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### Special Issue:

### Progress of Tobacco Control in the Western Pacific Region

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# CONTENTS

APJCP, Volume 21, Suppl. 1, 2020

<b>Editorial:</b>	<b>Page 1</b>
<i>Building Momentum for Tobacco Control in the Western Pacific Region</i> <b>Vinayak Prasad, Julliane Moira Sy</b>	
<b>Perspective:</b>	
Making Strides Together against Tobacco Use <b>Takeshi Kasai</b>	<b>Page 3</b>
<b>Correspondence:</b>	
<i>Improving Information to Enable Effective Tobacco Control Intervention .....</i> <b>James Rarick, They Kheam, Yel Daravuth</b>	
<b>Review:</b>	<b>Page 5</b>
<i>Investing in Tobacco Control: Twelve Years of MPOWER Measures and Progress .....</i> <b>Katia De Pinho Campos, Mina Kashiwabara, Ashlee Teakle</b>	
<b>Original Article:</b>	
<i>Secondhand Smoke Exposure among Nonsmokers in China</i> <b>Lin Xiao, Yuan Jiang, Jingru Zhang</b>	<b>Page 9</b>
<b>Original Article:</b>	<b>Page 17</b>
<i>Tobacco Industry Fingerprints on Delaying Implementation of Pictorial.....</i> <b>Yen Lian Tan, Judith Mackay, Mary Assunta Kolandai</b>	
<b>Original Article</b>	
<i>Raising Tobacco Taxes: The Philippine Experience</i> <b>Jo-Ann L. Diosana</b>	<b>Page 23</b>
<b>Original Article</b>	
<i>Secondhand Tobacco Smoke Exposure in Indoor Workplaces.....</i> <b>Nguyen Tuan Lam, Pham Thi Quynh Nga, Mina Kashiwabara</b>	<b>Page 33</b>

## Building Momentum for Tobacco Control in the Western Pacific Region

Vinayak Prasad<sup>1\*</sup>, Julliane Moira Sy<sup>2</sup>

*Asian Pac J Cancer Prev*, 21, Progress of Tobacco Control in the Western Pacific Region Suppl, 1-2

The tobacco epidemic is a significant global public health threat, killing more than eight million people a year around the world. More than seven million of these deaths result from direct tobacco use, and around 1.2 million result from non-smokers being exposed to second-hand smoke. Around 80% of the 1.1 billion smokers worldwide live in low- and middle-income countries (LMICs), where the burden of tobacco-related illness and death is heaviest (WHO, 2019a).

Despite the challenges ahead for tobacco control, considerable progress has been made in reducing the demand for tobacco products. Global tobacco use is declining, notwithstanding population growth. The number of male tobacco users in the world is projected to decline from 2019 forwards, a trend that was increasing in previous years (WHO, 2019b). Progress is a result of effective measures to reduce the demand for tobacco at the country level. Since WHO introduced MPOWER (*Monitor tobacco use and prevention policies; Protect people from tobacco smoke; Offer to help quit tobacco use; Warn about the dangers of tobacco; Enforce bans on tobacco advertising, promotion and sponsorship; and Raise taxes on tobacco*) as a tool to help countries implement the WHO Framework Convention on Tobacco Control (WHO FCTC) demand reduction measures, five billion people are now covered by at least one MPOWER measure at the highest level of achievement. This represents about 65% of the world's population and a quadruple increase since MPOWER launched in 2007 (WHO, 2019c).

Although the average rate of tobacco use in the Western Pacific Region (WPR) is declining over time in accordance with global trends, the region is experiencing the slowest decline of all six WHO regions. There are 399 million current tobacco users in WPR. Tobacco use rates (approximately 26% prevalence overall, 49% among men, and 4% among women) are at the higher end of the range compared to other WHO regions. Around 12% of boys aged 13-15 and 4% of girls in the same age group are current tobacco users in WPR. The fact that nearly six million children use tobacco products at the young age of 13-15 is cause for concern; adolescence is a crucial age for initiation and addiction to tobacco use into adulthood. Additionally, tobacco industry marketing tactics around new and novel products can further complicate tobacco

control efforts and contribute to misinformation with respect to these products.

Tobacco data collection, which is the focus of this special supplement, plays a key role in understanding the magnitude, patterns, determinants and consequences of tobacco use and exposure. Good monitoring tracks the extent and character of the tobacco epidemic and indicates how best to tailor policies (WHO, 2019d). WHO assists LMICs in running surveys, and with a rise in prevalence of non-communicable diseases (NCDs), additional countries are interested in monitoring data on risk factors like tobacco use.

Half of the countries (14) in WPR monitor tobacco use by repeating nationally representative youth and adult surveys at least once every five years. Another twelve countries are partially monitoring, and one country has no representative surveys for adults or youth in the past five years. There is marked progress in efforts to reduce tobacco use at the country level. Five countries (Australia, Cambodia, Japan, New Zealand, Republic of Korea) are expected to achieve the 30% reduction in tobacco use target of the Global Action Plan for the Prevention and Control of Noncommunicable Diseases. On the other hand, three countries (Singapore, Solomon Islands, Tonga) are not expected to see any decline in tobacco use rates over the same period unless policies are strengthened.

The Western Pacific Region is a varied group of countries with different experiences of the tobacco epidemic. As emphasized in the WHO FCTC, concerted action in countries is the best response to the threat to health, wellbeing, economy (Goodchild et al., 2018) and environment posed by tobacco. Tobacco cultivation, production, distribution, consumption, and waste contribute to environmental damage, including deforestation, the use of fossil fuels, the dumping or leaking of waste products, and air pollution (WHO, 2017). Furthermore, tobacco is a sustainable development priority – the implementation of the WHO FCTC is recognized as one of the means to achieving the overall sustainable development health goal, and meeting the target of reducing one third of premature mortality from NCDs by 2030 (WHO, 2020a).

Tobacco use interferes with sustainable development because it causes long periods of ill health, diseases that are

<sup>1</sup>Route de Lausanne 341, Switzerland. <sup>2</sup>World Health Organization, Switzerland. \*For Correspondence: [prasadvi@who.int](mailto:prasadvi@who.int)

expensive to treat, and premature death. The total economic cost of smoking was estimated at US\$ 1.4 trillion, or 1.8% of the world's annual GDP, based on analyses assessing the total economic cost of smoking-attributable diseases in 152 countries, representing 97% of the world's smokers (Goodchild et al., 2018). The Addis Ababa Action Agenda of the Third International Conference on Financing for Development recognizes tobacco taxation (WHO FCTC Article 6) for its potential to improve health by reducing tobacco consumption, avert costs associated with tobacco use, and generate significant revenue for development financing (WHO, 2019d). Governments have used NCD investment cases, which outline national economic and political analyses of current and potential interventions to prevent and control NCDs, to campaign for stronger tobacco control legislation based on data quantifying the costs related to tobacco use (WHO, 2019d).

With the COVID-19 pandemic affecting many countries globally, now is an opportune time to reduce tobacco use. Tobacco smoking is a known risk factor for many respiratory infections and increases the severity of respiratory diseases. Tobacco use is a major risk factor for noncommunicable diseases like cardiovascular diseases, cancers, chronic respiratory diseases and diabetes which put people with these conditions at higher risk of increased severity of disease and death in hospitalized COVID-19 patients (WHO, 2020b).

The findings and lessons from this special supplement provide a welcome contribution to the progress made in global tobacco control and a testament to the efforts and dedication of countries across the Western Pacific Region to fighting the tobacco epidemic. Much can be learned from the Region's successes outlined in the six papers and I am optimistic that the countries in the Region will take concerted efforts to further accelerate the implementation of the WHO Framework Convention on Tobacco Control, and achieve their commitments under the Sustainable Development Goals.

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## Making Strides Together against Tobacco Use

**Takeshi Kasai\***

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In the Western Pacific Region, more than 3 million people die as a result of tobacco use every year. That's over 8000 people every day. Not only does tobacco use kill people prematurely, it exacerbates poverty, reduces economic productivity, and damages the environment. Tobacco is therefore not only a problem for health – it also threatens social and economic development. This must stop.

When countries came together to adopt the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) - the world's first international public health treaty - 17 years ago, they made a commitment to ending death and disease caused by the world's number one preventable killer. Following the adoption of this landmark treaty, WHO developed the MPOWER package – six evidence-based demand-reduction measures to support countries in implementing the WHO FCTC. Taking advantage of these powerful tools, countries have made important progress in the last decade, with two out of three countries and areas in the Region achieving measurable declines in smoking rates.

Data, in all its forms, is a powerful tool for tobacco control. In many countries, strong national surveillance mechanisms have been established to monitor both tobacco use and tobacco control measures at the population level, through standardized methods. Comparable data made available through these efforts helps to assess tobacco control issues and evaluate measures implemented over time and across countries. In turn, this facilitates the sharing of achievements and lessons learned in tobacco control at the country, regional and international level.

This special supplement highlights the power of data and the important role it plays in helping countries to better understand issues and progress in tobacco control. In this supplement, six papers are presented to showcase efforts by a number of Western Pacific countries and areas to combat tobacco use and further advance progress in the battle against it.

As the six articles show, countries and areas across the Western Pacific Region have made substantial progress on tobacco control. Slowly, we are turning the tide against this preventable killer and the industry which promotes it. We should savour these successes, and do everything we can to sustain the momentum. And crucially, the

critical role tobacco control plays in promoting social and economic development is now acknowledged more widely; the WHO FCTC is included in the Sustainable Development Goals which were unanimously adopted by all UN Member States in 2015.

However, we must not be complacent: there is still much to be done.

It is my hope that countries from around the Region will gain valuable insight from this supplement and be inspired to continue fighting against the world's deadliest epidemic. Together, we can and will beat tobacco.

# Improving Information to Enable Effective Tobacco Control Intervention and Measure Progress Over Time: The Cambodia Country Experience

James Rarick<sup>1,2</sup>, They Kheam<sup>3</sup>, Yel Daravuth<sup>4</sup>, Edouard Tursan d'Espaignet<sup>5</sup>, Mina Kashiwabara<sup>6\*</sup>, Chhea Chhordaphea<sup>7</sup>, Bungon Ritthiphakdee<sup>8,9</sup>

## Abstract

Tobacco is a leading cause of noncommunicable diseases (NCDs) which kill about 41 million people each year. Of these, 15 million die prematurely between the ages of 30 and 69 years, most of which occur in low- and middle-income countries (LMICs). The adoption of the Sustainable Development Goals and their targets under the 2030 Agenda for Sustainable Development provides a new impetus for countries to accelerate tobacco control efforts as they specifically call for strengthening implementation of the World Health Organization (WHO) Framework Convention on Tobacco Control and striving to achieve a one-third reduction in premature deaths from NCDs. While NCD prevention and control is a priority in the national strategic plans and policies for health in most countries in the Western Pacific Region, few have formally adopted a national target for reducing tobacco use. Article 20 of the WHO FCTC calls on all countries to improve tobacco surveillance to enable monitoring and evaluation of tobacco control efforts. The increase in timely and standardized comparable data presents new opportunities to set scientifically valid and achievable national indicators and targets for development and implementation of strong tobacco control measures. Cambodia is yet to establish national targets and full implementation of legislative measures. However, with strong tobacco surveillance mechanism in place, it can provide the country experience for a LMIC that has developed its own capacity to conduct periodic monitoring and surveillance of tobacco use and for using national data to advocate successfully for stronger tobacco control policies.

**Keywords:** Tobacco- noncommunicable diseases- primary prevention- health policy- public health surveillance

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## Introduction

Noncommunicable diseases (NCDs) kill about 41 million people each year, accounting for more than 70% of all deaths in the world. Fifteen million of these deaths occur prematurely between the ages of 30 and 69 years and 85% in low- and middle-income countries (LMICs) (WHO, 2018). Tobacco use, recognized as a leading cause of NCDs, alone kills more than 8 million people each year (Institute for Health Metrics and Evaluation, 2019).

The Government of Cambodia endorsed the 2030 Agenda for Sustainable Development in 2015. The adoption of the Sustainable Development Goals (SDGs) and their targets provides a new impetus for countries to accelerate tobacco control efforts. To implement the SDGs, countries have called for strengthening implementation of the World Health Organization (WHO) Framework

Convention on Tobacco Control (FCTC). Article 20 of the Convention calls on all countries to improve tobacco surveillance to enable monitoring and evaluation of tobacco control efforts (WHO, 2003).

To encourage comparability across countries, WHO, the US Centers for Disease Control and Prevention (CDC) and Canadian Public Health Association partnered to set up the Global Tobacco Surveillance System (GTSS) in 1998 (Global Tobacco Surveillance System Collaborating Group, 2006). The initial focus of the GTSS was on youth through the Global Youth Tobacco Survey. In 2008, WHO and CDC expanded the GTSS to include adults in the Global Adult Tobacco Survey (GATS) – a household survey of people aged 15 years and over (Palipudi et al, 2016). The GTSS surveys use a standard protocol for sample design, questionnaire, field implementation, data collection, aggregation, analysis and reporting of results.

<sup>1</sup>(Former) World Health Organization Representative Office in Cambodia, Phnom Penh, Cambodia. <sup>2</sup>(Current) MonEval International, Australia. <sup>3</sup>Director of Demographic Statistics Census and Survey Department, National Institute of Statistics, Phnom Penh, Cambodia. <sup>4</sup>World Health Organization Representative Office in Cambodia, Phnom Penh, Cambodia. <sup>5</sup>School of Rural Medicine, University of New England, Australia. <sup>6</sup>Division of Healthy Environments and Population, WHO Regional Office for the Western Pacific, Manila, Philippines. <sup>7</sup>National Center for Health Promotion, Ministry of Health, Phnom Penh, Cambodia. <sup>8</sup>(Former) South East Asia Tobacco Control Alliance (SEATCA), Bangkok, Thailand. <sup>9</sup>(Current) Global Centre for Good Governance in Tobacco Control, Pathumthani, Thailand. \*For Correspondence: kashiwabaram@who.int

In 2011, WHO and the US Centers for Disease Control and Prevention released the “Tobacco Questions for Surveys” (TQS) – a subset of questions from the Global Adult Tobacco Survey covering both tobacco use and tobacco control measures. The TQS has since increasingly been incorporated in part or in full into other survey systems, such as the WHO STEPwise multi-risk factor survey for noncommunicable diseases and the Demographic and Health Survey. The increase in timely and standardized comparable data presents new opportunities for all countries to develop and implement strong tobacco control measures, as well as setting scientifically valid and achievable national indicators and reduction targets.

While much progress in tobacco control surveillance has been made in all WHO regions, the information base needed for informed decision making is still relatively weak. There is an urgent need for countries to fund and implement regular populations-based surveys. Cambodia is one country in the WHO Western Pacific Region that has made substantial efforts over the past decade to improve its information base.

#### *Using data for policy development and intervention*

After Cambodia ratified the WHO FCTC in 2005, its first step was to assess the country’s strengths and weaknesses in relations to selected tobacco control demand reduction measures. This assessment, captured in the WHO Report on the Global Tobacco Epidemic, indicated that Cambodia had relatively weak measures such as a smoke-free laws covering only limited types of public places and no policy on tobacco advertising bans (WHO, 2008). Efforts to revise Cambodia’s tobacco control law began thereafter. There was, however, strong interference from the local and international tobacco industries to block development of stronger tobacco control measures (Southeast Asia Tobacco Control Alliance and Health Justice, 2015). Cambodia soon realized that it could not overcome this interference without better evidence to convince decision makers to take strong action.

#### *Development of new information*

Cambodia has been collecting adult tobacco use data since 2000 (Table 1). It undertook a Demographic Health Survey with questions on tobacco use in 2000, a smoking behavior survey in 2004, and a tobacco use and religious

beliefs survey in 2005/6. However, none of those surveys used standard validated questions and therefore produced limited information for decision making. Cambodia then conducted two Demographic and Health Surveys in 2010 and 2014. Those surveys contained information on tobacco prevalence but were limited to women aged 15–49 years of age and provided limited information on determinants of tobacco use that could inform tobacco reduction interventions.

To strengthen tobacco surveillance, the Government of Cambodia invested its own funds and expertise and also partnered with outside organizations such as South East Asia Tobacco Control Alliance (SEATCA), Loma Linda University and WHO for additional financial and technical resources. Through these partnerships, Cambodia carried out four national surveys which generated comprehensive data on tobacco epidemic in the country. Cambodia conducted its first NCD multi-risk factor survey, Cambodia STEPS Survey, in 2010, using globally standardized questions on NCD risk factors, with the nationally representative sample of men and women aged 25–64 years (University of Health Sciences and Ministry of Health, 2010). The STEPs survey at that time did not yet contain policy related questions. In 2011, Cambodia conducted its first National Adult Tobacco Survey of Cambodia (NATSC) which used globally standardized questions on tobacco use and demand reduction measures from GATS, and covered men and women aged 15 years and older (National Institute of Statistics, 2015). A repeat NATSC was carried out in 2014 (National Institute of Statistics, 2015). Cambodia also repeated the Cambodia STEPS survey in 2016, with an expanded age range of 18–69 compared to the first STEPS survey (University of Health Sciences and Ministry of Health, 2018). Despite the variance in the age ranges used in these surveys, the two NATSC and the two STEPS surveys, all using the standardized questions on tobacco use, provide comparable data for analyzing tobacco use trends for Cambodian adults over time.

The availability of comprehensive scientifically valid information collected from the NATSC and Cambodia STEPS surveys enabled the tobacco control community to effectively counter tobacco industry interference. These survey results were used to advocate for an increase in taxation on tobacco products, to mandate smoke-free

Table 1. National Adult Surveys that Included Tobacco Use Indicators and Reported Smoking Rates since 2000

Survey name	Year	Age	Current smoking	
			Male	Female
Cambodia STEPS Survey	2016	18-69	37.2	2.9
Demographic and Health Survey	2014	15-49	31.8*	2.3*
National Adult Tobacco Survey of Cambodia	2014	15+	32.9	2.4
National Adult Tobacco Survey of Cambodia	2011	15+	39.1	3.4
Cambodia STEPS Survey	2010	25-64	54.1	5.9
Demographic and Health Survey	2010	15-49	34.3	2.4
Demographic and Health Survey	2005	15-49	NA	3.6*
Smoking Behavior Survey	2004	15+	44.1	5.1
Demographic and Health Survey	2000	15-49	NA	10.5*

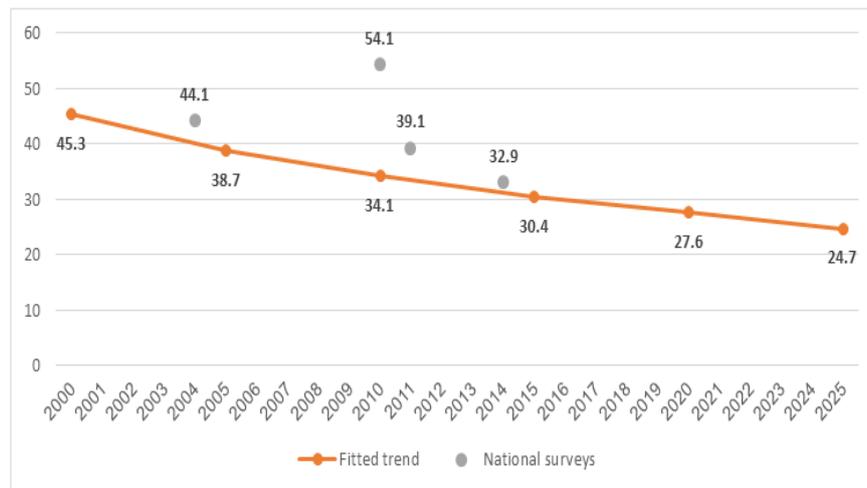


Figure 1. Fitted Trends in Current Tobacco Smoking among Men Aged  $\geq 15$  Years, Cambodia. Source: WHO global report on trends in prevalence of tobacco use 2000-2025, third edition.

public places, implement pictorial health warnings on tobacco packaging, and to strengthen measures to restrict tobacco advertising and promotion. The survey data also indicated public support for strong tobacco control policies. A related policy paper was presented to the Council of Ministers, the National Assembly, and the Senate. These efforts led to successful adoption of comprehensive tobacco control measures including the 2015 Tobacco Products Control Law.

#### *Taking the next step – Measuring progress over time*

WHO began reporting estimates of the prevalence of tobacco smoking for all countries in the first report on the global tobacco epidemic, in 2008 (WHO, 2008). As the GTSS has generated a greater quantity of standardized data from countries, this has enabled WHO to develop a statistical tool to produce observed and projected trends in tobacco use. WHO has published three editions of these trends in the WHO global report on trends in prevalence of tobacco use 2000-2025 which provides country-by-country analysis of trend projections in tobacco smoking (WHO, 2015; WHO, 2018; WHO, 2019b). WHO used all available Cambodia data (except for the 2016 Cambodia STEPs survey as results were not available at time of producing the trends) to generate an underlying tobacco smoking trend for Cambodia (Figure 1).

Based on the projections, Cambodia will not achieve the voluntary global target of 30% relative reduction of tobacco use between 2010 and 2025 with business as usual. This projection points to a need for more intensive tobacco control efforts to protect the health of Cambodians.

An important advantage of timely and regular tobacco surveillance data is that these provide Cambodian authorities and tobacco control partners with a capacity to project the impact of interventions on future tobacco use. This information can be a potentially powerful tool for engaging policy-makers and the general public in the process of setting national targets and agreeing on future action to reach those targets.

Partly as a result of improving its tobacco control surveillance systems, Cambodia has been able to adopt stronger tobacco control measures and has begun to develop its regulatory framework through the adoption of several sub-decrees relating to enforcement of the existing tobacco control laws. An additional benefit is that Cambodia has been designated as one of the world's first FCTC 2030 countries – selected LMICs receiving direct support from the WHO FCTC Secretariat, the United Nations Development Programme (UNDP) and WHO Department of Prevention of Noncommunicable Diseases in accelerating the implementation of the WHO FCTC. This has led to the development of an investment case for tobacco control in Cambodia, launched in 2019 (RTI International, Ministry of Health of Cambodia, United Nations Development Programme, WHO FCTC Secretariat and World Health Organization, 2019). This investment case anticipates significant benefits ranging from saving thousands of lives to preventing economic loss from tobacco activities. With a strong sustained capacity for conducting monitoring and surveillance, Cambodia will be able to take corrective and new actions when necessary to protect its population from harm.

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##### *Disclaimer*

The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the institutions with which they are affiliated.

##### *Statement conflict of Interest*

The authors confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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## REVIEW

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# Investing in Tobacco Control: Twelve Years of MPOWER Measures and Progress in the Western Pacific Region

Katia De Pinho Campos<sup>1,2</sup>, Mina Kashiwabara<sup>3\*</sup>, Ashlee Teakle<sup>1</sup>, Ramon De Guzman<sup>4</sup>, Kate Lannan<sup>4</sup>, Susan Mercado<sup>1</sup>

## Abstract

Tobacco use has detrimental effects in the Western Pacific Region. The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) came into effect in 2005 to address the global tobacco epidemic, and WHO introduced the MPOWER measures to facilitate implementation of key demand-reduction measures of the WHO FCTC at the country level. This paper provides an overview of progress made by countries within the Region since the introduction of the MPOWER measures 12 years ago, and examines challenges and threats hindering their further implementation.

**Keywords:** Tobacco- public health- noncommunicable diseases- primary prevention- health policy

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## Introduction

Tobacco use, in all its forms, is one of the leading preventable risk factors of noncommunicable diseases (NCDs) and premature mortality in the world (World Health Organization [WHO], 2008). The Western Pacific Region is home to one third of the world's smokers, with five people dying every minute from tobacco-related disease (WHO, 2018; Institute for Health Metrics and Evaluation, 2019). It is estimated that half of all men, women and children within the Region are regularly exposed to second-hand smoke (SHS) in public places and at home (Oberge et al., 2011).

The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC), which came into effect in 2005, is the first global public health treaty developed by countries in response to the urgent need to curb the tobacco epidemic. The treaty is an evidence-based instrument that contains measures to reduce both supply and demand of tobacco, and reaffirms the right of all people to the highest standard of health (WHO, 2003). In 2008, WHO introduced the MPOWER measures to assist countries in the implementation of effective interventions to reduce tobacco use (WHO, 2008). The six proven policies that can reverse the tobacco epidemic and prevent millions of tobacco-related deaths include:

- Monitor tobacco use and prevention policies
- Protect people from tobacco smoke

- Offer to help quit tobacco use
- Warn about the dangers of tobacco
- Enforce bans on tobacco advertising, promotion and sponsorship; and
- Raise taxes on tobacco

Since the introduction, WHO has been monitoring and assessing the level of implementation of the MPOWER measures against the best practice level defined by WHO every two years.

The Global Action Plan has recommended a list of “best buys”, which are the most cost-effective and affordable policy options for preventing and controlling the four key risk factors for NCD, one of which is tobacco use. Four of the MPOWER measures, more specifically, PWER measures are included in this list of policy options to reduce tobacco use: (WHO, 2013).

The Western Pacific was the first WHO region to set a measurable reduction target for smoking and other tobacco use – a 10% reduction in relative prevalence over five years. It was first set in its Regional Action Plan 2010–2014, and again in the Regional Action Plan 2015–2019 (WHO Regional Office for the Western Pacific [WHO WPRO], 2009; WHO WPRO, 2015). These targets are consistent with the WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020 (Global Action Plan), which calls for a 30% relative reduction in prevalence of current tobacco use in persons aged 15 years and above by 2025 (WHO, 2013).

<sup>1</sup>(Former) Division of NCD and Health through the Life-Course, World Health Organization Regional Office for the Western Pacific, Manila, Philippines. <sup>2</sup>Pan American Health Organization, Representative Office, Brasilia, Brazil. <sup>3</sup>Division of Healthy Environments and Populations, World Health Organization Regional Office for the Western Pacific, Manila, Philippines. <sup>4</sup>(Former) Division of Healthy Environments and Populations, World Health Organization Regional Office for the Western Pacific, Manila, Philippines. \*For Correspondence: kashiwabaram@who.int

These regional and global action plans provide practical recommendations to guide Member States in accelerating and/or strengthening implementation of the WHO FCTC and MPOWER measures. These action plans will contribute to the realization of the Sustainable Development Goals, particularly Goal 3, which seeks to “ensure healthy lives and promote well-being for all at all ages”. Target 3. specifically calls on countries to strengthen the implementation of the WHO FCTC in all countries, as appropriate.

This article aims to highlight the progress of implementation of the MPOWER measures over the past 12 years in 27 countries in the Western Pacific Region. It also identifies challenges and emerging threats to further implementing the MPOWER measures.

#### *Tobacco Use and Patterns*

Smoked tobacco includes cigarettes, pipe tobacco, loose tobacco and waterpipe tobacco, and is the most commonly used form of tobacco across the Region. Between 2000 and 2015, WHO estimated that the Western Pacific Region observed a 17% reduction in the overall smoking rate, from 29.9% to 24.8% (WHO, 2018). According to the latest national surveys in the 27 countries in the Region, in almost all countries, smoking rates among men are remarkably higher than for women. The gender gap is particularly wide in Cambodia, China, Malaysia, Vanuatu and Viet Nam, where smoking prevalence is 14, 19, 33, 11 and 41 times higher among men when compared to women, respectively. Nauru is the only country with a reversed gender gap in the Region, with female prevalence exceeding male prevalence by 2% (Table 1).

The smoking patterns among youth in the Region tell a slightly different story with the gender gap in adolescents being significantly narrower than the gap between adult men and women (Table 1). In some countries, smoking rates for female adolescents exceeds that of male adolescents. For instance, in New Zealand, the smoking rate for girls is 20% higher than the rate for boys, while the smoking rate among adult women is 19% lower than that for men.

Data also suggest that countries with low adult smoking prevalence (i.e. less than 20%) tend to fall into the high-income category, while countries with high smoking prevalence (i.e. greater than 30%) are most likely to be in the middle-income category. Similar patterns are observed among adolescent populations (Table 1).

Smokeless tobacco such as snuff and chewing tobacco are also commonly used across the Region (Table 2). In some countries, tobacco is chewed together with another addictive substance such as areca nut (also referred to as betel nut) (WHO WPRO, 2012). Whilst data are limited, it is worth noting that smokeless tobacco use exceeds smoking rates in some countries. For instance, in Palau, prevalence of smokeless tobacco is twice the smoking rate both among adults and youth. Data also show that smokeless tobacco use is higher among women in some countries within the Region, including Brunei Darussalam, Cambodia, the Lao People’s Democratic Republic, Palau and Viet Nam.

#### *Progress of MPOWER Measures*

The following section highlights progress made by countries in each of the MPOWER measures over the past 12 years from 2007 (i.e. the year before the introduction of MPOWER) to 2018.

#### *Monitoring Tobacco Use and Prevention Policies*

Monitoring is an essential aspect of tobacco control. It allows for the collection of data to help raise awareness of the problem, understand trends in tobacco use and plays an integral role in decision making and evaluation of tobacco control measures implemented in a country. As best practice, WHO recommends that countries collect nationally representative tobacco use estimates for both adults and youth with at least two time-points with an interval of five years or less.

As of December 2018, 14 of the 27 countries in the Region have achieved the best practice level for the M measure (Figure 1). This is a threefold increase since 2007 (WHO, 2009; WHO, 2019). Many of these “best practice” countries have established their own tobacco surveillance mechanisms. For instance, Japan has been monitoring adult tobacco use since 1983 as part of a wider health survey (Committee on Health Impact of Smoking, 2016). In New Zealand, its health survey was first carried out intermittently from 1992 until it became an annual survey in 2011; the survey tracks smoking patterns, among other health indicators.

The Pacific island countries (PICs) have made important progress despite logistical challenges. PICs are generally composed of a number of islands spread across vast areas, posing challenges for conducting national surveys, such as the need for additional financial and human resources. Despite this, two of the 14 best practice countries are from the Pacific – Cook Islands and Palau. Cook Islands, for example, in addition to health-specific surveys, collects tobacco use data through its census conducted every five years. This has allowed the country to regularly monitor tobacco use without needing to invest additional resources on tobacco-specific (or public health) surveys.

Standardized global surveillance mechanisms have significantly facilitated progress in monitoring tobacco use in the Region. Examples of surveillance mechanisms include the Global Tobacco Surveillance System (GTSS), which encompasses Tobacco Questions for Surveys (TQS), Global Adult Tobacco Survey (GATS) and Global Youth Tobacco Survey (GYTS). These surveillance mechanisms were developed in the late 1990s/early 2000s by WHO, the United States Centers for Disease Control and Prevention (CDC) and other partners. Other global surveillance tools commonly used to monitor tobacco use include the WHO STEPwise Approach to Surveillance (STEPS) and Global School-based Student Health Surveys (GSHS). Their purpose is to assist countries in systematically collecting health data that can be compared over time and across countries. While GATS, GYTS, STEPS and GSHS are designed to be implemented as standalone surveys, TQS – which contains a subset of key questions from GATS – was designed to be included in any national survey. Its purpose is to promote data comparability using existing

Table 1. Current Tobacco Smoking by Country, most Recent National Survey

Country	Adult					Survey, Year	Age	Overall	Boys	Girls
	Survey, Year	Age	Overall	Men	Women					
Australia	National Drug Strategy Household Survey, 2016 <sup>a</sup>	14+	12.2	13.8	10.7	Australian Secondary School Students Alcohol and Drug Survey, 2014 <sup>b</sup>	12-17	5.1	5.4	4.9
Brunei Darussalam	STEPS, 2016	18-69	19.9	36.3	3.7	GSHS, 2014 <sup>b</sup>	13-17	11.4	17.8	4.8
Cambodia	National Adult Tobacco Survey of Cambodia, 2014	15+	16.9	32.9	2.4	GYTS, 2016	13-15	1.5	1.8	1.2
China	Adult Tobacco Survey, 2015	15+	27.7	52.1	2.7	GYTS, 2014	13-15	6.4	10.6	1.8
Cook Islands	STEPS, 2014	18-64	32.6	37.9	27.7	GYTS, 2016	13-15	20.7	28.1	13.9
Fiji	STEPS, 2011	25-64	30.7	47	14.3	GYTS, 2016	13-15	7.6	9.6	5.5
Japan	National Health and Nutrition Survey, 2017 <sup>b</sup>	20+	17.7	29.3	7.2	National Survey on Underage Smoking and Drinking, 2017 <sup>a</sup>	Junior-High	0.6	0.7	0.5
Kiribati	STEPS, 2015-2016	18-69	47.7	64.7	33.4	GSHS, 2014 <sup>a</sup>	13-15	26.1	34.3	19.5
Lao People's Democratic Republic	National Adult Tobacco Survey, 2015	15+	27.9	50.8	7.1	GYTS, 2016	13-15	8.1	12.9	3.3
Malaysia	National Health and Morbidity Survey, 2015	15-75	22.6	42.5	1.3	National Health and Morbidity Survey – Adolescent Health Survey, 2017	13-17	15.9	25.3	6.7
Marshall Islands	STEPS, 2002	15-64	23.1	39.5	6	GYTS, 2016	13-15	19.3	27.7	12.3
Micronesia, Federated States of	National Outcome Measures Survey, 2012 <sup>b</sup>	Dec-98	62.4	69.1	46.9	GYTS, 2013	13-15	33	43	24.4
Mongolia	STEPS, 2013	15-64	27.1	49.1	5.3	GYTS, 2014	13-15	5.6	8.2	2.9
Nauru	STEPS, 2015-2016	18-69	46.3	47.4	45.3	GSHS, 2011 <sup>b</sup>	13-15	22.1	19.5	24.5
New Zealand	New Zealand Health Survey, 2017-2018	15+	14.9	16.4	13.3	ASH Year 10 Survey, 2018	14-15	5	4.5	5.4
Niue	STEPS, 2011	15+	17.7	22.6	13	GSHS, 2010 <sup>b</sup>	13-15	16.1	23.3	...
Palau	Palau Hybrid Survey, 2016	18-97	20.4	30.9	9.7	GYTS, 2017	13-15	35.4	42.3	28.8
Papua New Guinea	Household Income & Expenditure Survey, 2009-2010	0+	26.3	37.3	14.5	GYTS, 2016	13-15	25.4	34.9	18.2
Philippines	GATS, 2015	15+	22.7	40.3	5.1	GYTS, 2015	13-15	14.5	20.5	9.1
Republic of Korea	Korea National Health and Nutrition Examination Survey, 2017 <sup>b</sup>	19+	21.1	37	5.2	Korea Youth Risk Behavior Web-based Survey, 2018 <sup>b</sup>	13-18	6.7	9.4	3.7
Samoa	STEPS, 2013	18-64	25.6	36.5	13.7	GYTS, 2017	13-15	13	19.9	6.5
Singapore	National Population Health Survey, 2016-2017	18-69	12	21.1	3.4	Student Health Survey, 2014-2016 <sup>b</sup>	13-20	4.3	...	...
Solomon Islands	Demographic and Health Survey, 2015 <sup>b</sup>	15-49	...	49.8	17	GSHS, 2011 <sup>b</sup>	13-15	24	28.3	18.4
Tonga	STEPS, 2017	18-69	24.5	40	15.9	GSHS, 2017 <sup>b</sup>	13-15	14.6	22.1	6.8
Tuvalu	STEPS, 2015	18-69	35	48.6	22.4	GSHS, 2013 <sup>b</sup>	13-15	15.9	27.2	5.6
Vanuatu	STEPS, 2011	25-64	23.7	45.8	4	GYTS, 2017	13-15	14.1	16.7	11.7
Viet Nam	GATS, 2015	15+	22.5	45.3	1.1	GYTS, 2014	13-15	3.5	6.3	0.9

<sup>a</sup>, Daily cigarette smoking; <sup>b</sup>, Current cigarette smoking; <sup>c</sup>, Daily tobacco smoking; ..., No data available or reported in the WHO report on the global tobacco epidemic 2019; STEPS, the WHO STEPwise Approach to Surveillance; GATS, Global Adult Tobacco Survey; GSHS, Global School-based Student Health Surveys; GYTS, Global Youth Tobacco Survey

Table 2. Current Smokeless Tobacco Use by Country, most Recent National Survey

Country	Adult					Youth				
	Survey, Year	Age	Overall	Men	Women	Survey, Year	Age	Overall	Boys	Girls
Australia	National Drug Strategy Household Survey, 2013	14+	0.4	0.6	0.3	...	...	...	...	...
Brunei Darussalam	STEPS, 2016	18-69	1.9	1.7	2.1	GYTS, 2013	13-15	0.9	1.2	0.7
Cambodia	National Adult Tobacco Survey of Cambodia, 2014	15+	4.9	0.8	8.6	GYTS, 2016	13-15	1	1.3	0.8
China	...	...	...	...	...	GYTS, 2014	13-15	1	1.3	0.6
Cook Islands	...	...	...	...	...	GYTS, 2016	13-15	3	3.8	2.4
Fiji	...	...	...	...	...	GYTS, 2016	13-15	2.1	2.6	1.5
Kiribati	STEPS, 2015-2016	18-69	4.2	7.6	1.4	...	...	...	...	...
Lao People's Democratic Republic	National Adult Tobacco Survey, 2015	15+	4.3	0.5	8.6	GYTS, 2016	13-15	3.8	4.8	2.8
Malaysia	National Health and Morbidity Survey, 2015	15-75	10.9	20.4	0.8	National Health and Morbidity Survey – Adolescent Health Survey, 2017	13-17	6.3	8.2	3.2
Marshall Islands	STEPS, 2002	15-64	8.9	13.7	4	GYTS, 2016	13-15	14.9	18.9	11.8
Micronesia, Federated States of	...	...	...	...	...	GYTS, 2013	13-15	23.8	26.4	21.7
Mongolia	STEPS, 2013	15-64	0.5	0.8	0.2	GYTS, 2014	13-15	9.5	13.6	5.7
Nauru	STEPS, 2015-2016	18-69	0.1	0.2	...	...	...	...	...	...
Niue	STEPS, 2011	15+	0.2	0.3	0.2	GYTS, 2009	13-15	8.6	9	7.9
Palau	Palau Hybrid Survey, 2016	18-97	44.4	40.2	48.8	GYTS, 2017	13-15	14.7	12.2	16.8
Papua New Guinea	...	...	...	...	...	GYTS, 2016	13-15	12.2	10.9	13.6
Philippines	GATS, 2015	15+	1.7	2.7	0.7	GYTS, 2015	13-15	2.5	2.9	2.1
Samoa	STEPS, 2013	18-64	0.9	1.3	0.5	GYTS, 2017	13-15	2.1	2.9	1.5
Solomon Islands	STEPS, 2015	18-69	3.4	4	2.9	...	...	...	...	...
Vanuatu	STEPS, 2011	25-64	0.9	1.8	0.2	GYTS, 2017	13-15	5.2	5.9	4.6
Viet Nam	GATS, 2015	15+	1.4	0.8	2	GYTS, 2014	13-15	0.7	1	0.4

No data available either for adults or youth for Japan, New Zealand, Republic of Korea Singapore, Tonga, and Tuvalu in the WHO report on the global tobacco epidemic 2019; STEPS, the WHO STEPwise Approach to Surveillance; GATS, Global Adult Tobacco Survey; GSHS, Global School-based Student Health Surveys; GYTS, Global Youth Tobacco Survey.

national surveillance mechanisms. In some cases, these surveys are adapted to the national context; for instance, Cambodia adopted GATS with a modified sampling method to accommodate existing national capacity and implemented two rounds of that survey to collect comprehensive information on tobacco use and control in the country. Almost all Member States in the Region (24 out of 27) have implemented one of the above-mentioned surveys over the past 12 years. In many of these countries, these surveys are the only source of tobacco use data.

#### *Protecting People from Tobacco Smoke*

There is no safe level of exposure to SHS. To effectively protect people from SHS, WHO recommends that governments implement comprehensive smoke-free laws covering all indoor public places, workplaces and public transport, without exception. This includes the prohibition of designated smoking rooms or areas.

As of December 2018, nine countries have implemented best practice smoke-free policies. Best practice means that all public places are completely smoke-free or that at least 90% of the population is covered by comprehensive subnational smoke-free laws. There has been significant progress in this measure over the last 12 years (WHO, 2019). In 2007, there were only three countries in the Region with best practice smoke-free policies – Australia, Marshall Islands and New Zealand (Figure 1) (WHO, 2008). Since then, Brunei Darussalam, Cambodia, Lao People's Democratic Republic, Nauru, Niue and Papua New Guinea have introduced smoking bans in all public places.

Health care facilities are the best protected indoor public space across the Region, with 23 countries mandating that these be smoke-free through legislation, followed by public transport (21 countries), government facilities (20 countries) and educational facilities with the

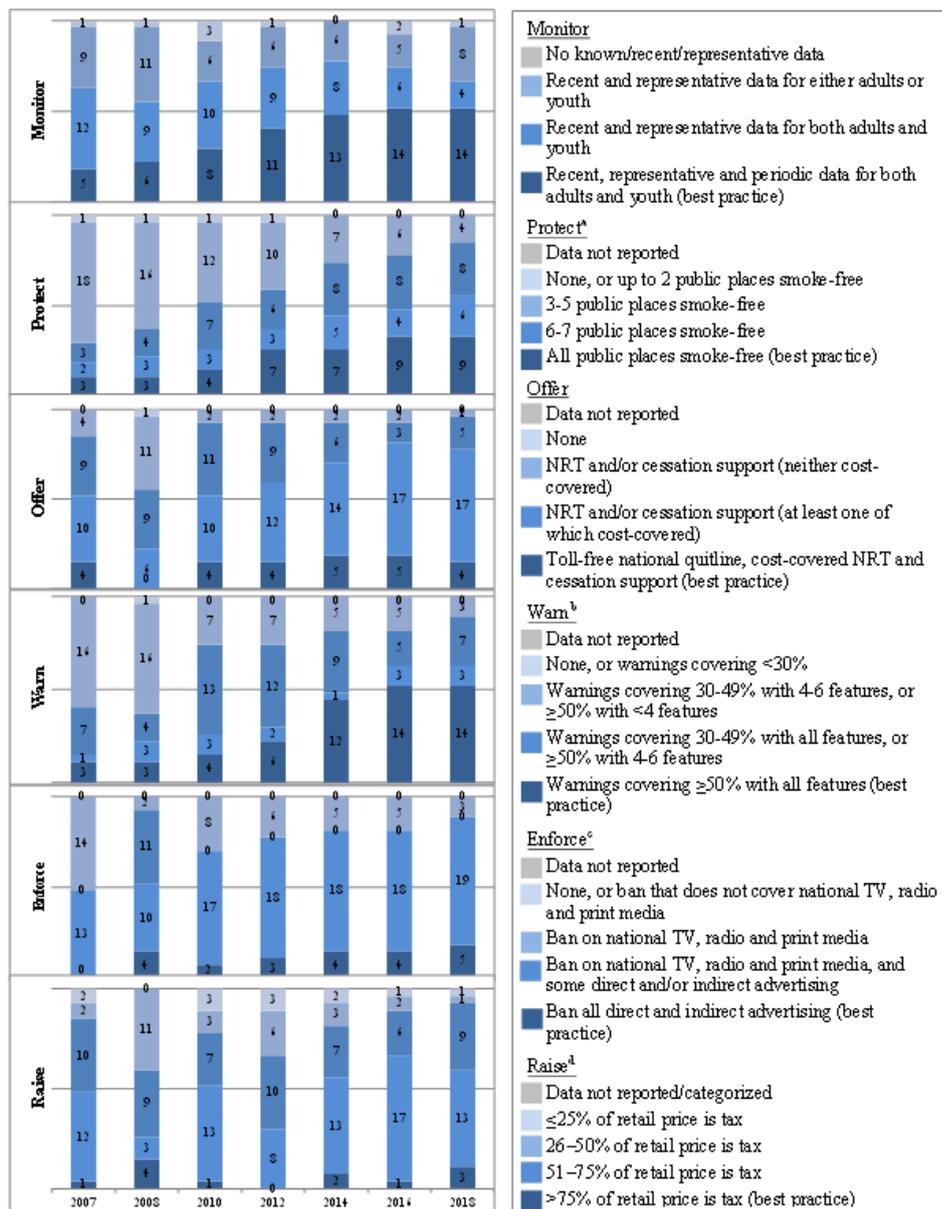


Figure 1. Status of MPOWER Measures by Country, 2007–2018. <sup>a</sup>, Types of public places: health-care facilities; educational facilities other than universities; universities; government facilities; indoor offices and workplaces not considered in any other category; restaurants; cafés, pubs and bars; and public transport; The best practice category includes when 90% of the country’s population are covered by subnational laws. <sup>b</sup>, Proportion indicates the average of front and back display areas of package; Features include: specific health warnings mandated; appearing on individual packages as well as on any outside packaging and labelling used in retail sale; describing specific harmful effects of tobacco use on health; are large, clear, visible and legible (e.g. specific colours and font style and sizes are mandated); rotate; include pictures or pictograms; and written in (all) the principal language(s) of the country. <sup>c</sup>, Direct advertising bans include national television and radio, local magazines and newspapers, billboards, and outdoor advertising and point of sale (indoor); Indirect advertising bans include free distribution of tobacco products in the mail or through other means, promotional discounts, non-tobacco products identified with tobacco brand names (brand stretching), brand names of non-tobacco products used for tobacco products (brand sharing), appearance of tobacco brands (product placement) or tobacco products in television and/or films, and sponsorship (contributions and/or publicity of contributions); The best practice category includes when 90% of the country’s population are covered by subnational laws; <sup>d</sup>, Proportion indicates the total taxes in the retail price of the most sold brand of cigarettes.

exception of universities (20 countries) (WHO, 2019). Pubs and bars are the least protected indoor area with only 12 countries mandating these as smoke-free.

While national smoke-free laws are preferred for maximum impact, the role of subnational governments must not be overlooked (Yan, 2008). Mayors and other subnational leaders are increasingly taking steps to introduce local smoking bans in instances of weak or

absent smoke-free policies at the national level. In China, for example, Beijing, Lanzhou, Shanghai, Shenzhen and Xi’an – with populations totalling 67 million – passed comprehensive smoke-free laws between 2014 and 2018. Without the introduction of these laws, the residents of these cities would still be exposed to SHS.

Site-specific interventions have positively contributed to the expansion of smoke-free environments. Many of

the Region's mega sports events – such as the Olympic Games, Pacific Games and Southeast Asian Games – have been declared smoke-free in a bid to promote healthy environments (Yan, 2008; WHO WPRO, 2010). It is worth noting that since 1988, every Olympic Games has been declared smoke-free. This includes the Beijing Olympics in 2008 that was the impetus for the development of Beijing's broader 10-year health plan, "Healthy Beijing Residents". The plan included a commitment to strengthening tobacco control and led to the enactment of Beijing's comprehensive smoke-free law in 2014 (Southeast Asia Tobacco Control Alliance [SEATCA], 2013).

Another important site-specific approach to smoke-free policies is to implement these measures in major tourist areas or attractions, such as World Heritage Sites, national parks and beaches. In 2011, the Southeast Asia Tobacco Control Alliance (SEATCA) convened a regional workshop calling for cities and heritage sites in the Association of Southeast Asian Nations (ASEAN) countries to become smoke-free (SEATCA, 2013). This was to ensure the protection of people from SHS, in addition to preventing fires and environmental damage caused by tobacco use. Since then, a number of World Heritage Sites and the cities in which they are located are now smoke-free, including Angkor sites in Cambodia, Luang Prabang in the Lao People's Democratic Republic, Penang in Malaysia and Ha Long in Viet Nam (SEATCA, 2013).

#### *Offering to Help Quit Tobacco Use*

Nicotine in tobacco products is an addictive drug that causes tobacco users to develop dependency. As part of the O measure, WHO recommends that access to cessation support be a crucial component to helping users overcome tobacco dependence. Best practice in cessation requires availability of three important services: (1) a toll-free national quitline; (2) cost-covered nicotine replacement therapy (NRT); and (3) other cost-covered cessation support.

As of 2016, the O best practice measure has been implemented in four countries, including Australia, New Zealand, the Republic of Korea and Singapore (Figure 1) (WHO, 2019). Meanwhile, the number of countries that offer cost-covered NRT and/or cessation service (i.e. best practice measures, lacking only a toll-free national quitline) has increased steadily from 10 in 2007 to 17 in 2018 (WHO, 2008; WHO, 2019).

As countries strengthen their tobacco control policies, demand for cessation support increases. This includes technical support by governments to establish smoking cessation programmes. Since 2013, the WHO Collaborating Centre for Smoking Cessation and Treatment of Tobacco Dependence, Tobacco Control Office, Department of Health, Hong Kong SAR (China), has trained several government officials and health-care professionals across the Region on smoking cessation. Training is run through the annual fellowship programme and focuses on the development and evaluation of cessation programmes.

The use of mobile technology has also been used to

support smoking cessation and has been of increasing interest to countries across the Region. Early experiences suggest that mCessation – as it is referred to in the Region – is a cost-effective tool to support smokers to quit their deadly habit (Guerriero et al., 2013). The Philippines, for example, was the first country in the Region to launch mCessation services as part of its National Quitline Programme (Republic of the Philippines Department of Health [DOH Philippines], 2017). Taking advantage of the number of people who have access to mobile phones in the Philippines, the mCessation service provides Filipinos, including those living in remote areas, with cheap yet reliable support to help them quit smoking (DOH Philippines, 2017).

#### *Warning about the Dangers of Tobacco*

Health warnings are an effective measure to communicate risks of using tobacco and encourage quitting, and should be placed on all tobacco packages. Best practice for the W measure requires specific health warnings to be mandated by law, and for the warnings to cover at least 50% of the front and back display areas of cigarette packs.

Health warnings are an increasingly popular measure in the Region. The number of W best practice countries increased from three in 2007 to 14 in 2019 (Figure 1) (WHO, 2008; WHO, 2019). These countries include Australia, Brunei Darussalam, Cambodia, Fiji, Lao People's Democratic Republic, Malaysia, Mongolia, New Zealand, Philippines, Samoa, Singapore, Solomon Islands, Vanuatu and Viet Nam. All 14 countries have required that all cigarette packages carry health warnings that meet the best practice measures.

The world's first plain packaging (i.e. tobacco packs with no logos, brand images or promotional information other than brand names and product names in a standardized format and colours) was introduced in Australia in 2012. New Zealand also introduced plain packaging in 2018, and Singapore is set to implement this by 2020. Fiji, Samoa, Solomon Islands and Vanuatu became the first PICs to introduce best practice health warnings in 2013. In 2016, Vanuatu implemented one of the largest pictorial health warnings in the world, covering 95% of cigarette packs. In the same year, the Lao People's Democratic Republic adopted the Region's second largest pictorial warnings, covering 85% of cigarette packs.

#### *Enforcing Bans on Tobacco Advertising, Promotion and Sponsorship*

To effectively reduce tobacco use, all forms of tobacco advertising, promotion and sponsorship must be banned. In this regard, best practice for the E measure includes a ban on all forms of direct and indirect tobacco advertising. Alternatively, if there is no national ban, at least 90% of the population is required to be covered by complete bans on advertising at a subnational level.

Progress in this area has been relatively slow in the Region. The first two countries to ban all forms of advertising were Tuvalu and Vanuatu, both of which adopted the comprehensive ban in 2008 (Figure 1) (WHO, 2019). Following these two PICs, Mongolia, Kiribati and

Niue adopted this best practice in 2012, 2013 and 2018, respectively.

Traditional direct advertising uses television, radio, print media and billboards, and is being banned in an increasing number of countries. While 15 out of 27 countries in the Region have banned direct advertising, indirect advertising, which refers to promotion and sponsorship, is still prevalent in many of these countries (WHO, 2019). As of 2018, only Kiribati, the Lao People's Democratic Republic and Mongolia have comprehensive bans on sponsorship, that is any form of contribution by the tobacco industry, even when it is done anonymously, are banned. Brand stretching – using tobacco brand names on non-tobacco products such as clothes – is banned in 19 countries.

#### *Raising Taxes on Tobacco*

Raising tobacco taxes to reduce affordability of tobacco products is the most cost-effective measure to save lives, reduce poverty and increase countries' domestic resources (WHO, 2010; United Nations, 2015; WHO, 2017). A 2016 study has shown that if countries around the world increased excise taxes by US\$ 0.80 per cigarette pack, the amount of excise revenue generated will produce an extra US\$ 141 billion. Additionally, smoking prevalence will be reduced by 9% (or 66 million smokers) and smoking-attributable deaths will decline by 6% (or 15 million) among the world's adult population (Goodchild et al., 2016). For the Western Pacific Region, the increase of excise tax by US\$ 0.80 per cigarette pack will translate to the prevention of 7 million premature deaths (Goodchild et al., 2016).

WHO best practice in regard to the R measure involves increasing the total tobacco taxation rate to more than 75% of the retail price of tobacco products. According to the WHO reports on the global tobacco epidemic (2008; 2009; 2011; 2013; 2015; 2017; 2019), between 2007 and 2018, R best practice was only achieved by Australia, New Zealand and Niue (Figure 1). As of July 2018, tobacco taxes in Australia, New Zealand and Niue respectively account for 77.5%, 82.2% and 87.7% of the retail price of each country's most sold cigarette brand. However, due to other factors such as changes in the production cost and the most sold brand, these countries did not achieve the best practice level of taxation rate consistently throughout the 12 years. In 2018, Cook Islands, Palau, Philippines and Republic of Korea have achieved more than 70%; however, their taxation levels have yet to reach the best practice level (WHO, 2019).

#### *Challenges and ways forward*

Tobacco use is one of the biggest preventable causes of premature death worldwide, killing over 8 million people each year. Its economic costs are also enormous, totalling more than US\$ 1.4 trillion in health-care costs and lost productivity (Goodchild et al.; 2016). The Western Pacific Region is no exception.

A dramatic change in tobacco control has been observed in the Western Pacific Region over the past 12 years. While the level of progress made varies across the MPOWER measures, countries are increasingly

taking the necessary steps towards implementation of best practice measures. The introduction of global surveillance mechanisms such as GTSS, STEPS and GSHS have greatly contributed to the wider availability of data. Data have shown that while smoking rates are decreasing in many countries in the Region, smokeless tobacco use remains highly prevalent in some countries. Furthermore, the significant gender gap in tobacco use persists in adult populations, while the gap between boys and girls is narrowing. Tobacco control measures should be responsive to these gender differences.

Surveillance must also take into account the evolving nature of tobacco products, with waterpipe tobacco, smokeless tobacco and heated tobacco products becoming increasingly accessible across the Region. Electronic nicotine delivery systems (ENDS), including e-cigarettes and vaping devices, for example, are being aggressively marketed in a number of countries. Countries must adapt to these changes to ensure that all forms of tobacco use and other products that may undermine tobacco control gains are addressed to ensure tobacco control measures are effectively implemented.

This paper also highlights the possibility for countries – including the small islands dispersed across the Pacific – to conduct periodic monitoring of tobacco use without relying exclusively on external financial support but by taking advantage of existing regular national surveys.

Efforts to expand smoke-free environments must be strengthened to protect workers and members of the general public from the harmful effects of tobacco smoke. People are still exposed to SHS in two thirds of countries within the Region. This includes exposure in health-care facilities, where health should be the utmost priority, as well as in pubs and bars. Countries must do more to require the introduction of smoke-free policies in these indoor places.

Mobile cessation tools have great potential to contribute to tobacco control and play an increasingly valuable role in expanding the reach of cessation support to those who are willing to quit smoking. This allows appropriate support to expand beyond the health system, to those living in hard to reach areas and other vulnerable populations such as youth.

The best practice of having large graphic health warnings on tobacco products is being adopted by an increasing number of countries across the Region. Several countries have adopted or are considering an even stronger approach by introducing plain packaging. While this paper looked at the health warnings on cigarette packages, although it should be noted that health warnings – at the best practice level – must be applied to all tobacco products, not just to cigarette packaging. This is particularly important given the changing market of tobacco products and the promotion of new products by the tobacco industry.

Despite progress in direct advertising bans, indirect advertising is not yet prohibited in many countries in the Region. The tobacco industry is using this to their advantage and in doing so, is compromising tobacco control efforts in the Region (WHO, 2017). For any ban

on tobacco to be effective, all forms of tobacco advertising must be prohibited.

Finally, this report highlighted that there is still a long way to go in implementing best practice R measures. Even for countries that have achieved best practice, there is a need to continually reassess tobacco taxes to ensure tax rates keep pace with the changing prices of tobacco products and with inflation. This is crucial to reduce the affordability of tobacco products. Introducing higher tobacco taxes is often a contentious process, with countries facing strong opposition from the tobacco industry. WHO, civil society, academics and other relevant stakeholders must continue to work together to support countries in strengthening their actions and arguments to overcome interference from the tobacco industry.

While this paper focuses on the progress of implementation of the MPOWER measures, it must be noted that strong policy also requires enforcement measures. This is an essential component of successful tobacco control because it ensures compliance, which in turn contributes to a reduction in tobacco use and subsequent improvements in health and wellbeing.

The war on tobacco is not yet over and much remains to be done. The efforts of countries must be scaled up to ensure the future success of the Western Pacific Region in curbing the tobacco epidemic. We owe it to the people of our Region to protect them from the harms of tobacco.

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### *Statement conflict of Interest*

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RESEARCH ARTICLE

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## Secondhand Smoke Exposure among Nonsmokers in China

Lin Xiao<sup>1\*</sup>, Yuan Jiang<sup>1</sup>, Jingru Zhang<sup>2</sup>, Mark Parascandola<sup>3</sup>

### Abstract

**Background:** China signed the World Health Organization Framework Convention on Tobacco Control and conducted a series of activities to protect people from secondhand smoke exposure. This paper explores the changes in prevalence of secondhand smoke exposure among nonsmokers between 2010 and 2015. **Methods:** Data from the 2010 Global Adult Tobacco Survey and 2015 National Adult Tobacco Survey were used in this study. Due to the complex sample design for these surveys, data were weighted and analyzed using the SAS 9.3 complex survey data analysis procedure. The Chi-square test was used for comparison among different groups. **Results:** From 2010 to 2015, secondhand smoke exposure among nonsmokers decreased in restaurants, government buildings, health-care facilities, schools, and public transportation in China ( $p < 0.05$ ). The relative change was most significant for schools (52.1%), followed by public transportation (49.4%) and government buildings (42.2%). The percentage of secondhand smoke exposure reported in workplaces declined from 55.2% to 45.3%. Secondhand smoke exposure at home reduced from 58.3% to 46.7%. People's awareness that secondhand smoke could cause heart disease in adults, lung illness in children, and lung cancer in adults increased from 24.6% to 36.0%. Additionally, support for smoke-free policies is high among the Chinese population. Even for restaurants, where support for smoke-free policies was lowest, 75.1% of nonsmokers and 55.3% of smokers supported smoke-free policies. **Conclusion:** Secondhand smoke exposure declined from 2010 to 2015 in China but remains a serious problem. Public awareness about the hazards of secondhand smoke is increasing and Chinese people support smoke-free laws.

**Keywords:** Secondhand smoke- surveillance and monitoring- smoke-free policy

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### Introduction

Tobacco use kills approximately 7 million people globally every year and is a significant threat to health and development (World Health Organization, 2017). China is the largest consumer of tobacco in the world. There are 316 million smokers and about 44% of the cigarettes consumed globally are smoked in China (Chinese Center for Disease Control and Prevention, 2016; Michael et al., 2015). Consequently, more than 1 million Chinese die of tobacco-related diseases each year and secondhand smoke exposure remains a serious public health problem (Ministry of Health, 2012).

China has taken a number of steps to prevent people from exposure to secondhand smoke. An important step was banning smoking in health facilities by the Ministry of Health in 2009 (Ministry of Health, 2009), followed by the Ministry of Education banning smoking in primary schools and middle schools in 2010 (Ministry of Education, 2010). In recent years, there have been national and local mass media campaigns to raise awareness about the risks of secondhand smoke and many restaurants and private companies have implemented their own smoke-free policies (Redmon et al., 2014). In 2013, the General Office

of the Communist Party of China Central Committee and the General Office of the State Council issued a notice requiring leading officials to set an example through their own actions, by avoiding tobacco use in public places and supporting the implementation of smoke-free policies (The State Council of the People's Republic of China, 2013). In 2014, smoking was banned in high-speed trains (The State Council of the People's Republic of China, 2014). "No smoking in public places" was included in China's 12<sup>th</sup> and 13<sup>th</sup> Five-Year Plans (The National People's Congress of the People's Republic of China, 2011; The State Council of the People's Republic of China, 2017), and passed at the National People's Congress conferences in 2011 and 2016, respectively. Local smoke-free ordinances were enacted in 18 cities, including Beijing and Shanghai. Following this, in 2014, the Legislation Office of the State Council embarked on drafting the first nationwide regulation to ban smoking in indoor public places (Legislation Office of the State Council, 2014; National Health and Family Planning Committee, 2014).

This study explores the changes in prevalence of secondhand smoke exposure among nonsmokers in public places, workplaces, public transportation, and homes, as well as people's knowledge and perceptions about

<sup>1</sup>Tobacco Control Office, Chinese Center for Disease Control and Prevention, Beijing, China. <sup>2</sup>School of Public Health, Peking University, China. <sup>3</sup>National Cancer Institute, USA. \*For Correspondence: xiaolin@chinacdc.cn.

secondhand smoke from 2010 to 2015 in China.

## Materials and Methods

### Data resource

The 2010 Global Adult Tobacco Survey in China and 2015 National Adult Tobacco Survey were nationally representative household surveys conducted by the Chinese Center for Disease Control and Prevention (Tobacco Control Office, Chinese Center for Disease Control and Prevention, 2011; Chinese Center for Disease Control and Prevention, 2016). The target population of the two surveys were non-institutionalized men and women aged 15 and older. The survey questionnaire collected information on demographics; tobacco use; cessation; secondhand smoke exposure; media exposure; and knowledge, attitudes, and perceptions about tobacco use and tobacco control measures. Handheld computers were used to collect data. The key indicators used in this study were measured using the same questions for both surveys.

### Outcome variables

Outcome variables used were secondhand smoke exposure among nonsmokers in public places (yes/no), secondhand smoke exposure among nonsmokers at workplaces (yes/no); secondhand smoke exposure among nonsmokers at home (yes/no); knowledge that exposure to secondhand smoke causes heart disease in adults, lung illness in children, lung cancer in adults, and all three diseases (yes/no/don't know); and people's attitude toward smoke-free policy in various public places (support or not). Restaurants, government buildings, health-care facilities, schools, and public transportation were included in public places. Nonsmoker status was determined by the question: "Do you currently smoke tobacco on a daily basis, less than daily, or not at all?" Respondents who answered "not at all" were considered nonsmokers.

The questionnaire did not include a direct measure of secondhand smoke exposure among respondents. Instead, two questions were used to provide an indirect measure of change in prevalence of secondhand smoke in certain public places between 2010 and 2015. For example, respondents were asked: "During the past 30 days, did you visit any government buildings or government offices?" Those who answered "yes" were asked: "Did anyone smoke inside of these government buildings or government offices that you visited in the past 30 days?" Therefore, secondhand smoke exposure in public places was measured by whether respondents who had visited these public places in the past 30 days noticed anyone smoking there. The question about secondhand smoke exposure at workplaces included respondents aged 16 to 60 who had noticed anyone smoke at a workplace. Respondents who reported any frequency of smoking at home (daily, weekly, monthly, or less than monthly) were considered to be exposed to secondhand smoke in the home.

### Independent variables

Independent variables used were gender (male/female),

age, education level, resident (urban/rural), and occupation. The age groups in this study were classified into 15-24, 25-34, 35-44, 45-54, and 55+ years old. Education levels included four categories: primary school or less, attended secondary school, high school, and college graduate or above. Occupations were categorized into agriculture worker, business or service employee, medical/health personnel, teaching staff, and others (see Table 1).

### Statistical analysis

Due to the complex survey sample design for these surveys, each responding unit was assigned a unique survey weight that was used to produce estimates of population parameters. All computations were performed using the SAS 9.3 complex survey data analysis procedure. Percentage or proportion was used for descriptive statistics. The Chi-square test was used for comparison among different groups. A  $p$  value  $<0.05$  was considered statistically significant.

## Results

### Secondhand smoke exposure among nonsmokers in public places

In 2015, exposure to secondhand smoke among nonsmokers was most commonly reported in restaurants (70.1%). The proportion of nonsmokers exposed to secondhand smoke in other public places included: 32.0% in government buildings, 24.2% in health-care facilities, 17.1% in schools, and 16.1% on public transportation. Secondhand smoke exposure was higher among male than female nonsmokers in restaurants, government buildings, and schools ( $p<0.05$ ). There was no difference between genders in health-care facilities and public transportation. The proportion of people exposed to secondhand smoke in schools was greatest for the 15-24 age group (29.8%) compared with other age groups ( $p<0.05$ ).

Between 2010 and 2015, the proportion of respondents reporting secondhand smoke exposure dropped in all categories of public places ( $p<0.05$ ). The relative change was most significant for schools (52.1%), followed by public transportation (49.4%) and government buildings (42.2%) (see Figure 1).

### Secondhand smoke exposure among nonsmokers at workplaces

In 2015, the percentage of nonsmokers working in indoor locations exposed to secondhand smoke at work during the last 30 days was 45.3% (54.6% for males and 39.8% for females). The proportion increased with age ( $p<0.001$ ) and declined with higher education levels (i.e., college or above) ( $p<0.001$ ). There was no significant difference between urban and rural areas ( $p=0.757$ ). By occupational category, the highest proportion of people exposed to secondhand smoke was agriculture workers (68.5%), followed by business or service employees (49.7%), while the proportion among medical/health personnel and teaching staff were 23.7% and 30.2%, respectively.

From 2010 to 2015, the percentage of secondhand smoke exposure in the workplace declined by 9.9%. The

Table 1. Percentage of Nonsmokers  $\geq 15$  Years Old Exposed to Secondhand Smoke in the Workplace\*

	2010		2015	
	%	95%CI	%	95%CI
Overall	55.2	50.4~59.9	45.3	41.4~49.2
Gender				
Male	58	51.9~63.8	54.6	48.7~60.4
Female	53.3	47.6~58.9	39.8	35.9~43.9
Age (years)				
15-24	44.6	38.1~51.2	34.1	27.2~41.7
25-34	55.1	48.0~62.0	42.7	38.2~47.3
35-44	62.1	54.9~68.7	52.2	46.1~58.2
45-54	66.5	57.2~74.7	54.4	48.1~60.6
55-60	67.7	56.8~77.0	60.7	48.2~71.9
Education level				
Primary school or less	67.4	52.8~79.3	55.2	45.5~64.4
Attended secondary school	64.7	58.0~70.9	57.9	50.7~64.8
High school	59	50.7~66.9	49.2	43.2~55.3
College graduate or above	57	48.6~64.9	42.5	37.0~48.2
Resident				
Urban	53.7	47.6~59.7	44.9	40.4~49.5
Rural	57.9	52.0~63.6	46.3	38.8~53.9
Occupation				
Agriculture worker	73.1	56.6~85.0	68.5	48.2~83.6
Business or service employee	60.2	53.5~66.6	49.7	45.0~54.5
Medical/health personnel	51.1	37.4~64.6	23.7	15.6~34.4
Teaching staff	49.2	38.1~60.3	30.2	20.5~42.1
Others	49.2	43.9~54.4	37.2	30.5~44.4

Note: Secondhand smoke exposure in the workplace is calculated only among respondents 16-60 years old; Data sources: 2010 Global Adult Tobacco Survey (GATS) and 2015 National Adult Tobacco Survey (NATS).

proportion dropped more among women (13.5%) than among men (3.4%). By education level, the change was greatest among those with a college education or above – a decrease from 57.0% in 2010 to 42.5% in 2015. By occupational category, the largest changes in exposure were among medical/health personnel and teaching staff, with a decrease from 51.1% to 23.7% among medical/

health personnel ( $p=0.017$ ) and 49.2% to 30.2% among teaching staff ( $p<0.001$ ) (see Table 1).

#### Secondhand smoke exposure among nonsmokers at home

In 2015, 46.7% of nonsmokers were exposed to secondhand smoke at home. The proportion was higher in rural areas (57.5%) compared with urban areas (36.9%) ( $p<0.001$ ). Secondhand smoke exposure at home differed dramatically among groups with different education levels ( $p<0.001$ ). Exposure was much lower among those with a university education or above (23.5%) compared to those with only a secondary school education (50.9%) or primary school education or less (50.5%).

From 2010 to 2015, the percentage of reported secondhand smoke at home dropped from 58.3% to 46.7% ( $p<0.001$ ). It declined from 48.4% to 37.4% among males and from 63.2% to 51.4% among females. The relative change was much more significant in urban areas (13.4%) than in rural areas (7.7%) and was greatest among those with a university education or above (44.0%) compared to those with lower education levels.

#### Awareness of the hazards of secondhand smoke

In 2015, the percentage of adults who knew that secondhand smoke causes heart disease in adults, lung illness in children, or lung cancer in adults was 41.7%, 65.2%, and 64.6%, respectively, while 36.0% of adults were aware that secondhand smoke could cause all three diseases. Rural residents had a lower awareness of the health hazards posed by secondhand smoke (27.0%) compared with urban residents (44.7%). Awareness of the health hazards posed by secondhand smoke was closely related to education level ( $p<0.01$ ). Only 16.4% of those with an education level of primary school or less were aware that secondhand smoke could cause all three diseases. The proportion among those with an education level of college or above was 54.9%. Although people's awareness of secondhand smoke hazards is still low, it increased substantially from 2010 to 2015, as shown in Figure 2.

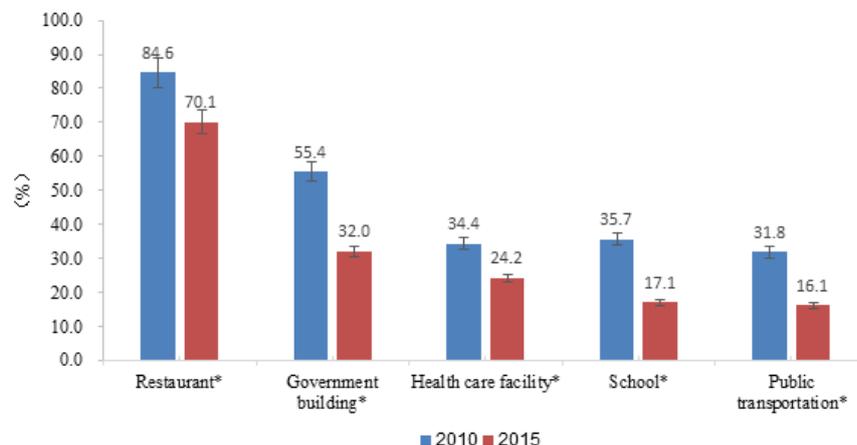


Figure 1. Percentage of Nonsmokers  $\geq 15$  Years Old Exposed to Secondhand Smoke at Public Places, 2010 and 2015. Note, \*  $P<0.05$ ; Data sources, 2010 Global Adult Tobacco Survey (GATS) and 2015 National Adult Tobacco Survey (NATS).

Table 2. People's Support towards Smoke-Free Policies in Public Places in 2015

	Nonsmoker		Smoker		Chi-square	P- value
	%	95%CI	%	95%CI		
Health-care facility	94.7	93.5~95.6	93.8	92.3~94.9	4.74	0.18
Workplace	88.2	85.9~90.1	80.9	77.6~83.8	133.834	<0.001
Restaurant	75.1	71.9~78.0	55.3	51.5~59.0	558.902	<0.001
University	86.9	84.2~89.1	82.6	79.7~85.2	44.877	<0.001
Taxi	87.2	84.5~89.5	79	76.0~81.7	160.44	<0.001
Primary and secondary school	93.4	91.6~94.8	92	90.3~93.5	7.942	0.069

Data source, 2015 National Adult Tobacco Survey (NATS).

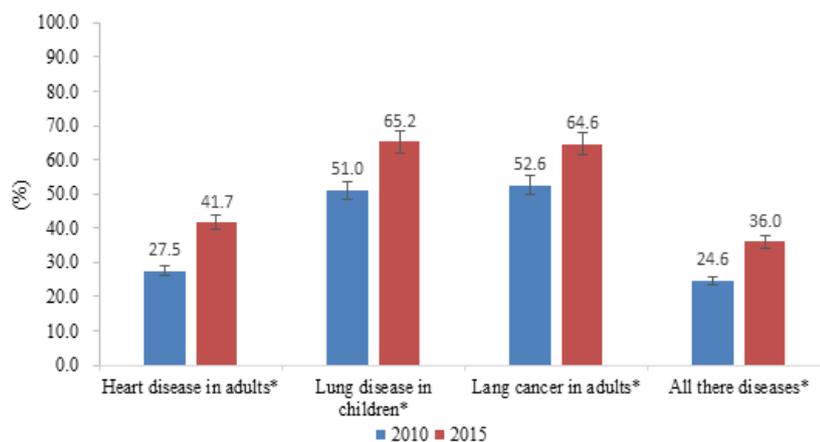


Figure 2. Peoples Awareness of Hazard of Secondhand Smoke , 2010-2015

#### Public support for smoke-free law

In 2015, more than 90% of respondents (both nonsmokers and smokers) supported banning smoking in indoor spaces at health-care facilities, primary schools, and secondary schools. In terms of smoke-free policies in other public places, nonsmokers were more likely than smokers to support smoke-free policies (although support among both groups was substantial). This included support for smoke-free policies in the workplace (88.2% nonsmokers vs. 80.9% smokers), universities (86.9% vs. 82.6%), restaurants 75.1% vs. 55.3%), and taxis (87.2% vs. 79.0%) (see Table 2).

## Discussion

From 2010 to 2015, nonsmokers' exposure to secondhand smoke in public places and workplaces in China declined significantly ( $p < 0.001$ ). Despite this reduction, exposure to secondhand smoke remained high in 2015, with exposure at 70.1% in restaurants and 45.3% in workplaces. These levels are much higher than what has been observed in many other countries (Ministry of Health and Social Development of the Russian Federation, 2017; Pan American Health Organization, INDC Brazil, 2010; Bureau of Tobacco Control, Department of Disease Control (DDC) Ministry of Public Health, 2011). It indicates that secondhand smoke exposure is still a serious public health problem in China.

Starting in 2009, the Chinese Ministry of Health and Ministry of Education implemented regulations to prohibit smoking inside health-care facilities and on primary and

secondary school campuses. Consequently, secondhand smoke exposure in those places was already relatively low in 2010 and declined between 2010 and 2015. Additionally, the proportion of medical/health personnel and teaching staff exposed to secondhand smoke at their workplaces decreased more than for other occupations between the two survey years. Moreover, while 55.4% of nonsmokers were exposed to secondhand smoke in government buildings in 2010 (before the 2013 notice requiring government offices to go smoke-free), this number declined to 32.0% in 2015. These findings provide support for the conclusion that targeted smoke-free environment campaigns are effective. The lowest level of secondhand smoke exposure observed was in public transportation. This is likely due to the fact that smoke-free laws and regulations for public transportation were enacted in 1997 (Civil Aviation Administration of China, 2015). This, in addition to the prohibition of smoking on high-speed trains in 2014 (Civil Aviation Administration of China, 2014), contributed to a further reduction in secondhand smoke exposure on public transportation. This suggests that smoke-free laws or regulations, as shown in the case for the public transportation regulations, are more efficient than a smoke-free campaign alone.

A substantial body of evidence from many countries has shown that comprehensive smoke-free laws can reduce secondhand smoke exposure and improve the air quality of indoor places (Fong et al., 2013; Mulcahy et al., 2005; Hyland et al., 2008). Additionally, in cities in China that have implemented comprehensive smoke-free laws, such as Beijing, secondhand smoke exposure has

decreased much more than at the national level (Xiao et al., 2016). This highlights the need for a comprehensive national smoke-free law to ensure the greatest impact on reducing secondhand smoke exposure in China. Given President Xi Jinping's pronouncement that "An all-around moderately prosperous society cannot be achieved without the people's all-around health," in addition to the "Healthy China" development strategy, a national comprehensive smoke-free law should be enacted for China to protect people from secondhand smoke and its impact on public health.

The results of this paper indicate that there is broad support for smoke-free policies among the Chinese population. The findings of this study show that people are aware that secondhand smoke can cause heart disease in adults, lung illness in children, and lung cancer in adults. Furthermore, smoking in the home declined substantially over the five-year period between 2010 and 2015, especially for those with higher education. This indicates that Chinese people are increasingly aware of the hazards of secondhand smoke and are beginning to take steps to protect themselves and the next generation. In addition, this study found smokers as well as nonsmokers to be in support of smoke-free policies. This demonstrates that a national comprehensive smoke-free law would be welcome in China.

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## Conflict of Interest Statement

The authors have no conflicts of interest associated with the material presented in this paper. The ORCID of the corresponding author is 0000-0002-5052-6663.

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## RESEARCH ARTICLE

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# Tobacco Industry Fingerprints on Delaying Implementation of Pictorial Health Warnings in the Western Pacific

Yen Lian Tan<sup>1\*</sup>, Judith Mackay<sup>2</sup>, Mary Assunta Kolandai<sup>1</sup>, E Ulysses Dorotheo<sup>1</sup>

## Abstract

**Objective:** This case series describes tobacco industry tactics and strategies used to interfere, derail, delay, and weaken the development of effective health warning regulations in Malaysia, Cambodia, the Philippines, and Hong Kong. **Methods:** A historical review of official reports, news articles, and gray literature was undertaken to identify tobacco industry tactics and strategies to hamper government efforts in implementing stronger pictorial health warning regulations in four Asian jurisdictions (Cambodia, Hong Kong, Malaysia, and the Philippines). **Results:** Nineteen countries/jurisdictions in the WHO Western Pacific region currently require pictorial health warnings on cigarette packs, including some of the world's largest, in line with the WHO Framework Convention on Tobacco Control Article 11 Guidelines. In the four jurisdictions examined, tobacco industry interference consisted of lobbying and misinformation of high-level government officers and policy-makers, distributing industry-friendly legislative drafts, taking government to court, challenging government timelines for law implementation, and mobilizing third parties. Strong political leadership and strategic advocacy enabled governments to successfully overcome this industry interference. **Conclusion:** The tobacco industry uses similar tactics in different jurisdictions to derail, delay, and weaken the implementation of effective health warning policies. Identifying and learning from international experiences can help anticipate and defeat such challenges.

**Keywords:** Tobacco industry- pictorial health warnings- interference- WHO FCTC- Asia

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## Introduction

Effective health warnings on all tobacco product packs are mandated under Article 11 of the WHO Framework Convention on Tobacco Control (FCTC). To this end, the Article 11 Guidelines, adopted at the third Conference of Parties in 2008, recommend 50% or more but not less than 30%, prominent pictorial health warnings (PHWs). Among 118 countries/jurisdictions worldwide that apply PHWs, 19 are in the Western Pacific Region (Canadian Cancer Society, 2018). The tobacco industry has routinely interfered to derail, delay, and weaken effective health warning regulations. Industry tactics in Malaysia, Cambodia, the Philippines and Hong Kong were strikingly similar, despite the diverse forms of government in these Asian jurisdictions.

## Materials and Methods

Official government reports, news articles, and gray literature relevant to PHW policy development in the four focus jurisdictions were identified and analyzed to identify tobacco industry tactics and strategies to hamper government efforts in implementing stronger PHW

regulations in four Asian jurisdictions (Cambodia, Hong Kong, Malaysia, and the Philippines).

## Results

### *The Case of Malaysia*

The Ministry of Health (MOH) Malaysia started advocating for PHWs in 2002 when drafting amendments to the Control of Tobacco Product Regulations (CTPR). Tobacco companies objected to the inclusion of PHWs, claiming that PHWs violate their intellectual property rights and would damage their brands' image. The Malaysian MOH subsequently omitted the PHW provision in the amendment (CTPR 2004) to avoid deferment of the regulation's passage as a prerequisite for FCTC ratification.

In December 2005, Malaysia officially became a Party to the WHO FCTC, committing to implement strong tobacco control policies; however, between 2004 and 2008, the tobacco industry continued to undermine government efforts by proposing 30% text-only warnings on tobacco product packaging, instead of PHWs, to fulfill the bare minimum requirement of the FCTC. The industry misled policy-makers with claims that substantial investments

<sup>1</sup>Southeast Asia Tobacco Control Alliance, Bangkok, Thailand. <sup>2</sup>Asian Consultancy on Tobacco Control, Hong Kong.  
\*For Correspondence: yenlian@seatca.org

are required to print PHWs – such as redesigning packaging, ordering printer drums from overseas (that take several months to arrive), and communicating changes to customers – using these excuses to request a longer implementation deadline. Despite these challenges, the Malaysian government introduced six rotating PHWs to be printed on the upper 40% of front and upper 60% of back panels of all cigarette packs, effective 1 January 2009, legislated under the CTPR as amended in September 2008 (Ministry of Health Malaysia, 2008). These policy changes are attributed to the government's strong political will to meet its FCTC obligations, as well as the influence of neighboring Singapore and Thailand, which had implemented PHWs in 2004 and 2005, respectively.

After the implementation of PHWs in 2009, the tobacco industry introduced various alternative pack shapes and designs in an attempt to dilute the effectiveness of the PHWs (Tan and Foong, 2012) and alternative descriptors for quality variations to undermine the ban on misleading descriptors (Tan and Foong, 2014). In response, the CTPR (Amendment) 2013 further expanded the descriptor ban to include any term that states the grading, quality or supremacy of, or is fanciful and not relevant to, the physical characteristics of the tobacco products.

#### *The Case of Cambodia*

In 2015, after passage of the national tobacco control law stipulating at least 50% PHW in the Khmer language on all cigarette packs, the tobacco industry tried to undermine the draft MOH sub-decree to implement PHWs by submitting letters of concern to high-level officials and other ministries. Tobacco companies also mobilized third parties – their distributors – to support their lobbying efforts. Huotraco, the distributor of foreign cigarette brands in Cambodia, reportedly submitted a letter to the then Deputy Prime Minister, opposing a PHW size of more than 50% and requesting 12 months or longer lead time to comply. The newly formed Association of the Tobacco Industry of Cambodia was also reported to have submitted a similar letter denying the effectiveness of large PHWs and claiming PHWs would increase the consumption of illegal tobacco products and reduce government revenues. The Asia Pacific Travel Retail Association and Dufry (Cambodia) Ltd (a global travel retailers chain) was reported to have submitted letters to the President of the National Assembly requesting that tobacco products sold at duty-free outlets be exempted from the PHW requirement; they claimed incorrectly that tobacco products sold at duty-free outlets should follow international standards and carry small English-language warnings rather than local health warnings.

With strong MOH commitment, as well as constant technical support from and close communications with local tobacco control advocates to counter tobacco industry interference, the PHW sub-decree was legislated on 22 October 2015 (Royal Government of Cambodia, 2015). The tobacco industry was given nine months (i.e. by 23 July 2016) to apply 55% PHWs on all cigarette packs (Ministry of Health Cambodia, 2016).

Prior to this, in 2009, the tobacco industry had successfully defeated PHWs being implemented when

a draft sub-decree on health warnings, which included five rotating PHWs, was watered down to a mandatory bottom-30% text-only warning after the industry lobbied government agencies and politicians, claiming that PHWs violated their intellectual property rights and Cambodia's international trade treaty obligations (Tan, 2010).

#### *The Case of the Philippines*

In 2007–2008, pro-health legislators filed bills to have PHWs cover 60% of the principal display areas of packs, but pro-industry legislators, after allegedly receiving bribes, firmly blocked the bill from being discussed beyond the health committee, claiming that PHWs would kill the industry (Rufo, 2009).

Because of Congress's failure to pass the bill, the Philippine Department of Health (DOH) issued Administrative Order (AO) No. 2010-0013 in 2010, requiring nine rotating PHWs to cover 30% of the upper-front and 60% of the upper-back of the pack in addition to the existing 30% text warning on the front (Department of Health Philippines, 2010).

Claiming that DOH was usurping legislative power, the Philippine Tobacco Institute argued that the AO violated Republic Act (RA) 9211, which prohibited the printing of warnings other than the existing text warnings, and that tobacco companies would face hefty fines and imprisonment for complying with the AO (Andreo, 2010). Subsequently, five tobacco companies filed separate court cases in the regional trial courts questioning the AO's validity (WHO, 2011). Unfortunately, the Marikina Trial Court granted Fortune Tobacco Corporation's petition for a preliminary injunction, effectively barring the DOH from implementing the AO (Mark, 2010).

In 2012, the Philippines passed a landmark Sin Tax Reform Act (RA 10351) that raised tobacco taxes to discourage smoking and provide sustainable revenues for universal health coverage. In 2013, buoyed by the successful tobacco tax reform, pro-health legislators pushed for PHWs on the upper 85% of the front and back of packs and a ban on misleading descriptors, prompting the industry to respond with its own PHW bill, proposing a 30% PHW on the back in addition to the existing 30% text-only warning on the front, as well as an alternate bill simply adding a 30% text warning to the lower back in minimum compliance with the FCTC.

After months of deliberations and compromises, the Graphic Health Warnings Law (RA 10643) was finally signed into law in July 2014. The law requires 12 rotating, 50% PHWs to be replaced every 24 months, additional text information on 30% of one side panel, and a ban on misleading descriptors. Aside from the smaller PHW size, other concessions to the industry included: requiring PHWs to be in the lower rather than upper portion of principal pack surfaces, and giving the industry 20 months from publication of the PHW templates for full compliance. Seemingly unsatisfied with these concessions, the industry tried unsuccessfully to weaken the implementing rules and regulations (IRR), by arguing for a narrow interpretation of the law and exclusion of products sold in duty-free stores. Due to the many instances of tobacco industry interference, the IRR took more than a year to be finalized

and officially published in February 2016 (Department of Health Philippines, 2016).

### *The Case of Hong Kong*

In 2015, the Hong Kong government took steps to enhance the existing 2007 PHW requirements by proposing larger (85%) PHWs, increasing the number of rotating PHWs from six to 12, and adding the Hong Kong Quitline number on the pack. Similar to arguments used in Cambodia, the tobacco industry claimed that larger PHWs would lead to cigarette smuggling. Industry allies – the Coalition of Hong Kong Newspaper and Magazine Merchants and the wholesale and retail sectors, including elected legislators – shared concerns that it would affect their business. Tobacco vendors threatened to protest if 85% warnings were adopted (Ng, 2017).

The amendment proposal was scrutinized by the Legislative Council, where other members outvoted the few pro-tobacco industry legislators who had expended great efforts to obstruct the bill. After more than a year's delay, the Smoking (Public Health) (Notices) (Amendment) Order 2017 was gazette (Hong Kong Legislative Council, 2017), requiring health messages to be printed in Chinese on one side and in English on the other, with one year (by 20 June 2018) for full compliance by the tobacco industry. The government was able to resist the industry by a combination of use of international and national data, global experience, WHO FCTC recommendations, media campaigns, mobilizing international support, consulting the legal departments within the government, and by showing laudable determination to stand up to the industry.

In conclusion, globally, tobacco companies routinely use a range of tactics to undermine effective legislation and other measures to reduce tobacco use, including blocking implementation of prominent PHWs on tobacco packs. These tactics to oppose strong health warning measures include lobbying and submitting letters with misinformation to high-ranking government officers and policy-makers, distributing industry-friendly legislative drafts, bribery, taking government to court, challenging government timelines for law implementation, and mobilizing third parties. These have a measurable delaying effect on governments introducing such measures and can cause a regulatory chilling effect on other countries contemplating the same actions. These four Asian governments have demonstrated that these challenges are surmountable with strong political leadership and strategic advocacy.

### *Statement conflict of Interest*

The authors declare they have no conflict of interest.

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# Raising Tobacco Taxes: The Philippine Experience

Jo-Ann L. Diosana\*

## Abstract

The 2012 Philippine Sin Tax Reform Law or Republic Act No. 10351 (RA10351) offers important lessons on tobacco taxation and tobacco control. In a span of five years, it increased the excise tax rate on cigarettes to as high as 1000% for low-priced brands. It is recognized by the international community not only because of the magnitude of the tobacco tax increase that it stipulated but also because of the challenging context within which it was achieved. This article presents the Philippine experience as a case study in pursuing bold reforms in tobacco taxation and tobacco control amidst strong opposition by the tobacco industry. It considers: 1) the key events and factors that led to successful reform of the Philippine tobacco tax system; 2) the impact of higher tobacco taxes on health and the economy; and 3) the emerging challenges in tobacco taxation in the Philippines.

**Keywords:** Policy- taxation- cigarette smoking- tobacco smoking- tobacco control- health financing- tobacco industry

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## Introduction

Before enactment of the Philippine Sin Tax Reform Law (RA 10351) in 2012, the Philippines had some of the most inexpensive cigarettes in the world. The most-sold brand in the country was the cheapest brand among all the ASEAN countries. Total tax as a percentage of the retail price was also one of the lowest in the Region (World Health Organization, 2013).

Consequently, smoking prevalence and tobacco-related morbidity and mortality in the Philippines was one of the highest in the Region. The 2009 Global Adult Tobacco Survey (GATS) reported that 28.3% of Filipinos aged 15 years and older smoked tobacco. Seven out of the country's 10 leading causes of death were tobacco-related (Asuncion et al., 2012). Economic costs due to the top four tobacco-related diseases – lung cancer, chronic obstructive pulmonary disease, coronary artery disease and cardiovascular disease – were estimated at 188 billion Philippine pesos (PhP) in 2012 (Defensor-Santiago, 2012).

### *Sociopolitical context of the reform*

Raising taxes on tobacco products, alongside implementing tobacco control policies, has always been a challenge in the Philippines. Rampant corruption and manipulation of public policies to protect vested interests – known in economics as “rent-seeking” – have made the Philippine tobacco industry “the strongest tobacco lobby in Asia” (Alechnowicz and Chapman, 2004). For instance, the Congressional Ways and Means Committee from which all tax policies emanate has long been dominated by legislators from the tobacco-growing districts (Sidel,

2014).

As a result, the tobacco tax structure was problematic and increases in excise taxes had been small and erratic for decades. Varying specific taxes not indexed to inflation were imposed on four cigarette price categories: low-, medium-, high- and premium-priced. Excise tax on low-priced cigarettes increased from PhP 1 per pack in 1997 to only PhP 2.72 in 2012 (Philippines, 1997). Despite increases in the excise tax rates due to amendments to the tobacco tax law in 1997 and 2004, tobacco excise tax collection as a percentage of GDP continued to decline from 0.67% in 1988 to 0.30% in 2012 (Bangko Sentral Ng Pilipinas, 2018; Department of Finance, 2018).

In 2010, reform advocates became hopeful that a meaningful amendment to the Sin Tax Law – which covers excise taxes imposed on tobacco and alcohol products – would finally be achieved with the election of Benigno Aquino III to the presidency. During his campaign, Aquino had promised a clean and transparent government, one that might challenge the tobacco industry's usual method of doing business (Sidel, 2014).

At the same time, the Philippines' ratification of the World Health Organization Framework Convention on Tobacco Control (WHO-FCTC) in 2005, in addition to growing evidence on the harms of tobacco consumption, provided impetus for the government and health advocates' push for stronger tobacco control policies. The MPOWER strategy of the WHO-FCTC promotes key interventions to effectively monitor and reduce demand for tobacco. In particular, the “R” in MPOWER gives emphasis to raising the price of tobacco through higher taxes – the single most effective way to prevent people from starting to smoke

(World Health Organization, 2008).

Nevertheless, the election of Aquino also presented challenges. Included in his campaign was the promise to not impose new taxes but only focus on improving tax administration (ABS-CBN News, 2010). Aquino, known to be a heavy smoker, also did not seem supportive of tobacco control (GMA News, 2010).

#### *Enactment of RA 10351*

It was not until one year into his presidency that Aquino showed interest on reforming the Sin Tax Law. This came about when the “restructuring of excise taxes on alcohol and tobacco products” was included in the list to be prioritized by the Legislative Executive Development Advisory Council (LEDAC) (Business World Online, 2011). Despite inclusion of the Sin Tax Reform in the priority bills of the LEDAC and strong commitment from the Executive, the measure continued to face fierce resistance in both Houses of Congress. Active deliberations on the Sin Tax Reform lasted 14 months. The Senate’s final vote of 10-9 in favor of the bill is proof of how difficult it was to pass this measure (House of Representatives, 2012).

Fifteen years after the last restructuring of the Sin Tax Law, RA 10351 was finally enacted on December 20, 2012. The law introduced significant improvements to the excise tax system for both tobacco and alcohol products. Its main features include: (1) substantial increase in excise tax rates; (2) shift from a multitiered system with tax rates based on product prices to one tax rate for all like-products; (3) annual 4% increase in excise tax; and (4) substantial earmarking of revenues for universal health care (Philippines, 1997).

#### *Key factors in passing the law*

Key to successful passage of RA 10351 was the broad coalition that collaborated to defeat strong lobbying by the tobacco industry. The coalition comprised government officials from various agencies, legislators, former Cabinet officials, development partners and civil society organizations. Members of the informal alliance were diverse and included economic reform-oriented groups, health advocates, medical professional organizations, farmers’ groups, academics, media partners and youth groups.

At the core of the broad coalition was a devoted team of government and civil society champions that worked closely to manage the coalition. The coalition was led by experienced activists and officials with a deep understanding of the social, economic and political contexts, and who had been advocating for tax reforms and public health policies for decades. Guided by a whole-of-government or whole-of-society approach, the core team built the coalition, gathered intelligence and identified stakeholders, mapped out the bottom-line objectives, and set the direction of the coalition’s legislative and communications strategies.

The strong research capacity of the coalition brought to the fore evidence on the many benefits of reforming the law and exposed false claims made by the tobacco industry. Policy briefs and technical papers were

produced covering a wide range of related issues. The robust international literature on the harms of smoking and benefits of tobacco taxes was particularly helpful in making a strong case for raising the tax.

Finally, effectively framing the Sin Tax Law as a health measure and a “win for all”, and implementing a timely and dynamic multimedia campaign were important in creating public pressure for the legislation of RA 10351. It was the first time that taxation became a health issue instead of just a revenue measure. The sound evidence was translated into language that was relatable to the youth and the general public. The use of media, particularly social media, was maximized, and a pool of supportive journalists and columnists were constantly updated and engaged (Sidel, 2014).

#### *Impact of RA 10351*

After enactment of RA 10351, price per pack of the most-sold brand increased from PhP 16.22 in 2012 to PhP 36.39 in 2017. For the same period, the total tax burden per pack more than tripled from 27% of the retail price to 93% (Philippine Statistics Authority, 2018).

Tobacco tax revenue grew from PhP 32 billion in 2012 to PhP 70 billion in 2013, reaching PhP 106 billion in 2017 (Department of Finance, 2018). This increase was instrumental in improving the country’s fiscal space and credit ratings (Ordinario, 2013).

From 2008 to 2015, smoking prevalence declined in the Philippines, as confirmed by two national surveys, GATS and the National Nutrition Survey (NNS) (see Figure 1). Both survey results mean a three-million reduction in the number of smokers from 2012 to 2015. NNS also shows that the biggest decline in smoking was among the poorest households (Department of Science and Technology Food and Nutrition Research Institute, 2018; Department of Health and Philippine Statistics Authority, 2015).

The law earmarks around 80% of the incremental revenue for health, resulting in tripling of the national health budget from PhP 50 billion in 2013 to PhP 165 billion in 2019 (Philippines, 2012; Philippines, 2019). This allowed the national government to fully subsidize the health insurance premiums of the poor and the elderly, resulting in 25 million more members and dependents being covered under the national health insurance program (Philippine Health Insurance Corporation, 2013; Philippine Health Insurance Corporation, 2018).

#### *Tobacco tax reform: A tailwind for tobacco control policies*

Moreover, the tobacco tax reform in 2012 created momentum for the legislation of other tobacco control policies and another round of tobacco tax adjustments in the country. The coalition that was formed was maintained, making it a formidable force capable of neutralizing the near-permanent tobacco industry. The breadth and depth of knowledge gained from the passage of RA 10351 greatly encouraged the coalition to pursue more reforms, despite the strong lobby of the tobacco industry.

Shortly after the government started implementing RA 10351 in 2013, then-Senate President Franklin Drilon, who also shepherded the passage of RA 10351 in the

Table 1. Philippine Laws on Excise Tax on Tobacco Products, 1997 to 2019

Republic Act No.	8424	9334	10351	10963	11346
Date of Enactment	December 11, 1997	December 21, 2004	December 20, 2012	December 19, 2017	July 25, 2019
Number of Tiers	4	4	2013 to 2016: 2 2017 onwards: 1	1	1
Excise Tax Increase (cigarettes packed by machine)	1998-2000: 12%	2000-2005: 14% to 86% 2005-2007: 4% to 12% 2007-2009: 4% to 11% 2009-2011: 4% to 10%	2011-2013: 108% to 341% 2013-2014: 8% to 42% 2014-2015: 4% to 24% 2015-2016: 4% to 19% 2016-2017: 3% to 20%	2017-2018: 16% 2018-2020: 7% 2020-2022: 7% 2022-2024: 4%	2018-2020: 29% 2020-2021: 11% 2021-2022: 10% 2022-2023: 9%
Adjusts tax rates annually	No	No	Yes, by 4% every year beginning in 2018	Yes, by 4% every year beginning 2024	Yes, by 5% every year beginning in 2024
Unitary tax system	No	No	Yes	Yes	Yes
Earmarks for health	No	Yes, 2.5% of incremental revenue for the National Health Insurance Program and 2.5% of incremental revenue for disease prevention program	Yes, more than 80% of incremental revenue for universal health care	No	Yes, 50% of total revenue for universal health care

Senate, expressed his strong commitment to pursue a bill that will replace the text warnings on cigarette packs with graphic health warnings. Drilon, together with other tobacco tax champions in the Senate, posited that picture-based health warnings would complement the recently passed tobacco tax law (Sy, 2013; Macaraig, 2013). True to Drilon’s promise, the Graphic Health Warnings Law or Republic Act No. 10643 (RA10643), which requires that graphic health warnings occupy 50% of the front and back panels of a cigarette pack, was enacted in June 2014 (Philippines, 2014).

As opposed to the pre-RA 10351 period, regular adjustment of tobacco taxes is now the new normal in

the Philippines. Two more amendments to the tobacco excise tax law were legislated after RA 10351. The first was a biannual PhP 2.50-increase in the specific tax on cigarettes equivalent to a 16% tax increase in 2018 under the Tax Reform for Acceleration and Inclusion (TRAIN) Law or Republic Act No. 10963 (RA 10963), which passed in December 2017. The most recent amendment under Republic Act No. 11346 (RA 1136), which was legislated in July 2019, imposed a 29-percent increase in the excise tax on cigarettes in 2020. This will be followed by 11-, 10-, and 9-percent increases for the years 2021, 2022, and 2023, respectively; after which, an annual adjustment of 5% will apply. RA 11346 also introduced excise taxes

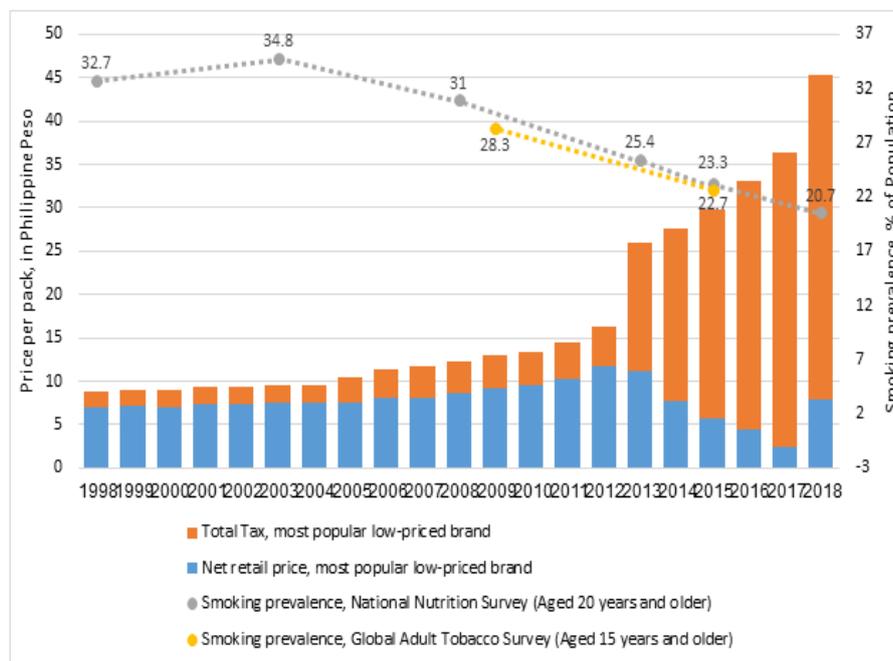


Figure 1. Price and Tax for the Most-Sold Brand among Low-Priced Cigarettes in the Philippines, and Smoking Prevalence Rates, 1998–2018. Philippine Statistics Authority. Monthly price survey, January 1998 to April 2018 (Philippine Statistics Authority, 2018). Department of Science and Technology Food and Nutrition Research Institute. National nutrition survey, 1998, 2003, 2008, 2013, 2015, and 2018 (Department of Science and Technology Food and Nutrition Research Institute, 2018). Department of Health, Philippine Statistics Authority. Global adult tobacco survey: Philippines country report (Department of Health and Philippine Statistics Authority, 2015).

on heated tobacco (HTPs) and vapor products; albeit differentiated rates on HTPs, salt nicotine vapes, and freebase vapes will apply (Philippines, 1997).

#### *New prospects for tobacco taxation*

If it were not for the inclusion of another tobacco tax increase under the TRAIN Law or RA 10963, the number of smokers would have begun to increase again in 2018 even as RA 10351 stipulates a continued annual increase of 4% in the excise tax rate. According to a tobacco excise tax simulation model, due to increasing population and strengthening of people's purchasing power concurrent with economic development, the number of smokers would have increased by one million by 2022 even when smoking prevalence would have slightly decreased if RA 10351 would have just been maintained (Van Walbeek, 2010; Action for Economic Reforms, 2017).

Hence, a more effective way to curb smoking is to consider the absolute number of smokers when setting health targets. Targeting just a reduction in the smoking prevalence rates without looking at the absolute number of smokers may fall short of the intended health impact of any tobacco control policy.

Moreover, cigarettes in the Philippines remain cheap compared to those in neighboring countries even as the excise tax of the most-sold brand already stands at more than 85% of the retail price (Kaiser et al., 2016). More importantly, cigarettes are still affordable relative to other commodities in the Philippines; for example, with the current price of a cup of cooked rice (PhP 10), one can already buy two cigarette sticks. In other words, reaching the WHO benchmark of a 70% excise tax burden may still not be enough to significantly discourage smoking.

Moving forward, the final retail price and some measure of affordability of cigarettes (i.e. price of cigarettes relative to other local commodities), as opposed to the excise tax burden, are more reliable indicators of the effectiveness of a tobacco tax policy. It is also important to monitor the pricing strategy of tobacco companies since this can easily influence the excise tax burden. Case in point, notice how, between 2013 and 2017, the net retail price of cigarettes seemed to have shrunk while the excise tax was increasing; thereby, artificially increasing the excise tax burden (see Figure 1). Tobacco companies were able to absorb the excise tax increases in the first few years of the reform but had to eventually bring back the price to its pre-reform net retail level (in 2018), to improve on their profit margin.

Hence, the 70% excise tax burden standard by the WHO should not prevent countries from pursuing higher tobacco tax levels. In setting tax level targets, each country should consider other factors, such as the baseline tax structure and tax rates, the tobacco industry's pricing behavior and competitiveness of the market, and the relative price of other basic goods. In terms of measuring affordability, however, comparison of real prices should not be with other countries but should be within country, since each country has a unique context.

Inasmuch as the tobacco industry is also quickly transitioning to harm reduction strategies, taxation as a regulatory policy for the industry's next generation

products should be simultaneously pursued alongside increasing excise taxes on the traditional tobacco products. At the very least, heated tobacco products and vape alternatives to smoking should be taxed at the same rate as cigarettes to ensure that the next generation products will not become cheaper alternatives to traditional tobacco products.

Lastly, the series of tobacco control reforms legislated in the past decade has also solidified the public's support for tobacco taxes, which once, like any other tax measure, were considered as unpopular. This implies that further tobacco tax increases, on top of the yearly 5-percent increase, can be expected in the future.

In conclusion, the Philippine experience in raising tobacco tax is proof that close collaboration between government and civil society can trump the strongest tobacco lobby even in an environment conducive to corruption and rent-seeking. It also contributes to the growing evidence that tobacco taxes are an effective policy tool in curbing smoking, expanding the fiscal space, and providing a sustainable source of financing for health. The Philippine tobacco tax reform in 2012 was also instrumental in facilitating the legislation of other tobacco control policies and further tobacco tax increases in the country. While much still needs to be done, the passage of RA 10351 offers valuable lessons for the global advancement of tobacco control and health reforms.

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#### *Statement of Conflict of Interest*

Jo-Ann Diosana is a board member at Action for Economic Reforms, Inc., one of the civil society organizations advocating for higher tobacco excise taxes in the Philippines.

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## Secondhand Tobacco Smoke Exposure in Indoor Workplaces in Viet Nam and Associated Factors: Findings from Two Rounds of Global Adult Tobacco Surveys (GATS) 2010 and 2015

Nguyen Tuan Lam<sup>1\*</sup>, Pham Thi Quynh Nga<sup>1</sup>, Mina Kashiwabara<sup>2</sup>, Phan Thi Hai<sup>3</sup>, Doan Thi Thu Huyen<sup>3</sup>, Kim Bao Giang<sup>4</sup>, Hoang Van Minh<sup>5</sup>, Nguyen The Quan<sup>6</sup>, Luong Ngoc Khue<sup>3</sup>, Kidong Park<sup>1</sup>

### Abstract

**Objectives:** This paper explores changes in the level of secondhand smoke (SHS) exposure at indoor workplaces between 2010 and 2015 in Viet Nam and the association between the exposure and various demographic factors, using data from Viet Nam's Global Adult Tobacco Surveys (GATS) 2010 and 2015. **Methods:** Data was pooled from the two GATS surveys and analysed using descriptive and Poisson regression analyses. **Results:** There was a highly statistically significant reduction in the level of SHS exposure at indoor workplaces from 55.9% to 42.6% ( $p < 0.001$ ) between 2010 and 2015. This equates to an additional 2.7 million people being protected from SHS exposure at indoor workplaces during the period. Of the demographic factors examined, being female was associated with a 30% lower risk of SHS exposure,  $p < 0.001$ . An average worker in non-government category has 16.3% lower risk compared to self-employed workers. Compared with a workplace where smoking was completely banned, those who worked in a workplace with a partial indoor smoking ban had more than 2.9 times (aPR 2.94;  $p < 0.001$ ) higher risk of SHS exposure; workplaces with no smoking policy had nearly 4 times (aPR 3.97;  $p < 0.001$ ) higher risk; and workplaces that allowed smoking anywhere indoors had a 4.6 times (aPR 4.61;  $p < 0.001$ ) higher risk. Overall, for an average worker, the risk of exposure to SHS in reduced by 23.8% in 2015 compared to 2010. Apart from the above three factors, other factors not captured in the survey contributed to about 13.3% reduction in the SHS between 2010 and 2015. **Conclusion:** SHS exposure in indoor workplaces significantly reduced in Viet Nam between 2010 and 2015. The implementation of an internal smoking ban policy in the workplaces, reflecting the implementation of the national Tobacco Control law, plays the key role in protecting people from SHS exposure in the workplaces in Viet Nam.

**Keywords:** Secondhand smoke- Indoor workplace- GATS- Viet Nam

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### Introduction

Secondhand tobacco smoke (SHS) is the combination of smoke emitted from the burning end of a cigarette or other tobacco products and smoke exhaled by the smoker. SHS contains thousands of known chemicals, at least 250 of which are toxic and more than 50 are carcinogenic (WHO, 2009). Involuntary or passive smoking occurs when an individual is exposed to SHS and involuntarily inhales the SHS carcinogens and toxic components (WHO, 2017). SHS has been found to increase an individual's risk of developing acute coronary heart disease, lung cancer, breast cancer, and nasal irritation, among other diseases (WHO, 2009). There is no safe level of exposure to SHS and everyone should be protected from such exposure (WHO, 2009). The workplace is one setting where a

number of deaths associated with exposure to SHS are reported. The International Labour Organization, for example, estimates that globally, approximately 14 %, about 200,000, of all work-related deaths caused by diseases are linked to exposure to SHS in the workplace (ILO, 2005).

Implementation of smoke-free workplace not only protects the workers there but also facilitates tobacco cessation among smokers. Evidence has shown that smokers who work in smoke-free workplaces are twice as likely to quit smoking than those who work in places where smoking is permitted and they tend to reduce the amount of cigarettes they consume per day (Bauer et al., 2005).

Creating smoke-free environment in indoor workplaces is one component of the World Health Organization

<sup>1</sup>World Health Organization, Country Office for Viet Nam, Hanoi, Viet Nam. <sup>2</sup>World Health Organization, WPRO, Manila, Philippines. <sup>3</sup>Viet Nam Tobacco Control Fund, Viet Nam. <sup>4</sup>Hanoi Medical University, Hanoi, Viet Nam. <sup>5</sup>Hanoi University of Public Health, Hanoi, Viet Nam. <sup>6</sup>Viet Nam General Statistics Office, Viet Nam. \*For Correspondence: nguyentuanl@who.int

(WHO) MPOWER package, the six effective measures to reduce tobacco use. It is also one of the most cost-effective interventions against NCDs, as recommended by WHO's Global Action Plan for the Prevention and Control of NCDs 2013-2020 (WHO, 2013).

Tobacco control has been identified as a public health priority in Viet Nam. In December 2004, the country ratified and became a party to the WHO Framework Convention on Tobacco Control (FCTC) and in 2012, enacted the national tobacco control law. The new law promulgates, among other tobacco control measures, the implementation of smoke-free environments covering indoor public places and workplaces.

In 2010, Viet Nam conducted the first Global Adult Tobacco Survey (GATS) and the survey was repeated in 2015. This provided a valuable opportunity to assess progress made in tobacco control, including the implementation of smoke-free environment in indoor workplaces. The GATS surveys utilized the standardized sampling design protocol developed by the Centre for Disease Control and Prevention (CDC) and WHO. A total of 9,925 interviews were completed for GATS 2010 and 8,996 for GATS 2015.

The purposes of this paper are 1) to examine the changes in the level of SHS exposure in workplaces in Viet Nam between 2010 and 2015, 2) to examine associated factors for SHS exposure in indoor workplaces in 2015, and 3) to assess relative levels of contribution of those factors in the total reduction of the probability of SHS exposure between 2010 and 2015.

## Materials and Methods

This paper utilized data from the Viet Nam GATS surveys 2010 from the WHO GATS database (WHO, 2016) and the GATS 2015 dataset from the Tobacco Control Fund-MOH Viet Nam. The Viet Nam GATS 2010 and 2015 are nationally representative surveys of adults aged 15 years and above and who identified Viet Nam as their primary place of residence. The two datasets were pooled and analysed using the Stata 14 software.

### Measurements

The dependent variable of interest is the level of SHS exposure in indoor workplaces, which was defined as indoor workers who had noticed someone smoking in the indoor area where he or she had worked in the 30 days prior to the survey being conducted. Independent variables included: year of the survey, gender, smoking status, age-group, residence, education level, employment type, occupation, and workplace smoking policy.

Year of the survey was coded for 2010 and 2015. Gender included male and female and smoking status included current smokers and non-smokers. Age-group included 3 categories: (1) 15-24, (2) 25-44, and (3) 45 and above. Place of residence was categorized into rural and urban. Education was coded into 4 categories: (1) primary or less, (2) lower secondary, (3) upper secondary, (4) college or above. Employment type included: (1) informal sector worker, (2) non-government employee and (3) government employee. Occupation was coded

into: (1) senior officials, (2) professional, (3) para-professional, (4) elementary, and (5) others. Workplace smoking policy was coded into: (1) not allowed anywhere indoors, (2) allowed in some indoor areas, (3) there is no policy, and (4) allowed everywhere. The latter refers to the internal smoke-free policies set by managers or owners of a workplace (which also reflect the level of the implementation of the national law in that workplace) as reported by survey participants. It should be noted that the occupation variable was asked differently in the 2010 and 2015 surveys, therefore, comparison of the level of SHS exposure using this variable was not possible.

Calculation were also made to estimate the number of workers protected from SHS exposure at the indoor workplaces by comparing the number exposed in 2015 with the number that would be exposed if the rate of SHS exposure were the same as in 2010.

### Statistical Analysis

Descriptive and inferential statistical analyses were conducted using Stata 14 software. The survey design, including strata, cluster and weight, were declared in the software and used in all analysis in this paper. Two-year comparison of SHS was explored using descriptive analysis comparing levels of exposure overall and among sub-groups (i.e. the independent variables) between 2010 and 2015. Chi-square was used to test for statistical differences in the prevalence of SHS exposure between 2010 and 2015 GATS surveys.

The associated factors for SHS exposure in indoor workplaces were examined using univariate and multiple regressions. Poisson regression with robust variance estimators was used to estimate adjusted Prevalence Ratio (aPR) and their 95% confidence intervals (CIs) for the cross-sectional data. This was achieved by treating the binary outcomes as count variables and assuming all the subjects had the same length of follow-up (Barros and Hirakata, 2003; Chen et al., 2016). Poisson regression was chosen because initial analysis showed that the proportion exposed to SHS in the indoors at work was high, which made it less appropriate to use OR as yielded by logistic regression (Barros and Hirakata, 2003; Deddens and Petersen, 2008; Chen et al., 2016). All the variable that showed significant ( $p < 0.05$ ) in the univariate model (Model 1) were included in the Poisson multiple regression model (Model 2). In the multiple regression model, the stepwise backward elimination procedure was applied until all variables in the model are significant ( $P < 0.05$ ). Beside the Poisson model, the same procedures were also done using logistic regression model (Model 3) and the results of the final multiple logistic regression model were also given for reference purpose only.

Each of the factors that showed significance in the multiple regression model were included in an additional regression models (model 2.a; 2.b; 2.c and 2.d) with the year of survey variable in order to assess the level of contribution of each of these variable in the reduction of SHS between 2015 and 2010, based on the change in the aPR of the variable Year of survey in these different models.

To help assess the fit of the regression model, the

goodness-of-fit chi-squared test value was obtained. To help assess if there was any problem with over-dispersion of the data (i.e. when the conditional variance exceeds the conditional mean), negative binomial regression was used to obtain the chi-square value for the hypothesis that alpha equals zero.

## Results

### *Comparison of SHS exposure in indoor workplaces between GATS 2010 and 2015*

Between 2010 and 2015, there was a significant reduction in the overall level of SHS exposure at work from 55.9% in 2010 to 42.6% in 2015 (Table 1). This represents a 23.8% relative reduction between the two surveys ( $p<0.001$ ). The reduction was almost evenly seen in all socioeconomic sub-groups between the two iterations of the survey. The highest reductions were observed in the groups who work in places where smoking indoors was not permitted from 24.6% in 2010 to 13.6% in

2015 (44.7% relative reduction); and among government employees from 46.3% in 2010 to 30.1% in 2015 (35.0% relative reduction). Among the non-smoking indoor workers alone, there was a highly significant reduction from 49.0% to 36.8% ( $P<0.001$ ) (i.e. a 24.9% relative reduction).

It is noted that on one hand, there was a large reduction in the level of SHS exposure in those workplaces where smoking is completely banned, on the other hand there was very little or no reduction in those workplaces where smoking is allowed everywhere, or smoking is allowed in some indoor areas or there is no policy.

### *Associated factors for SHS exposure in indoor workplaces*

The association between socio-demographic factors and SHS exposure is presented in Table 2. The univariate regression model showed significance for all factors considered. However, after using stepwise backward elimination procedure in the multiple regressions model, only 4 out of the 8 factors were significant ( $P<0.05$ ) and

Table 1. SHS exposure at indoor workplaces among Workers Aged 15 Years and Above –a Comparison between 2010 and 2015, GATS, Viet Nam

Demographic Characteristics	Exposure to SHS at workplaces				Relative Change (%)
	2010		2015		
	Percentage	(95% CI)	Percentage	(95% CI)	
Overall	55.9	(52.8, 59.0)	42.6	(39.9, 45.3)	-23.8***
Gender					
Male	68.7	(64.9, 72.2)	54.4	(50.6, 58.1)	-20.8***
Female	41.4	(37.2, 45.7)	29.9	(26.8, 33.1)	-27.8***
Smoking status					
Non-smokers	49.0	(45.4, 52.6)	36.8	(34.0, 39.7)	-24.9***
Smokers	74.3	(69.8, 78.5)	63.3	(57.7, 68.4)	-14.8**
Age (years)					
15-24	49.2	(41.8, 56.7)	36.7	(30.5, 43.4)	-25.4*
25-44	58.0	(54.4, 61.6)	43.0	(39.7, 46.4)	-25.9***
45 and above	58.6	(53.6, 63.5)	48.4	(44.4, 52.5)	-17.4**
Residence					
Urban	52.4	(49.1, 55.7)	39.8	(36.9, 42.8)	-24.0***
Rural	59.0	(53.9, 64.0)	45.1	(40.7, 49.5)	-23.6***
Education Level					
Primary or less	66.1	(54.9, 75.7)	52.9	(41.9, 63.6)	-20
Lower secondary	61.1	(56.3, 65.7)	53.6	(49.0, 58.2)	-12.3*
Upper secondary	61.6	(55.7, 67.2)	48.1	(41.7, 54.6)	-21.9**
College or above	45.6	(41.1, 50.2)	33.2	(29.5, 37.0)	-27.2***
Type of employment					
Informal-sector worker	68.4	(53.7, 63.4)	58.1	(53.6, 62.5)	-15.1***
Non-government employee	33.4	(54.4, 61.6)	31.4	(27.3, 35.9)	-6
Government employee	46.3	(41.8, 56.7)	30.1	(26.0, 34.5)	-35.0***
Workplace smoking policy					
Not allowed anywhere indoors	24.6	(20.8, 28.7)	13.6	(11.3, 16.4)	-44.7***
Allowed in some indoor areas	56.4	(50.3, 62.3)	51.7	(46.3, 57.0)	-8.3
There is no policy	82.1	(78.7, 85.1)	74.1	(69.1, 78.6)	-9.7**
Allowed everywhere	91.0	(86.1, 94.3)	90.1	(85.1, 93.6)	-1

\*  $p<0.05$ , \*\*  $p<0.01$ , \*\*\*  $p<0.001$

Table 2. Associated Factors for SHS Exposure at Indoor Workplaces, GATS 2010 and 2015, aged 15 Years and Older, Viet Nam

Demographic	Poisson univariate regression aPR (95% CI) (Model 1)		Poisson multiple regression aPR (95% CI) (Model 2)		Logistic multiple regression OR (95% CI) (Model 3)	
Characteristics						
Year of survey						
2010	1		1		1	
2015	0.762***	(0.699, 0.829)	0.867***	(0.814, 0.923)	0.644***	(0.534, 0.777)
Gender						
Male	1		1		1	
Female	0.572***	(0.527, 0.621)	0.706***	(0.657, 0.757)	0.390***	(0.326, 0.465)
Smoking status						
Non-Smoker	1					
Smokers	1.64***	(1.53-1.76)				
Age (years)						
15-24	1					
25-44	1.17**	(1.03, 1.33)				
45-64 and above	1.25***	(1.10, 1.42)				
Residence						
Urban	1					
Rural	1.13**	(1.04, 1.23)				
Education Level						
Primary or less	1					
Lower secondary	0.891*	(0.803, 0.988)				
Upper secondary	0.883*	(0.787, 0.990)				
College or above	0.618***	(0.551, 0.691)				
Type of employment						
Informal sector worker	1		1		1	
Non-government employee	0.508***	(0.451, 0.572)	0.837***	(0.756, 0.927)	0.677**	(0.532, 0.861)
Government employee	0.578***	(0.522, 0.640)	1.02	(0.921, 1.12)	0.963	(0.753, 1.23)
Workplace smoking policy						
Not allowed anywhere indoors	1		1		1	
Allowed in some indoor areas	3.10***	(2.69, 3.59)	2.94***	(2.54, 3.39)	5.29***	(4.24, 6.59)
There is no policy	4.49***	(3.93, 5.14)	3.98***	(3.43, 4.62)	14.2***	(10.9, 18.4)
Allowed everywhere	5.21***	(4.56, 5.95)	4.61***	(3.98, 5.34)	39.4***	(26.1, 59.3)

p<0.05, \*\* p<0.01, \*\*\* p<0.001

kept in the model. These includes: (1) year of survey, (2) gender, (3) type of employment and (4) workplace smoking policy.

An average workers in 2015 was less likely to be exposed to SHS compared to their counterpart in 2010 (aPR=0.867; P<0.001). Women were having lower risk of exposed to SHS at work than men (aPR =0.706; p<0.001). Those who work in the non-government sector have lower

risk of exposure to SHS compared with those who were self-employed workers (aPR=0.837; P<0.001).

Most importantly, having a smoke-free policy in the workplace showed a significant and strong association with being protected from SHS exposure. Compared with workplaces with a complete smoking ban, those who worked in a workplace with a partial indoor smoking ban or with no policy are much more likely to be exposed to

Table 3. Changes in the aPR of the Year of Survey Variable, Reflecting the Level of Reduction of the Risk of Exposure to SHS between 2010 and 2015 of an Average Worker and Role of Different Factors

Models specifications	Multiple regression with Year of survey + Gender aPR (95% CI) (Model 2.a)		Multiple regression with Year of survey + Type of employment aPR (95% CI) (Model 2.b)		1c: Multiple regression with Year of survey + Workplace smoking policy aPR (95% CI) (Model 2.c)		1d: Multiple regression with year of survey + Type of employment+ Workplace smoking policy aPR (95% CI) (Model 2.d)	
Year of survey								
2010	1		1		1		1	
2015	0.767***	(0.708, 0.831)	0.826***	(0.763, 0.895)	0.854***	(0.800, 0.911)	0.867***	(0.814, 0.925)

SHS (aPR= 2.94 and aPR=3.98 respectively;  $p<0.001$  for both). Furthermore, the highest risk of SHS exposure was observed among those workers in an indoor workplace where smoking is allowed everywhere (aPR=4.61;  $p<0.001$ ).

For other factors, including Smoking status, Age group, Residence and Education level there were significant difference of the aPR in the univariate regression model, but there is no significant difference found in the multiple regression model.

Both tests for the regression model showed that the model fits very well with the data and there is no problem with over-dispersion as the Hosmer–Lemeshow goodness-of-fit test gives  $F = 0.81$  and  $P = 0.60$ , and the negative binomial regression gives the likelihood-ratio test of  $\alpha=0$  with  $P = 1.00$ .

On average a worker in 2015 has 23.8% reduction in the risk of exposure to SHS compared to his or her counterpart in 2010 (Table 2, Model 1: aPR=0.762). Based on the further analysis to assess the contribution of each factor to the overall reduction of the risk of SHS exposure (Table 3), gender accounted for only about 0.5% reduction (Table 3, Model 2.a: aPR for year of survey increased from 0.762 in the univariate model to 0.767 in the model with Gender) in the risk of exposure to SHS at workplaces, type of employment account for about 6.4% reduction (Table 3, Model 2.b: aPR increased from 0.762 to 0.826,) while workplace smoking policy account for about 9.2% (Table 3, Model 2.c: aPR increased from 0.762 to 0.854).

When both variables “Type of employment” and “Workplace smoking policy” were added in the model (Table 3, Model 2d), the combined effect of the two variables is a reduction of only 10.5% (aPR for Year of survey increased from 0.762 to 0.867). That is, the combined effect of the two variables (as can be seen in the Model 2.b and Model 2.c) is less than the sum of the two (Model 2.d).

## Discussion

In comparing the results of the Viet Nam GATS 2010 and 2015 surveys, there is evidence of a significant reduction (23.8% relative reduction) in the level of SHS exposure at indoor workplaces, from 55.9% in 2010 to 42.6% in 2015. As the results of the reduction in the rate of SHS exposure, there were 2.7 million more workers, including nearly 2 million nonsmokers, being protected from SHS exposure at indoor workplaces in 2015, as compared with 2010.

This reduction reflected the result of significant investment, effort, and progress made in tobacco control in the country in the period, especially the adoption of a strong tobacco control law in line with the WHO FCTC in 2012, and the establishment of the Viet Nam Tobacco Control Fund (VNTCF) in 2014 (WHO, 2016a), which has been providing sustainable funding for tobacco control activities in the country.

During 2014 and 2015, the VNTCF had invested 35% of the total of its income to support implementation of smoke-free settings in work and public places (WHO, 2016a). The effort included activities such as:

disseminating the smoke-free provisions in the Law; conducting training on SHS harm and how to implement smoke-free workplace and public places for managers of public and workplaces; producing and disseminating no-smoking signs; and conducting mass media campaign on harm of SHS. As results, the percentage of respondents who reported working in an indoor workplace with a total indoor smoking ban increased significantly from 30.9% in 2010 to 43.8% in 2015 ( $p<0.001$ ) (author calculation).

Of the associated factors, being female proved to be a protective factor, having about 30% lower risk of exposure to SHS compared to male counterpart. There seems to be some level of consideration for women by smokers at workplaces, e.g. smokers would try not to smoke when there were women in the room. This result is also consistent with studies in Germany (Fischer and Kraemer, 2016), and USA (Max et al., 2012). On the other hand, this factor does not seem to contribute any significant role in the reduction of SHS exposure between 2010 and 2015, with only about 0.5% of the reduction, as calculated from Table 3, Model 1. This could be explained by the fact that the composition of male and female worker stayed almost the same in the two surveys.

Regarding the type of employment, those working the informal sector has the highest risk of exposure to SHS exposure, while non-government workers have about 16.3% (aPR=0.837) lower risk. This result is as expected, given the informal sector often has a lower level of compliance with the smoking ban in workplaces. Regarding the contribution in the overall reduction of the risk of SHS exposure between the two surveys, this factor contributed a sizable part, about 6.4% as calculated from the Table 3, Model 2.b. The main contribution seems to come from the fact that there is a smaller proportion of informal sector workers in 2015 (80.5%-author calculation) as compared to that in 2010 (88.4%-author calculation).

The implementation and enforcement of smoke-free workplace policies proved to be the most important factor that affected levels of SHS exposure at indoor workplaces. The risk of SHS exposure was 4.6 times higher (aPR=4.61) in the workplaces where smoking is allowed everywhere compared with those places where smoking is completely banned. This result is similar to studies conducted in China, national level (Xiao et al., 2010), and 5 venues in Zhejiang Province (Xu et al., 2014), in which they found significant lower odds of exposure to SHS in the workplaces that had comprehensive smoking ban compared with the workplaces without the ban. This result shows that, even when there is a national smoke-free law in place, it is not effective if the law is not implemented by managers or owners of the workplace. Furthermore, this is also the factor that have accounted for the biggest impact in the reduction in the risk of exposure to SHS between 2015 and 2010, about 9.2%, as calculated from the Table 3, Model 2.c.

The combined effects of the two variables “Type of employment” and “Workplace smoking policy” (Table 3, Model 2.d) were smaller than the sum of the impact of the two in the separate models (Model 2.b and Model 2.c) which suggested that the impact of reducing SHS

exposure by the “Type of employment” between 2010 and 2015 had been partly achieved via the improvement of the workplace smoking policy in each of the type of employment categories.

It is noted that adding the Gender variable to the Model 2.b, Model 2.c and Model 2.d does not change the result of those models. There, the Gender variable was not included in those models.

Apart from the above three factors, the year of survey variable in the multiple regression model showed, as in Table 2, Model 2, that there are other factors that accounted for about 13.3% reduction (aPR=0.867) in the risk of exposure to SHS in the workplace in 2015 compared to 2010. Certainly, the communication efforts to raise awareness of smokers and their level of self-compliance with the smoke-free indoor regulation played an important role in this part.

Although the level of SHS exposure in Viet Nam has decreased significantly between 2010 and 2015, it is still at a fairly high level compared with other countries where GATS surveys have been conducted. For example, in Turkey, SHS exposure at indoor workplaces was found to be the lowest at 15.6% in 2012, followed by Brazil at 24.4% in 2008 (WHO, 2016).

On the statistical side, the logistic regression results showed very high OR (up to 39.0) for selected indicators which can cause misleading interpretation of the level of association. This provided additional evidence to show that the use of Poisson regression is more suitable than logistic regression when the outcome is prevalent.

In summary, there was a statistically significant reduction in the level of SHS exposure at indoor workplaces and there was significantly higher percentage of respondents reporting working in a workplace with complete indoor smoking ban in 2015 compared to 2010. This reflected the effort of the Ministry of Health and partners in the implementation of the tobacco control law, especially the implementation of smoke-free environment in public and workplaces during the period between 2010 and 2015. It was the internal workplace smoking policy of each workplace that played the most important role in deciding level of SHS exposure to workers.

The government should take special efforts to ensure all indoor workplaces issue and enforce their internal workplace smoking ban policy so as to effectively implement the smoke-free environment provision in the national law, to protect the health of their workers. This should include more communication campaigns target workplace owners and managers; trainings and regular inspections to ensure that the owners or managers of the workplaces issue and implement internal smoking ban policy covering all indoor areas in their workplaces.

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## Statement conflict of Interest

None.

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# CONTENTS

APJCP, Volume 21, Suppl. 1, 2020

## Editorial:

*Building Momentum for Tobacco Control in the Western Pacific Region*  
**Vinayak Prasad, Julliane Moira Sy**

Page 1

## Perspective:

*Making Strides Together against Tobacco Use*  
**Takeshi Kasai**

Page 3

## Correspondence:

*Improving Information to Enable Effective Tobacco Control Intervention .....*  
**James Rarick, They Kheam, Yel Daravuth**

## Review:

*Investing in Tobacco Control: Twelve Years of MPOWER Measures and Progress .....*  
**Katia De Pinho Campos, Mina Kashiwabara, Ashlee Teakle**

Page 5

## Original Article:

*Secondhand Smoke Exposure among Nonsmokers in China*  
**Lin Xiao, Yuan Jiang, Jingru Zhang**

Page 9

## Original Article:

*Tobacco Industry Fingerprints on Delaying Implementation of Pictorial.....*  
**Yen Lian Tan, Judith Mackay, Mary Assunta Kolandai**

Page 17

## Original Article

*Raising Tobacco Taxes: The Philippine Experience*  
**Jo-Ann L. Diosana**

Page 23

## Original Article

*Secondhand Tobacco Smoke Exposure in Indoor Workplaces.....*  
**Nguyen Tuan Lam, Pham Thi Quynh Nga, Mina Kashiwabara**

