

# The Challenge of Eliminating Tobacco-induced Cancers in the Developing World

a report by

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Cancer is a leading cause of death worldwide. The World Health Organization (WHO) estimates that 7.6 million people died of cancer in 2005.<sup>1</sup> More than 70% of all cancer deaths occur in low- and middle-income countries.<sup>1</sup> Deaths from cancer in the world are projected to continue rising, with an estimated nine million people dying from cancer in 2015 and 11.4 million dying in 2030.<sup>2</sup> This forms part of a larger epidemiological transition in which the burden of chronic, non-communicable disease is now increasing in less developed countries. Tobacco use is the single largest preventable cause of cancer in the world today. In addition to the accumulating risks associated with diet, alcohol and industrial exposure, the increase in tobacco use in developing countries will result in large increases in tobacco-induced cancers and death. This article summarises the current status of the tobacco epidemic and tobacco-induced cancer burden and the challenges in curbing the tobacco epidemic in the developing world. It also explores potential policy responses to the growing tobacco epidemic in developing countries. Such responses may include mobilising the political will of governments to implement the WHO Framework Convention on Tobacco Control (WHO FCTC) to fulfil their commitment to fight the tobacco epidemic and protect their population from tobacco-related death. Another response is the integration of tobacco control interventions into the overall framework of chronic disease prevention and control, together with encouraging more engagement in tobacco control from oncologists as part of their routine practice.

## A Growing Tobacco Epidemic in Developing Countries

Tobacco use is the single largest preventable cause of cancer in the world today. Tobacco kills one person every six seconds.<sup>3</sup> It kills up to one in every two users of those who use it as intended.<sup>3,4</sup> In the 20th century, it is estimated that the tobacco epidemic has killed 100 million people worldwide. Unless urgent action is taken there could be up to one billion deaths during the 21st century.<sup>5</sup> Tobacco use is growing fastest in low-income countries as a result of low prices and steady population growth coupled with tobacco industry targeting, ensuring that millions of people become fatally addicted each year. More than 80% of the world's tobacco-related deaths by 2030 will be in low- and middle-income countries.<sup>6</sup>

More than 40% of the world's smokers live in two major developing countries: China and India. As many as 100 million Chinese men currently under 30 years of age will die from tobacco use.<sup>7</sup> In India, about one-quarter of deaths among middle-aged men are caused by smoking.<sup>8</sup> As the number of smokers in this group increases with population growth, so will the number of deaths. The shift of the tobacco epidemic to the developing world will lead to unprecedented levels of disease and early death in countries where population growth

and the potential for increased tobacco use are highest and where healthcare services are least available.

## Association Between Tobacco and Cancer

No part of the human body escapes damage from tobacco use. Tobacco use is the single most important risk factor for cancer and causes a large variety of cancer types, such as lung, larynx, oesophagus, stomach, bladder, oral cavity and others (see *Table 1*). The parts of the body with direct contact with smoke (lungs, oral cavity and oesophagus) are at the greatest risk of developing cancer. Environmental tobacco smoke (passive smoking) causes lung cancer. The proportion of lung cancers in ex-smokers and those who have never smoked that are attributable to environmental tobacco smoke was estimated as between 16 and 24%, mainly the result of the contribution of work-related exposure.<sup>9</sup>

Lung cancer is recognised to be the most important cause of death from cancer in the world (1.3 million deaths/year).<sup>2</sup> The major cause of the disease is tobacco smoking, primarily of cigarettes. Tobacco's role in increasing the chance of lung cancer is one of the most widely known of tobacco's harmful effects on human health. Sir Richard Doll's 1950 paper demonstrating the association between smoking and lung cancer has become a public health classic. After half a century, the report of the Surgeon General in 2004 stated that cancer "was among the first diseases causally linked to smoking".<sup>10</sup>



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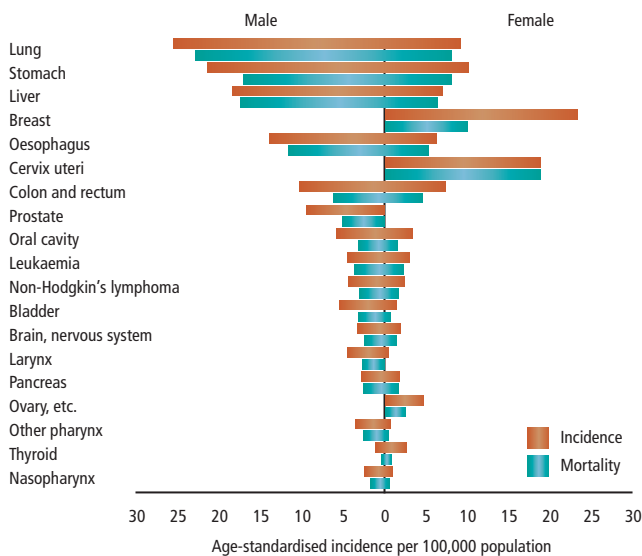
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**Table 1: Diseases Caused by Smoking and Second-hand Smoke**

Disease Caused by Smoking		Disease Caused by Second-hand Smoke	
Cancers	Chronic Diseases	Children	Adults
Larynx	Stroke	Brain tumours	Stroke
Oropharynx	Blindness Cataracts	Middle ear disease	Nasal irritation Nasal sinus cancer
Oesophagus	Periodontitis	Lymphoma	Breast cancer
Trachea, bronchus or lung	Aortic aneurysm	Respiratory symptoms Impaired lung function	Coronary heart disease
Acute myeloid leukaemia	Coronary heart disease	Asthma	Lung cancer
Stomach	Pneumonia	Sudden infant death syndrome (SIDS)	Atherosclerosis
Pancreas	Atherosclerotic peripheral vascular disease	Leukaemia	Chronic obstructive pulmonary disease (COPD) Chronic respiratory symptoms Asthma Impaired lung function
Kidney and ureter	Chronic obstructive pulmonary disease (COPD) Asthma Other respiratory effects	Lower respiratory illness	Reproductive effects in women: Low birthweight Pre-term delivery
Colon	Hip fractures		
Cervix	Reproductive effects in women (including reduced fertility)		
Bladder			

*Evidence of causation suggestive; evidence of causation sufficient.*

**Figure 1: Incidence and Mortality from the Most Common Cancers in Less Developed Countries**



For smoking-attributable cancers, the risk generally increases with the number of cigarettes smoked and the number of years of smoking, and generally decreases after quitting completely. Risk of lung cancer is particularly dependent on duration of smoking; therefore, the earlier the age at initiation of smoking, the greater the individual risk. Furthermore, the longer the time period during which a major proportion of adults in a population have smoked, the greater the incidence and mortality from the disease in that population. Risk of lung cancer is also proportional to the number of cigarettes smoked, increasing with increasing cigarette usage. In populations with a long duration and heavy intensity of cigarette usage, the proportion of lung cancer attributable to smoking is of the order of 90%.<sup>11</sup> This attributable proportion applies to men in most Western populations. In populations in which women are increasingly using cigarettes, the attributable proportion in women is also approaching this level. In the US, the risk of dying from lung cancer is more than 22 times higher

among men who smoke cigarettes and about 12 times higher among women who smoke cigarettes compared with those who have never smoked.<sup>12</sup> Recently, the spread of tobacco use to developing countries has led to papers describing similar patterns there. In a study of one million deaths in China, lung cancer risk was two to four times higher among men who smoked compared with men who did not smoke. This association was generally consistent over both rural and urban areas.<sup>7</sup> A newly published study in South Africa showed that the odds ratio for lung cancer among current smokers was 16.3 (95% confidence interval [CI] 9.6–27.6) for men and 6.4 (95% CI 4.0–10.4) for women compared with those who have never smoked.<sup>13</sup>

All forms of tobacco are lethal. Bidis are small hand-rolled cigarettes typically smoked in India and other South-East Asian countries. Bidi smokers have a three-fold higher risk of oral cancer compared with non-smokers and are also at increased risk of lung, stomach and oesophageal cancer.<sup>14</sup> Kreteks, clove and tobacco cigarettes, most commonly smoked in Indonesia, place smokers at increased risk of acute lung injury and lung cancer as well.<sup>15</sup> Shisha, tobacco cured with flavourings and smoked from hookahs primarily in the eastern Mediterranean region, is linked to lung disease, cardiovascular disease and cancer.<sup>15</sup>

**Tobacco-related Cancer Burden in Developing Countries**

Tobacco use is responsible for up to 1.5 million cancer deaths per year, 60% of these deaths occurring in low- and middle-income countries.<sup>1</sup> A shifting tobacco epidemic in developing countries, together with the rapid ageing of populations and other factors, is likely to lead to a new epidemic of tobacco-induced cancers in developing countries. In low- and middle-income countries, tobacco-attributable deaths have been projected to double between 2002 and 2030.<sup>1</sup> Lung cancer is the most frequent type of cancer in developing countries (see *Figure 1*).<sup>16</sup> It is projected that the number of lung cancer deaths will nearly double by 2030 (from 1.3 million in 2005 to 2.2 million in 2030). The burden of this increase will be felt most dramatically in low- and middle-income countries in Africa and Asia. The first estimates of the health impacts

of smoking in China and India have also shown substantially increased risk of mortality from, among others, lung cancer and oral cancer.<sup>17</sup>

A first analysis of time trends in cancer mortality in China at the national level, based on data from a national mortality routine reporting system in China, demonstrated that between 1987 and 1999 the age-standardised mortality rate for lung cancer showed significant increasing trends in both urban and rural areas and for both sexes.<sup>18</sup> As the Chinese population ages, and smoking prevalence remains high, the number of new lung cancer cases will continue to increase and the overall burden of lung cancer will remain high.

A systematic review of the published studies on epidemiology, diagnosis and treatment of lung cancer in India showed that with the increasing prevalence of smoking lung cancer has reached epidemic proportions in India. It has surpassed the earlier most common form of cancer, that of the oropharynx, and is now the most common malignancy in males in many hospitals.<sup>19</sup> In view of the large population in India, the burden of lung cancer will be enormous in the future.

### Eliminating Tobacco-induced Cancers by Reducing Tobacco Use in Developing Countries

Although some other factors (e.g. population ageing and urbanisation) are associated with the increased cancer burden in developing countries, addressing tobacco is also addressing cancer, as tobacco use is becoming the greatest threat to cancer control in developing countries. The decrease in the overall lung cancer burden that is currently occurring in the US has been proved to be mainly attributed to tobacco control efforts over the past 40 years.<sup>20,21</sup> Therefore, reducing tobacco use should be a critical priority to eliminate tobacco-induced cancers in developing countries. Currently, there are a number of common policy deficiencies or challenges to both tobacco control and cancer prevention in developing countries. These include the lack of effective surveillance and control, lack of capacity in healthcare systems, lack of funding and coverage at the national level and lack of political will, but, more fundamentally, the aggressive tobacco industry marketing efforts.

### World Health Organization Tobacco Control Tools for Cancer Prevention

WHO and its Member States recognised the global burden of non-communicable diseases as one of the major challenges for development in the 21st century (demonstrated in World Health Assembly [WHA] resolution 58.22 at the 58th WHA). Moreover, the Member States of the WHO have expressed strong commitment to developing and reinforcing comprehensive cancer control programmes in which prevention is considered a key element. In this regard, public policy targeting behavioural changes including tobacco control is a key component of the overall strategy for the prevention of non-communicable diseases.

Extending far beyond the health sector, cancer prevention actively involves a broad spectrum of occupational, social and political sectors. The major aim is to create environments where health choices are the easier ones, and to increase individual skills in making healthier lifestyle choices.<sup>22</sup> The draft action plan for the global strategy for the prevention and control of non-communicable diseases, which was discussed at the 61st WHA in May 2008, provides a clear road-map for

scaling up the WHO's technical assistance at global, regional and country levels to address the growing burden of non-communicable diseases. As outlined in the following sections, the WHO FCTC and WHO's complementary technical package for tobacco control (MPOWER) are key components of the WHO's global strategy for preventing non-communicable diseases.

### World Health Organization Framework Convention on Tobacco Control

The WHO FCTC is the first global health treaty negotiated under the auspices of the WHO. This convention is an evidence-based treaty that reaffirms the right of all people to the highest standard of health. It represents a paradigm shift in developing a regulatory strategy to address addictive substances. In contrast to previous drug control treaties, the WHO FCTC asserts the importance of demand reduction strategies, as well as supply reduction issues.

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The WHO FCTC was developed in response to the globalisation of the tobacco epidemic. The spread of the tobacco epidemic is exacerbated by a variety of complex factors with cross-border effects, including trade liberalisation, direct foreign investment, global marketing, transnational tobacco advertising, promotion and sponsorship, and the international movement of contraband and counterfeit cigarettes. Therefore, the convention addresses both public health and economic dimensions of the tobacco epidemic with evidence-based measures that set a global minimum standard.

Less apparent than the economic and health impact of the WHO FCTC's methods is its political and multisectoral impact. Co-operation and political resolve have become essential as more sectors become involved with the battle against the tobacco epidemic. There is a growing awareness of the effectiveness of the multisectoral approach's synergistic core. As Dr Margaret Chan, Director General of WHO, stated: "Multiple sectors influence health and should pay attention to the health impact of their policies".<sup>23</sup> Each of the WHO FCTC's measures enhances the efficacy of the others. Thus, the whole of the WHO FCTC is greater than the sum of its parts.

The WHO FCTC provides the context for a substantial scale-up of the WHO's efforts at a country level to reduce the burden of non-communicable disease by implementing a core package of cost-effective demand reduction measures. The treaty itself has catalysed organisational and national programmatic movement to address the effects of non-communicable disease and its determinants.<sup>23</sup>

The WHO FCTC came into force on 27 February 2005 and quickly became one of the most rapidly embraced treaties in the UN's history. The convention has re-invigorated tobacco control efforts and has

established tobacco control as a priority on the public health and development agenda.

### **World Health Organization MPOWER Policies as Entry Points for Cancer Prevention and the Effective Implementation of the Framework Convention on Tobacco Control**

Understanding the importance of the political momentum developed during the negotiations and the tremendous global support for the WHO FCTC, whose parties cover more than 80% of the world's population, the WHO has established MPOWER, a package of six proven tobacco control policies designed to help countries implement and build on the core elements of the WHO FCTC convention. The MPOWER policies, and the corresponding demand reduction articles of the WHO, offer a cost-effective road-map for saving millions of lives in the future. The MPOWER package includes the most effective policies that are proved to reduce the prevalence of tobacco use:<sup>5</sup>

- monitoring tobacco use and prevention;
- protecting people from tobacco smoke;
- offering help to quit tobacco use;
- warning people about the dangers of tobacco;
- enforcing bans on tobacco advertising, promotion and sponsorship; and
- raising taxes on tobacco.

If these policies are fully implemented and enforced, they will protect each country's people from the illness and death that the tobacco epidemic will otherwise inevitably bring. The impact of the MPOWER policies can turn the vision of the FCTC into a global reality. Although the tobacco epidemic can be countered, countries need to take effective steps to protect their populations. Furthermore, the tobacco epidemic is making health inequalities worse, both within countries, where in most cases the underprivileged smoke far more than the wealthy, and internationally, with poor countries soon to make up more than 80% of the illness and death caused by tobacco.

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In order to address those common challenges to both tobacco control and cancer prevention, the WHO has developed several tools for tobacco control and preventing cancers at a country level under the global strategy for the prevention and control of non-communicable diseases. Foremost among these, the WHO MPOWER strategy is a good example.

The package is an integral part of the WHO action plan for the prevention and control of non-communicable diseases that was presented at the 61st session of the WHA. As noted in the draft WHO non-communicable diseases action plan,<sup>24</sup> the MPOWER package is

complementary to the WHO FCTC and is intended to provide key entry points for scaling effective tobacco control work, especially in under-resourced developing countries. Therefore, the WHO MPOWER policies could be entry points for cancer prevention in both developed and developing countries.

The following are strategies that have been shown to reduce tobacco use. They have been successful in many countries and there are indications that they have a synergistic impact.

### **MPOWER Policy 1 – Monitoring Tobacco Use and Prevention**

Assessment of tobacco use and its impact must be strengthened. Currently, half of the countries in the world (two of three in the developing world) do not have even minimal data about youth and adult tobacco use. Good monitoring provides information about the extent of the epidemic in a country, as well as how to tailor policies to specific country needs. Both global and country-by-country monitoring are critical to understanding and reversing the tobacco epidemic.

### **MPOWER Policy 2 – Protecting People from Tobacco Smoke**

All people have a fundamental right to breathe clean air. Smoke-free places are essential to protect non-smokers and also to encourage smokers to quit. Environmental tobacco smoke contributes to a range of diseases, including heart disease and many cancers. There is no safe level of exposure to environmental tobacco smoke. Therefore, only a 100% smoke-free environment can protect people from tobacco smoke.

Smoke-free environments are popular. In 2006, Uruguay became the first country in the Americas to go 100% smoke-free. The ban won support from eight of 10 Uruguayans. In California, 75% of the population approves of smoke-free workplace laws that included restaurants and bars. In China, which has few smoke-free public places, more than 80% support a smoking ban in workplaces, and about half support banning smoking in restaurants and bars.

Smoke-free laws do not harm business. Experience shows that in every country where comprehensive smoke-free legislation has been enacted, smoke-free environments are easy to implement and enforce, and result in either a neutral or positive impact on businesses.

Any country, regardless of income level, can implement smoke-free laws effectively. However, only 5% of the global population is protected by comprehensive smoke-free legislation.

### **MPOWER Policy 3 – Offering Help to Quit Tobacco Use**

Among smokers who are aware of the dangers of tobacco, three of four want to quit. Comprehensive services to treat tobacco dependence are available to only 5% of the world's population. National healthcare systems hold the primary responsibility for treating tobacco dependence.

Identification of tobacco users and provision of brief advice should be integrated into primary healthcare services and other routine medical visits, and should include ongoing advice reinforcing the need to quit. Brief cessation counselling is effective and low-cost because it occurs within already existing healthcare services that most people access at

least occasionally. However, it requires that healthcare workers, particularly physicians, be motivated to provide advice. Cessation counselling is most effective when it includes clear, strong and personalised advice to quit from healthcare practitioners as part of general medical care. Physician advice can be especially powerful when it is related to issues of specific interest to the patient (e.g. consultation for heart or lung symptoms).

**MPOWER Policy 4 – Warning About the Dangers of Tobacco**

Despite overwhelming evidence of the dangers of tobacco, relatively few tobacco users worldwide fully understand the risks to their health, especially in developing countries. Most people know generally that tobacco use is harmful but are unaware of the wide spectrum of specific illnesses caused by tobacco, the likelihood of disability and death from long-term tobacco use, the speed or degree of addiction to nicotine or the harmfulness of second-hand smoke.

Graphic warnings on tobacco product packaging deter tobacco use, yet only 15 countries, representing 6% of the world’s population, mandate pictorial warnings that cover at least 30% of the principal surface area.

More than 40% of the world’s population lives in countries that do not prevent the use of misleading and deceptive packaging terms such as ‘light’ and ‘low-tar’ – none of which actually signifies any reduction in health risk.

**MPOWER Policy 5 – Enforcing Bans on Tobacco Advertising, Promotion and Sponsorship**

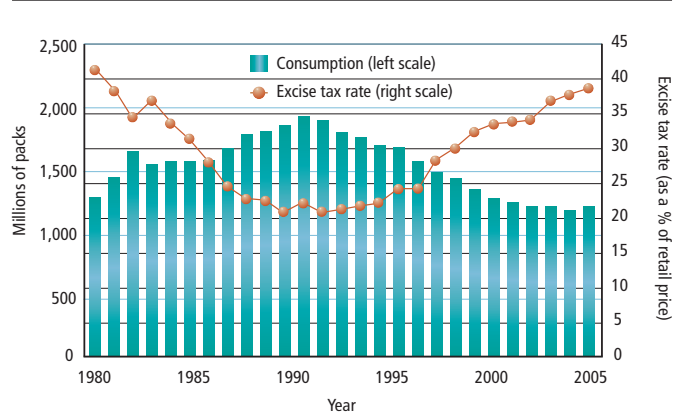
The tobacco industry spends tens of billions of dollars worldwide each year on advertising, promotion and sponsorship. Partial bans on tobacco advertising, promotion and sponsorship do not work, because the industry merely redirects its resources to other non-regulated marketing channels. Only a total ban can reduce tobacco consumption and protect people, particularly youth, from industry marketing tactics. Only 5% of the world’s population currently lives in countries with comprehensive bans on tobacco advertising, promotion and sponsorship. About half the children of the world live in countries that do not ban free distribution of tobacco products. National-level studies before and after advertising bans have found a decline in tobacco consumption of up to 16% following prohibitions.

**MPOWER Policy 6 – Raising Taxes on Tobacco Products**

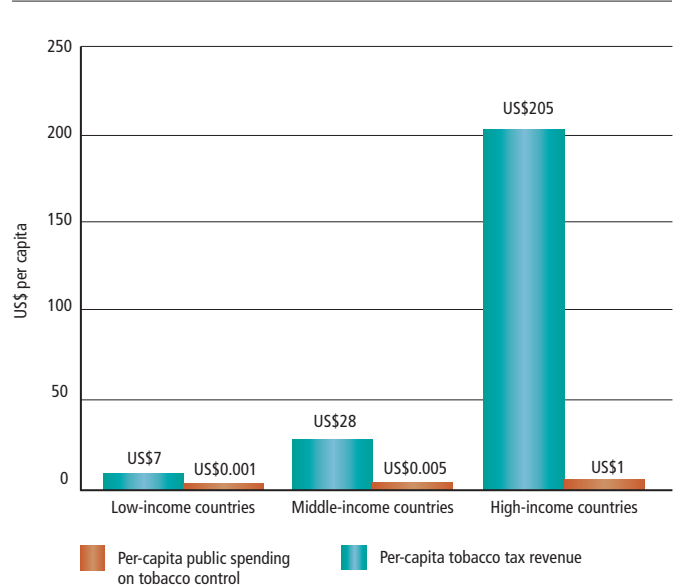
Raising taxes, and therefore prices, is the most effective way to reduce tobacco use, and especially to discourage young people from using tobacco. It also helps to convince tobacco users to quit. Increasing tobacco taxes by 10% generally decreases tobacco consumption by 4% in high-income countries and by about 8% in low- and middle-income countries. In South Africa, for example, cigarette consumption fell by 5–7% for every 10% increase in the price of cigarettes, resulting in a sharp decline in consumption, with the largest smoking decreases among the young and the underprivileged (see Figure 2). A 70% increase in the price of tobacco would prevent up to one-quarter of all tobacco-related deaths among today’s smokers.

Only four countries, representing 2% of the world’s population, have tax rates greater than 75% of retail price. In addition, although more

**Figure 2: Tobacco Taxes Reduce Consumption**



**Figure 3: Global Tobacco Control Is Underfunded**



Based on 70 countries that provided information on both tobacco tax revenues and expenditure on tobacco control.

than four of five high-income countries tax tobacco at 51–75% of retail price, fewer than one-quarter of low- and middle-income countries tax tobacco at this rate.

Higher taxes can also provide countries with funding to implement and enforce tobacco control policies and can pay for cancer prevention and other public health and social programmes. In countries with available information, tobacco tax revenues are more than 500 times higher than spending on tobacco control. In low- and middle-income countries for which information is available, tobacco tax revenue is 5,000 times higher than spending on tobacco control (see Figure 3).

The tobacco epidemic is man-made and entirely preventable. People, acting through their governments and civil society, can reverse the epidemic. However, strong, ongoing commitment is needed to see this through. Currently, only 5% of the world’s population lives in a country that fully protects its population with any one of the key policy interventions that have significantly reduced tobacco use in the countries that have implemented them. Countries need to act immediately, because reversing this entirely preventable epidemic is a top priority for public health and for political leaders in the world. The MPOWER package can not only provide a clear road-map for countries

to carry out effective and sustainable national tobacco control programmes, but can also serve as a communication tool to mobilise political will and financial resources for tobacco control activities.

### The Role of National Cancer Plans in Tobacco Control

For over a decade, the WHO has promoted comprehensive national cancer plans that encompass the full continuum from cancer prevention to early detection to treatment to palliative care.<sup>1</sup> More and more countries have developed national cancer plans and are on the way to a paradigm shift from cancer treatment-only approaches to comprehensive cancer prevention and control policies. Tobacco control is an essential element of any national cancer plan. Tobacco control within a cancer plan creates synergies between the cancer control and the tobacco control communities.

Although the involvement of political leaders is of major importance for the implementation of the WHO MPOWER policies, oncologists, as well as other health professionals, can play a key role as entry points for translating the WHO FCTC into effective action at the national level, implementing the practical, country-level actions. Oncologists and other health professionals are in an excellent position that allows them to play a prominent role in tobacco control.<sup>25</sup> They have knowledge of disease, they reach a high percentage of the population, they have the opportunity to help people change their behaviour and they can have positions as public advisers and access to decision makers through professional societies.

There should be no borders between cancer prevention and tobacco control. It is imperative that clinicians routinely screen for tobacco use and assist in the efforts made by their patients to stop smoking. Unfortunately, despite proven effectiveness, many practitioners are reluctant to consistently identify tobacco users and offer assistance to their patients.<sup>26</sup> As healthcare providers, oncologists should quit smoking themselves and incorporate the identification of tobacco users and provision of brief advice into their routine practice, because this intervention is feasible, effective and efficient and will help to improve their health and allow them to live longer. As discussed previously, physician advice can be especially powerful when it is related to

issues of specific interest to the patient. Oncologists are probably more powerful than other health workers in helping smokers to quit because cancer is a concern for many people and it has been inextricably linked to the use of tobacco. In addition, oncologists who treat adult family members with cancer have a unique opportunity to influence the family system, including adolescent children.<sup>26</sup> They can also influence peers and colleagues to quit using tobacco.

As advocates, they can speak out to paint the true picture of the disability, disease and death caused by tobacco, and encourage policy makers to take action. Every healthcare professional should be an advocate for MPOWER policies and interventions. Cancer care physicians can become involved in local and national tobacco control activities. Oncologists and their associations can be strong advocates with decision-makers for implementing smoke-free policies, including establishment of 100% smoke-free hospitals and healthcare settings. Through professional societies and associations, they can help to strengthen networks, set examples and drive change of social norms, eventually implementing the WHO FCTC at large.

In conclusion, a shifting tobacco epidemic, together with other factors, is likely to lead to a new epidemic of tobacco-induced cancers in developing countries. Tobacco is unique among today's leading public health problems in that the means of curbing the epidemic are clear and within our reach. If developing countries have the political commitment and technical and logistical support to implement the WHO MPOWER policy package as a key component of the WHO action plan for the prevention and control of non-communicable diseases, they can save millions of lives. Oncologists can play a key role in tobacco control as health role models in order to take action to help patients, influence other health professionals and advocate public policy. ■

### Disclaimer

*The authors are staff members of the WHO. The authors alone are responsible for the views expressed in this publication and they do not necessarily represent the decisions or policies of the WHO.*

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**The Multinational Association of Supportive Care in Cancer (MASCC)**, a multinational, multidisciplinary organization, is dedicated to research and education in all aspects of supportive care for people with cancer worldwide regardless of the stage of their disease.

*We invite you to visit our website, [www.mascc.org](http://www.mascc.org), to find out about membership, to learn about the organization, to visit the Study Group and Research Centers, and to register for our annual international meeting in Rome, Italy, June 25-27, 2009*



To find out more about MASCC/ISOO and its journal *Supportive Care in Cancer*, please contact Cindy Rittenberg via email at [crittenberg@mascc.org](mailto:crittenberg@mascc.org) or visit the web site at [www.mascc.org](http://www.mascc.org)