 2015). In the past, the tobacco and hospitality industries have successfully managed to derail efforts to enact SHS

prevention ordinances in at least 3 prefectures—Osaka, Kyoto and Yamagata (MHLW, 2016a). As of June 2018, only 2 prefectures, Hyogo and Kanagawa and a handful of small cities and city wards have local ordinances to curb SHS (MHLW, 2016a).

The Japanese hospitality establishments, especially traditionally-operated facilities, may also be less compliant with tobacco control measures. A cross-sectional survey in 2009 showed that over 72% of the modern-style hotels provided non-smoking rooms compared with only about 21% of the traditional-style hotels in Hokkaido prefecture (Kitada, Hata, & Ukae, 2011). Even fewer hotels provided smoke-free restaurants (56.4% modern and 41.8% traditional), cafes (29% modern and 17.3% traditional) and lobby (46.3% modern and 26.1% traditional) areas (Kitada et al., 2011). Moreover, only 53% of the modern-style hotels and about 29% of the traditional-style hotels in Hokkaido implemented some tobacco control measure within 1 year of enacting the Health Promotion Law and 70% of modern-style hotels and 50% of traditional-style hotels took action within 3 years of the enactment (Kitada et al., 2011). A recent study among adult Japanese e-cigarette users showed that approximately 26%–29% had ever used and 16%–19% had frequently used e-cigarettes in restaurants and/or workplaces where combustible tobacco smoking was banned (Kiyohara & Tabuchi, 2017) also suggests that such facilities are vulnerable to poor implementation of tobacco control policies.

Research conducted in a major Japanese restaurant chain suggests that prohibition of smoking outside of the DSA increased restaurant sales, while the separation of the smoking zone did not (Yamato, Ohta, & Nakamura, 2014). This may be a good incentive for restaurants to provide DSA but with lack of standardised policy on DSA as discussed in the subsequent section, this method, now being increasingly common in Japan, is unlikely to provide effective protection against SHS.

### Policy on protection from exposure to SHS and DSA

In 2017, about 20 million Japanese adults were exposed to SHS at home, 14 million were exposed at restaurants, 14 million at medical facilities, 12 million at workplaces and 9 million at public offices, the greater proportion being women (MHLW, 2018). SHS is an established cause of premature death, heart disease, respiratory diseases and several types of cancer (Barnoya & Navas-Acien, 2013; Hori, Tanaka, Wakai, Sasazuki, & Katanoda, 2016). A large study that enrolled 36,021 never-smoking Japanese women between 1983–1985 and followed-up for 15 years, suggests that exposure to SHS at home during adulthood is associated with an increased risk of stroke if living with smoking family members (Nishino et al., 2014). Furthermore, several studies provide consistent evidence for increased risk of asthma, allergic rhinitis, sudden infant death syndrome, low birth weight, decreased head circumference, respiratory infections, otitis media, childhood cancer, hearing loss, dental caries and metabolic syndrome in addition to adverse cognitive and behavioural outcomes in children exposed to SHS (Hur, Liang, & Lin, 2014; Tinuoye, Pell, & Mackay, 2013; Zhou et al., 2014).

In order to protect non-smokers from SHS, WHO-FCTC's Article 8 mandates member countries to “protect citizens from exposure to tobacco smoke in workplaces, public transport and indoor public places” (WHO, 2003). Article 8 implementation guidelines also state that the total elimination of smoking and tobacco smoke in all indoor/outdoor public places and workplaces are effective measures (WHO, 2003). Japan has not yet fully implemented Article 8 of the FCTC and the promotion of SHS prevention has largely depended on voluntary efforts from the tobacco industry (K. Yamada et al., 2015; Yamato, 2013). In 2014, the Industry Safety and Health Act was partially revised to prevent exposure to SHS. However, the revised act did not cover small-scale businesses such as restaurants and pubs and the prescribed DSA was found to be ineffective in reducing the exposure compared to 100% smoke-free environments (Yamato, Jiang, & Ohta, 2015).

Relatively loose policy on DSA is partly to blame for the continued

high exposure to SHS in public places in Japan. Most existing outdoor smoking bans allow DSAs in the no-smoking zones. Although opponents of the prohibition on public smoking promote separation of smokers and non-smokers, ventilation system, air cleaning and filtration, current evidence indicates that they are all ineffective in protecting from SHS exposure (Barnoya & Navas-Acien, 2013). Earlier research in Kobe city (Hyogo prefecture) has demonstrated that DSA is a source of SHS in zones where a street-smoking ban is in force and SHS spreads widely, both vertically and horizontally thereby strongly limiting protection (Yamato et al., 2013). Clearly, stronger policy on DSA that meets adequate standards or complete elimination of DSA from places where smoking bans are in force will be required if protection against SHS is to be effective.

Nevertheless, progress has been made in protecting certain populations from SHS. For example, a prospective cohort study involving 420 pregnant women in Amagasaki city in Hyogo prefecture showed decreased exposure of pregnant passive smokers and non-smokers to tobacco smoke (Higashida & Ohashi, 2014). Additionally, the numbers of cigarettes smoked by persons close to the passive smokers were also much lower suggesting that the harmful effects of SHS to the foetus during pregnancy was effectively communicated (Higashida & Ohashi, 2014). Furthermore, the prevalence of SHS exposure in infants also declined from 2001 to 2010 (Saito et al., 2015). However, most exposures occurred for infants in the lowest socioeconomic group and with fathers who smoked indoors (Saito et al., 2015).

#### Ban industry's corporate social responsibility activities

Japan also lacks a clear policy to limit corporate social responsibility activities which are often seen to promote tobacco smoking and underplay the health effects of smoking. The tobacco industry has frequently made strategies to exploit the culturally accentuated public manners in Japan such as emphasis on cleanliness and avoiding inconveniences to others to promote smoking (Kashiwabara & Armada, 2013). An example is the use of “manners strategies” since the 1960s by the tobacco industry in collaboration with local governments and companies to promote smoking manners to wider audiences through its advertising and corporate social responsibility activities (Kashiwabara & Armada, 2013). These strategies are particularly tactful in Japan to increase the social acceptability of smoking given the cultural value placed on manners (Kashiwabara & Armada, 2013). A specific case was that of RJ Reynolds where industry documents revealed marketing plans based upon their cultural assumptions of Japanese people being particular about hygiene and manners and with relatively high eagerness to try new products (Assunta & Chapman, 2004). RJ Reynolds also found that there was a growing concern for health, the environment and smokers were conscious of annoying others (Assunta & Chapman, 2004). RJ Reynolds used these cultural values and concerns to market their Salem Pianissimo brand, a “clean” cigarette with less smell and smoke (Assunta & Chapman, 2004). Menthol-flavoured Salem Pianissimo labelled to contain 1 mg tar and 0.1 mg nicotine, specifically targeted women as menthol cigarettes were popular among 18–24-year-old female smokers despite Japanese law prohibiting those < 20 years to smoke and the tobacco industry's voluntary code disallowing advertising to women and youth (Assunta & Chapman, 2004). It is noteworthy that, despite decreasing smoking prevalence in all age groups amongst males (Supplementary Fig. 1A), the change is less consistent across different age groups in females (Supplementary Fig. 1B) (Japan Tobacco Inc., 2017a). Smoking prevalence has increased, particularly in the 40–49 and 50–59 age groups, in women since the early 1990s.

As indicated in previous sections, there have been some local ordinances that aim to restrict street-smoking. Local ordinances are enacted by local assemblies and given legal forces within the region unless they are against law. In 2002, Chiyoda ward in central Tokyo became the first local self-governing body to pass an ordinance banning smoking while walking in some areas (Chiyoda Ward (Tokyo) (2002)).

In 2016, 6,856 people were fined (JPY2000 or USD16) for violating this ordinance (Chiyoda Ward (Tokyo) (2017)). Subsequently, 243 cities and wards such as Fukuoka city, Kyoto city and Minato ward in Tokyo enacted similar local rules (Ryosuke, 2017). However, except one ordinance by Minato ward that has an absolute ban on outdoor smoking (Ryosuke, 2017), these rules allow smoking on the streets if the smoker has an ashtray or is not walking while smoking, thus emphasising this as a cleanliness and beautification policy rather than a public health policy.

This emphasis of local anti-smoking ordinances on cleanliness and beautification rather than on public health has indeed attracted numerous criticisms. Analysis of 112 municipalities enforcing municipal smoking restrictions on streets in Japan revealed that 95% of the municipalities prohibiting street smoking did so only in a small proportion of streets (Ueda, Armada, Kashiwabara, & Yoshimi, 2011). It has been argued that street smoking bans are being used as a strategy by the tobacco industry to hold off indoor bans as the number of cigarettes forgone because of street smoking bans would be incomparably smaller than would be caused by indoor bans, including those in bars and restaurants (Chapman, 2009). The media's role further hinders the implementation of local anti-tobacco ordinances and in the past Japanese media have criticised local anti-smoking campaigns as “fascism” (Gohma, 2001).

The tobacco industry, including JT, continue to research and file patents on newer ways to reduced smoke constituents or quantity of smoke emitted by cigarettes, improved smoke odour and reduced visibility of smoke to reduce negative perceptions of cigarette smoke (Kennedy, Millstein, Rees, & Connolly, 2013). Japan has been slow in implementing Articles 9 and 10 of WHO-FCTC that regulate contents of tobacco products and promote disclosure on ingredients of cigarettes and regulations on additives that soften odour such as menthol as well as addictive smoke components such as nicotine and tar (Inaba, Uchiyama, & Kunugita, 2015).

#### Addressing issues with cigarette vending machines

Japan is one of the most tobacco accessible countries in the world with easy access and relatively low prices (Desapriya, Iwase, & Shimizu, 2003; Sobue, 2017; Tabuchi et al., 2016). Cigarettes can be purchased from widely spread convenience stores, dedicated tobacco vendors and cigarette vending machines. As of 2017, there were 55,176 convenience stores and 193,300 tobacco vending machines in Japan (Japan Franchise Association, 2017; Japan Vending System Manufacturers Association, 2016). Concerns have been raised about the relatively easy access to cigarettes for youths particularly through cigarette vending machines in Japan. The current RFID-enabled electronic age verification system for cigarette vending machines (Taspo cards) introduced in 2008 are largely ineffective (M. A. Levin, 2000; MHLW, 2016a). In a survey conducted in 2008 among Japanese high school students, as the amount smoked increased, the prevalence of purchasing cigarettes from vending machines also rose for both males and females (Kanda, Osaki, Ohida, Kaneita, & Munezawa, 2011). Somebody outside of family was the top source of obtaining Taspo cards (Kanda et al., 2011). Surprisingly, around 5% of males and females from the highest smoking group applied for Taspo cards themselves despite a ban on smoking below 20 years of age (Kanda et al., 2011). Earlier research has also shown that vending machines are the primary source of cigarettes for high school students (Osaki et al., 2006). The proportion of smokers who usually purchased cigarettes from vending machines increased in 2000, in spite of the limitations on night-time operations since 1998 which ironically was implemented to restrict under-age smoking (Osaki et al., 2006). Incidentally, the prevalence of smoking among girls increased in 2000 and adolescent market share of menthol brands has increased rapidly (Osaki et al., 2006). Menthol cigarettes are particularly popular amongst young and female smokers in Japan (Connolly, Behm, Osaki, & Wayne, 2011) and as discussed above, menthol cigarettes have been

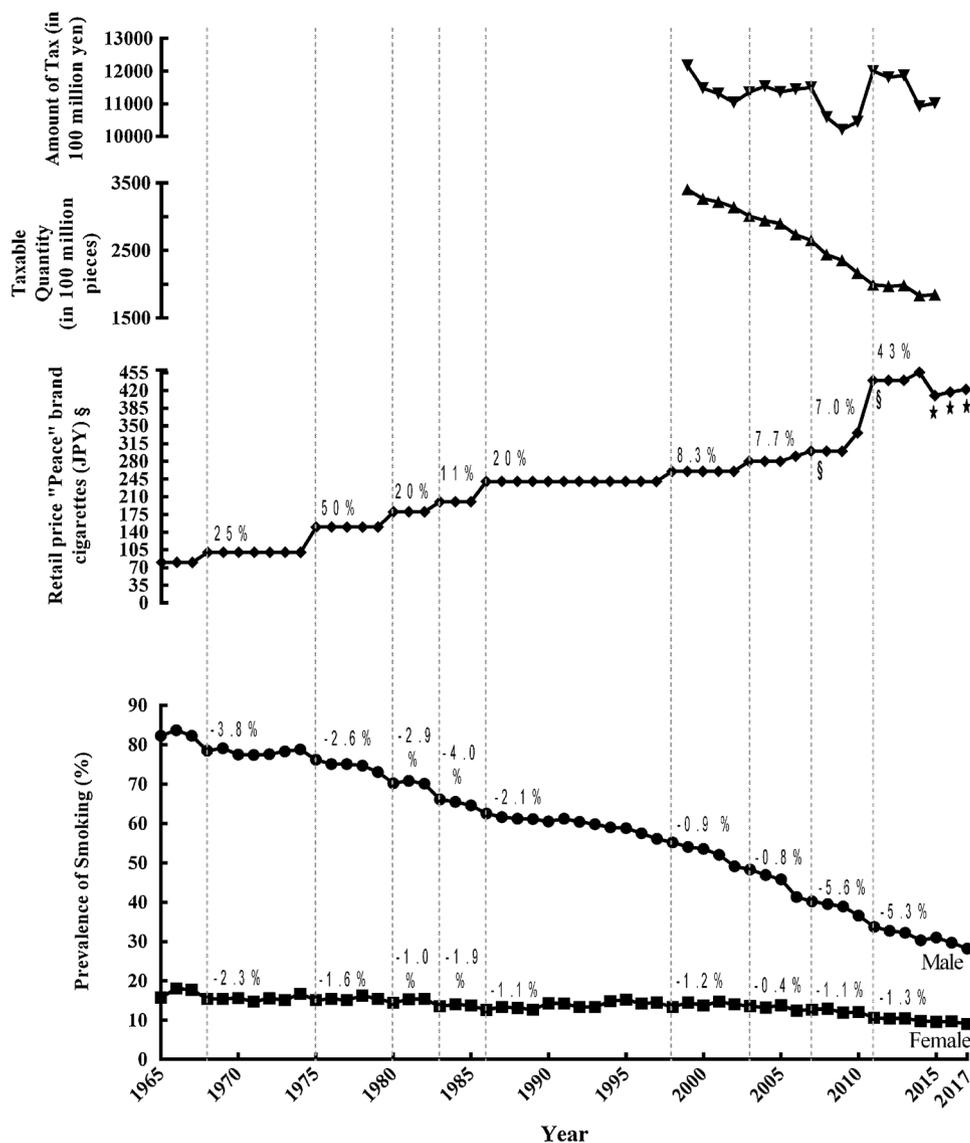


Fig. 1. Prevalence of tobacco smokers in Japan between 1965 and 2017 (by gender)(Japan Tobacco Inc., 2017a) alongside the retail price of cigarettes (pack of 20, domestic “Peace” brand) (Japan Statistics Bureau, Retail price survey (2019a), 2019b), sale and tax revenue from tobacco (2004, 2010, 2015). Timepoints with a major increase in tobacco prices are highlighted with dotted lines along with the percentage increase in price with corresponding percentage decrease in male and female smoking prevalence. For reference, the average annual decrease in smoking prevalence is -1.0% for males and -0.1% in females.

§The percentage increase in price and corresponding percentage decrease in smoking prevalence for 2007 and 2011 also included the previous year (2006 and 2011 respectively) data as the price increase overlapped over 2 years in these cases.

\*The price of cigarettes between 1965–2014 are reported for “Peace” brand which is a domestic cigarette brand as this was the only brand whose price has been reported every year in the retail price survey (Japan Statistics Bureau, Retail price survey Japan Statistics Bureau, Retail price survey (2019a), 2019b). However, since 2015, cigarette prices are only reported under two classifications “domestic brands” and “imported brands” with no disclosure on which brands were included in the survey.

specifically marketed to the young female population. Also, using convenience store daily was a significant factor associated with smoking among high school students, especially those attending part-time high schools that are usually attended by academically and socioeconomically disadvantaged youth (Watanabe et al., 2013).

**Increasing tobacco price**

Japan imposed a special tobacco tax from December 1998 with substantial hikes in 2003, 2006 and 2010 (Fig. 1) (Ito & Nakamura, 2013; Tabuchi et al., 2016; Tabuchi, Fujiwara, & Shinozaki, 2017). Although there has been a steady decline in the sale of cigarettes based on the number of taxable cigarettes sold in Japan since 2000, tax revenue has increased, particularly since 2010 due to a 37% hike in tobacco taxes (Fig. 1) (National Tax Agency, 2004, 2010, 2015). However, all three recent tax increases reduced the number of taxable cigarettes sold (Fig. 1). The increases in tobacco taxes have also produced a notable increase in cigarette prices (Fig. 1). Cigarette prices have been increased six times between 1965 and 2003. Importantly, each increase in cigarette price since 1965 has produced a notable decrease in the prevalence of smoking in both male and female population (Fig. 1). Despite this positive effect of increasing tobacco prices, 28.2% of males and 9% of females were active smokers in 2017 (Fig. 1)

(Japan Tobacco Inc., 2017a).

Tobacco prices in Japan remain quite low and affordable, especially for a developed, high-income nation (MHLW, 2016a). As of 2017, a standard pack of 20 cigarettes is priced in the range of JPY430–460 which is equivalent to USD3.8–4.1. There is ample evidence in Japan, including the prevalence trends shown in Fig. 1, to suggest that further increases in tobacco prices will significantly discourage tobacco use. Increase in tobacco taxes in 2003, 2006 and 2010 reduced tobacco sales by -2.4%, -2.9%, and -10.1% respectively (Ito & Nakamura, 2013). A recent national survey of individuals aged 50–59 years showed that of all the factors assessed, only tobacco price increase in 2010 was significantly associated with both cessations among smokers and prevention of relapse among quitters between 2005–2012 especially in the lowest income, recent quitters and very poor health sub-groups (Tabuchi et al., 2017). Another recent study that followed 2702 smokers for assessment of their cessation status after the 2010 tobacco price increase showed that overall cessation rates significantly increased from 2007 to 2010, from 3.7% to 10.7% in men and from 9.9% to 16.3% in women (Tabuchi et al., 2016).

Studies have also shown that price is negatively associated with smoking and that the effect of price is greater on smokers with lower nicotine dependence (Goto, Nishimura, & Ida, 2007). Further, it was estimated that an increase in the price of a pack of cigarettes from

JPY300 (USD2.58) to JPY500 (USD4.45) in 2006 would have reduced the number of smokers with low-moderate nicotine dependency by 50% (Goto et al., 2007). Given that smokers with low-moderate nicotine dependency account for around 80% of smokers (Goto et al., 2007) this would have been a big impact.

### Anti-smoking campaigns and ban on tobacco advertisements

As discussed in section 4, Japan has not been able to fully implement Articles 11 and 13 of WHO-FCTC that deals with packaging and labelling of tobacco products and restrictions on tobacco advertising, respectively. In 2016, Japan ranked 123 worldwide on display of warning label on cigarette package based on the presence of pictorial warning and the average size of front/back warning label (Canadian Cancer Society, 2016).

Numerous FCTC Article 11 requirements including warning label, pictorial use of adverse health effects, better visibility of warning labels and content implying reduced harm to be omitted are not required by Japanese guidelines (Katanoda et al., 2014). Current warning labels on cigarettes are included in Japanese languages as front and back labels explicitly warn about the adverse effects of smoking on minors (Katanoda et al., 2014). However, the key issue remains that despite decreasing trends, the male population has a very high prevalence of smoking and women aged 40–59 show an increasing prevalence of smoking in Japan (Supplementary Fig. 1B). Interestingly, numerous studies in Japanese adults have shown that increasing the knowledge of health risk of smoking along with higher cigarette prices is an effective anti-smoking strategy (Goto et al., 2007; Goto, Takahashi, & Ida, 2011; Tanihara & Momose, 2015). Other factors such as body aesthetics such as skin tone may be more effective particularly in younger women, as having a lighter skin tone is highly valued by many Asian women (Tamai et al., 2014). A 2003–2006 survey of Japanese women aged 20–74 in Gifu prefecture suggested that current smokers had higher melanin indices and erythema than never-smokers and former smokers and this was positively associated with the number of cigarettes smoked per day, the years of smoking and pack-years (Tamai et al., 2014). Clearly, better implementation of Article 11 highlighting the adverse effects of smoking in adults is timely in Japan with evidence to support the likelihood of its success. Given the increasing prevalence in certain women age groups, health warning and labels relevant to women on cigarettes specifically targeting women consumers are warranted.

The guidelines on advertisements concerning tobacco of 2004 outline the requirements for tobacco advertising including promotion and sponsorships of events in Japan (Supplementary Table 1). The restrictions mandated by these guidelines are largely voluntary in nature and similar to the warning on cigarette packaging, strongly emphasise the prevention of advertisements specifically targeting minors (Supplementary Table 1). As a result, advertisements in public, mass media, as well as sponsorships of sports and social events, remains very prevalent in Japan (Katanoda et al., 2014; MHLW, 2016a).

### Need for standardised tobacco monitoring programs

Although Japan received a top rating for monitoring in the 2017 WHO assessment on the implementation of MPOWER policy, lack of consistency and industry-sourced prevalence data limit the reliability and usefulness of the prevalence data. The prevalence data presented in Fig. 1 is provided by the tobacco industry (JT Survey)(Japan Tobacco Inc., 2017a). The MHLW also provide prevalence data from the annual national health and nutrition surveys. However, it has changed the definition of “current habitual smoker” at least three times since 2006 which makes the study of long-term smoking prevalence trends challenging (MHLW, 2016b). Between 2006–2010, a current habitual smoker was defined as a person who smoked at least 100 cigarettes or had been smoking for more than 6 months prior to the survey. In 2011 and 2012, current habitual smoker only included people who reported

smoking every day or few days every week in the last month. However, since 2013, all those who reportedly smoke every day or a few days every week (removed last month criteria) were categorised as current habitual smokers.

Further, limited data is available for underage smoking. An MHLW report in 2014 suggests that smoking experience rate and prevalence of daily/non-daily smokers have been declining since 1996 in both male and female adolescents (Supplementary figure 2) (MHLW, 2014). However, the data for underage smoking only includes students attending year 1–3 of junior high and high school and does not include out-of-school adolescents.

One of the important issues that the prevalence data does not emphasise is the exposure to SHS. Although the national health and nutrition survey has been providing data on SHS prevalence since 2003, the lack of consistency poses a major challenge to reliably interpret the data. Firstly, data on SHS were not reported in 2014, 2012, 2009, 2007, 2006, 2005 and 2004. Secondly, the location of SHS exposure varies by year. In 2016 and 2015, SHS exposure was reported from home, workplace, restaurants, administrative agencies, medical institutions, public transport, playgrounds and outdoor spaces used by children such as parks and school roads. However, reports prior to 2013 only included data from home, workplace, restaurants, playgrounds, administrative agencies, medical institutions and others. Thirdly, SHS exposure data from younger age groups has not been reported except in 2003 and 2008 where reports included data from 15-19-year age group for certain locations. The number of children exposed to SHS is currently not available in Japan. Therefore, in addition to urgently formulating policy on reducing exposure to SHS, Japan needs to set-up a standardised surveillance program as mandated by Article 20 of WHO-FCTC to better identify populations vulnerable to exposure to SHS. It is critical that the exposure to SHS in people < 20 years of age is comprehensively assessed due to the vulnerability of this population to SHS.

To help improve tobacco monitoring and control policies, WHO presented the framework for Global Tobacco Surveillance System (GTSS) within the MPOWER policy package in 2008 which provided standardized tobacco monitoring surveys including the Global Youth and Global Adult Tobacco Surveys (WHO, 2008). Unfortunately, GTSS has not yet been implemented in Japan. These surveys will have at least three distinct advantages. Firstly, the survey will provide a more accurate and independent estimate of the prevalence of smoking and the number of individuals, including adolescents, exposed to SHS at home, work or public places. Secondly, these surveys are designed to reflect the effects of policy pertaining to tobacco advertising and tobacco control measures in both adolescents and adults. Thirdly, GTSS will allow the comparison of Japanese trends and the impact of its policies internationally.

### Conclusion

Although Japan has seen a tremendous decline in the number of smokers over the past 5 decades, much work needs to be done to reduce the burden of tobacco. Greater emphasis has to be given to addressing female smokers, particularly those aged > 40 due to the increasing prevalence and those exposed to SHS in future policy efforts. In fact, the guiding principles of WHO-FCTC (Article 4) require the signatory parties to address gender-specific risks when developing national/regional tobacco control strategies (WHO, 2003).

The key challenge for Japan in implementing effective tobacco control policies is the high interaction between political parties, government and the tobacco industry. This has been even more evident in the past few years. In 2017, the Government of Japan planned on introducing a blanket ban on indoor smoking with the view of the 2020 Tokyo Olympics (Reuters, 2017). However, this policy was fiercely opposed by pro-tobacco legislators, restaurant owners and JT fearing the impact on revenue and the policy was not deliberated in the National Diet (Reuters, 2017; Tsugawa, Hashimoto, Tabuchi, & Shibuya,

2017; T. Yamada & Ryosuke, 2017).

In January 2018, the MHLW announced a draft proposal to amend the Health Promotion Act to ban smoking in public places (Taizou, 2017). This proposal was vastly different from the one that the MHLW made public in 2017. The earlier proposal of the MHLW required all restaurant, cafes and bars, except those less than 30 m<sup>2</sup>, to set up exclusive smoking rooms where no food or drink will be served (Taizou, 2017). In the January 2018 proposal, the 30 m<sup>2</sup> criteria was changed to 100 m<sup>2</sup>, the same as the LDP's counterproposal, but added other conditions such as being under private management with an annual capital of less than JPY50 million to be exempted from the ban (Taizou, 2017). The proposal was finally approved by LDP in February 2018 (Kyodo News, 2018). Although this will be the first national law which prohibits smoking in hospitals, schools, universities and public offices, it greatly lacks on regulating indoor smoking in restaurants.

Given prior records of tobacco control policies in Japan, policy formulation at sub-national levels to limit the exposure to SHS may face fewer barriers than national endeavours as discussed above. Until May 2018, the Kanazawa ordinance and the Hyogo ordinance, both discussed in preceding sections, were the only tobacco control policy that specifically aimed to prevent the exposure to SHS in public places. In June 2018, the Tokyo metropolitan government passed its long-anticipated passive smoking ordinance (Ryuya & Yoshikazu, 2018a). It prohibits smoking on school grounds, indoor smoking in universities, medical institution and government offices (Ryuya & Yoshikazu, 2018a; Tokyo Metropolitan Government, 2018). Importantly, the Tokyo ordinance is stronger than both Kanazawa and Hyogo ordinances and the national law being considered by the government in terms of the restriction placed on restaurants (Ryuya & Yoshikazu, 2018b). The Tokyo ordinance uniformly obliges all restaurants that hire any employees to prohibit indoor smoking except is DSA and by this criterion, it can cover 84% of pubs, bars and restaurants in the Tokyo metropolitan area. However, similar to the earlier sub-national ordinances, industry influence was evident in this case as well. After objections from JT and the food service industry, the Tokyo ordinance allows smoking of heated cigarettes but not burned cigarettes in restaurants that have smoking rooms where food is served (Japan Tobacco Inc., 2018a; 2018b, Ryuya & Yoshikazu, 2018b).

In addition to relatively fewer barriers, albeit industry influence, in enacting tobacco control policies at sub-national levels, research from within Japan have shown that strict tobacco control laws if implemented at the sub-national level, may be effective in decreasing smoking prevalence. Higher prefectural compliance with tobacco control laws from 2001 to 2007, was associated with decreased prevalence of smoking and consequently lower lung cancer mortality (Yorifuji et al., 2011). Prefectures involved in growing tobacco exhibited lower levels of compliance with national tobacco control laws and therefore also exhibited the worst improvement in smoking prevalence (Yorifuji et al., 2011). Another nationwide survey of health promotion sections of 3,207 municipalities showed that complete smoke-free school policy was significantly more likely to be implemented in municipalities in which tobacco control had a high priority among health promotion activities (Kayaba, Wakabayashi, Kunisawa, Shinmura, & Yanagawa, 2005).

Therefore, strict implementation of anti-tobacco policy and also making this a high priority of the local government will be essential to restrict tobacco use in Japan. Great efforts have to be made to separate the tobacco industry from the policymaking process to have a positive impact on public health. More rigorous implementation of the WHO-FCTC is necessary in Japan particularly concerning exposure to SHS, tobacco advertising and health warnings on tobacco packages.

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#### Appendix A. Supplementary data

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