Global Epidemiology of Chronic Respiratory Disease 4

Policy view: worldwide patterns of tobacco use with recommendations for tobacco control

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The global epidemic of tobacco-related diseases continues to be a major health and economic issue. The WHO Framework Convention on Tobacco Control (WHO FCTC), adopted in 2003, is a legally binding treaty aimed at reducing the demand for and supply of tobacco products, with 183 Parties, comprising countries and the EU, covering more than 90% of the world's population. This Policy View presents an analysis of the global patterns of tobacco use, the effects of the WHO FCTC and measures implemented for tobacco control, barriers to progress, and the principal ways forward. Our paper focuses on the overarching challenge of uneven WHO FCTC and tobacco control implementation across countries and policy domains, as well as related implementation barriers of insufficient funding and tobacco industry interference in policy development and implementation. The necessary response is the concerted application of WHO FCTC Article 5.3 protections against the political and scientific practices of the tobacco industry and its affiliates. This response to industry's interference needs to be supported by efforts to increase funding and strengthen political will to act in favour of health. A further challenge is the aggressive commercial marketing—particularly to young people and with unproven health claims—of new tobacco products, such as heated tobacco products, and new nicotine products, such as e-cigarettes. This issue needs to be met with the extension of tobacco control measures to these newproducts and concerted efforts to prevent industry interference.

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Introduction

The tobacco industry depends on maximising tobacco sales for its financial health and survival. Tobacco is health harming: it is highly addictive and toxic to both the people who use it and, when smoked, also others in the vicinity.[1] The inherently toxic tobacco plant became an epidemic-level threat when the tobacco industry turned it into a mass-consumer product at the turn of the 20th century.[2,3] The industry achieved this by altering the flavour and harshness of tobacco smoke to make it more palatable, changing the way it is consumed for improved convenience, and by the use of advertising and other marketing practices to cultivate population-wide demand.[2,3] The tobacco industry's products are some of the leading risk factors for the development of the major non-communicable diseases (NCDs) that together account for approximately half of all global mortality. Lung cancer and chronic respiratory diseases feature prominently among these NCDs.

Over the course of more than a century, as a large-scale commercial operation, the tobacco industry has become a leader and pioneer in the business of reaping profit while causing death, disease, and suffering.[2,3] The tobacco industry caused 100 million deaths in the 20th century[2] and more than 200 million deaths in the past thirty years.[4] In 2021 alone, the tobacco industry caused 7·3 million deaths—more than 10% of total global mortality.[5] If the current trends continue, the cost to humanity of the tobacco industry's drive for private profit is estimated to amount to more than a billion deaths in this century.[2]

The tobacco industry has also proven effective at externalising the costs of its business model onto countries, communities, and families worldwide. The annual economic cost of smoking-attributable diseases has been estimated at more than US$1436 billion, equivalent to 1·8% of the world's annual GDP.[6] By comparison, across the WHO regions, total average health expenditure ranges between less than 5% and 8% of GDP.[7] This figure includes health-care expenditures of US$422 billion on smoking-attributable disease.[6] This number also includes indirect economic costs of $1014 billion from productivity losses due to the health conditions and premature mortality caused by tobacco-related disease.[6] Almost 40% of the total economic cost of smoking-attributable disease and income losses now occurs in low-income and middle-income countries.[6] The effect of tobacco-related deaths, diseases, and social suffering is also disproportionately severe in these countries, which desperately need to preserve both human capital for development and fiscal space for expanding health coverage.[8,9] If the tobacco industry was made to pay for the full scale of these costs, they would no longer be in business.

Despite these immense harms, the tobacco industry has successfully shielded itself from comprehensive public health responses and continues to aggressively market its deadly product. As a result, approximately 20·9% of the global population aged 15 years and older were still using some form of tobacco in 2022, and the costs of tobacco-related disease are continuing to rise.[10]

Therefore, the abated but not averted commercial epidemic of tobacco-related disease remains a defining global health problem for the 21st century. This commercial epidemic continues because of the power the tobacco industry still has to shape our politics,

Key messages

- The tobacco industry caused more than 200 million deaths over the past 30 years with 7·3 million in 2021 alone. The commercial tobacco epidemic remains a leading cause of preventable respiratory diseases, contributing substantially to the global burden of chronic respiratory conditions. Smoking is the primary contributing factor in approximately 30% of deaths from chronic obstructive pulmonary disease and half of all lung cancer deaths, with many countries now seeing lung cancer mortality among women surpass breast cancer rates.
- The current global situation shows that there are opportunities to act and save lives. If urgent action is taken now, incipient tobacco epidemics in countries with low tobacco use can be quashed and growing epidemics in other countries can be minimised much more rapidly. In countries with high tobacco use prevalence among men, fast implementation of new measures and better enforcement of existing measures can often still avert a rise in tobacco use among women, which remains low in many regions.
- The rise of new nicotine products, such as e-cigarettes, and new tobacco products, such as heated tobacco products, presents new challenges. These products are often targeted at young people and, if they are widely available, can result in elevated population-level nicotine use and increased harm. The potential for electronic nicotine delivery systems to act as a gateway to tobacco use among young people is particularly concerning as it could reverse progress in countries that have successfully reduced tobacco use prevalence from previously high levels.
- The WHO Framework Convention on Tobacco Control (FCTC) and the measures of the MPOWER technical package have been indispensable in reducing tobacco use and tobacco use prevalence globally. These resources provide a proven set of commitments and implementation framework for addressing the commercial tobacco epidemic and the threats posed by new and emerging nicotine and tobacco products.
- Funding limitations and industry interference remain principal barriers to progress in the adoption and enforcement of the WHO FCTC and related MPOWER measures, which remains inconsistent across countries, leaving 2·3 billion people without protection from even one measure at a best-practice level of implementation.

knowledge, and beliefs in ways that protect their profit from measures that would protect and promote health. This power has enabled—and continues to enable—the industry to deter, prevent, delay, subvert, and challenge laws, policies, and interventions that evidence and experience long ago revealed to be necessary, effective, and proportionate.[11–17] Indeed, the health threat from tobacco became apparent by the 1950s, and by the 1980s a strong evidence base had developed on the measures needed in response.[2] Yet in 2025, more than 40 years after both the problem and effective resolutions were substantiated, the world remains far short of comprehensive tobacco control. As such, the tobacco industry, its power, and the ways in which it interferes in politics and science remain the pre-eminent obstacle to progress in tobacco control.

In response to this global epidemic, the WHO Framework Convention on Tobacco Control (WHO FCTC) was adopted by unanimity at the World Health Assembly in 2003, and entered into force in February, 2005. With 183 Parties currently, the WHO FCTC encompasses more than 90% of the world's population and constitutes a unifying framework for action at the national level and for intergovernmental cooperation in countering tobacco industry tactics and combating the tobacco epidemic. This legally binding treaty comprises a core set of demand and supply reduction obligations, supported by general obligations to prevent industry interference in public health policy and advance progress and cooperation on tobacco control at local, national, regional, and global levels.

The Conference of the Parties, the governing body to the WHO FCTC, has adopted across the years guidelines for the implementation of the main demand-reduction articles that help to guide Parties in the implementation of those articles.[18] To support the full implementation of the WHO FCTC, WHO also developed a technical package containing the main WHO FCTC demand-reduction measures, which were also recommended as WHO best buys for the prevention and control of NCDs.[19] All the measures contained in the WHO FCTC in general, and in the MPOWER technical package of critical demand-reduction measures in particular, are evidence-based, highly effective, mutually reinforcing, and best implemented in a comprehensive manner.

The priority of the tobacco control response in global health can be seen in its importance to achieving UN Sustainable Development Goal (SDG) 3.4, which aims to reduce the premature mortality from NCDs by one-third by 2030.[20,21] The WHO FCTC is explicitly referenced under Goal 3 of the SDGs. Target 3.a calls for countries to strengthen the implementation of the WHO FCTC, in recognition of its key role in reducing the burden of NCDs.[20,21] Because of the broad economic and environmental costs of tobacco, the implementation of WHO FCTC measures supports several other SDGs beyond health, supporting economic growth, poverty reduction, and the creation of healthy environments.[20,21]

The WHO FCTC has been instrumental in curbing the global tobacco epidemic, with tobacco use prevalence steadily decreasing and projections indicating a continued decline in the absolute number of people using tobacco. However, progress has been insufficient, with the implementation of the treaty's provisions varying across different articles and Parties.[10,22] The under-implementation and under-enforcement of the WHO FCTC's provisions is a result of the power that the well resourced and well reorganised tobacco industry has to deter, prevent, delay, and undermine progress.

Tobacco use trends

Evolution of the tobacco epidemic

Globally, the number of people who use tobacco peaked in 2010, and tobacco use prevalence has steadily declined over the last two decades (figures 1, 2).[10] This result obscures, however, important shifts in the distribution of tobacco use, with substantial decreases in many countries with advanced epidemics accompanied by slow progress or even increases in prevalence in others alongside

variations between women and men and among socioeconomic and demographic groups across all countries.[4,10]

These differences in the evolution of the tobacco epidemic can be understood according to stages that describe the way in which the tobacco epidemic tends to unfold across countries and population groups. These stages explain that socioeconomic factors and tobacco industry market practices increase tobacco use from a first stage incipient epidemic to a second stage escalating epidemic. This way of modelling the evolution of the tobacco epidemic also describes how increasing tobacco-related burden and increased awareness of these harms tends to trigger a commensurate response in the form of public health measures resulting in a third stage of initial declines but still high prevalence. With more ambitious tobacco control, prevalence can decrease to less than 25% in the fourth stage.[23]

Understanding how tobacco epidemics within countries tend to evolve according to stages also means understanding that they tend to evolve distinctly according to sex. Attention needs to be paid to the particularities of tobacco epidemics in women. In most cases, peak smoking prevalence among women has never reached the peak levels among men. Changes in the increase and decrease of smoking prevalence among women generally lag behind men by two or three decades, especially in high-income and upper middle-income countries.[23] Therefore, rapid action in countries with high tobacco use prevalence among men can often still avert a rise in tobacco use among women, which remains low in many regions.[23]

The stages of the tobacco epidemic that countries are currently in are shown in figure 3, with the stage of the epidemic among women depicted in the upper map and the stage of the epidemic among men depicted in the lower map. This model is not immutable, and the implementation of comprehensive tobacco control measures affects it. Therefore, by no means is it a destiny for countries with low tobacco use prevalence to transit through the four stages. If urgent action is taken, incipient epidemics can be quashed and growing epidemics can be slowed and reversed much more rapidly than has been possible in the past.

At the same time, there is no reason for complacency among countries in the third or fourth stage of their epidemics. The trajectory predicted in the model can be subverted. For example, the potential for electronic nicotine delivery systems (ENDS) to act as a gateway to tobacco use among young people is concerning, as it could undermine progress made in reducing smoking rates within countries with advanced epidemics and now low tobacco use prevalence.[24]

Urgent action is needed to quash the tobacco epidemics in countries with incipient epidemics and among women: action to halt epidemics before they escalate, bend the curve in rising epidemics, and

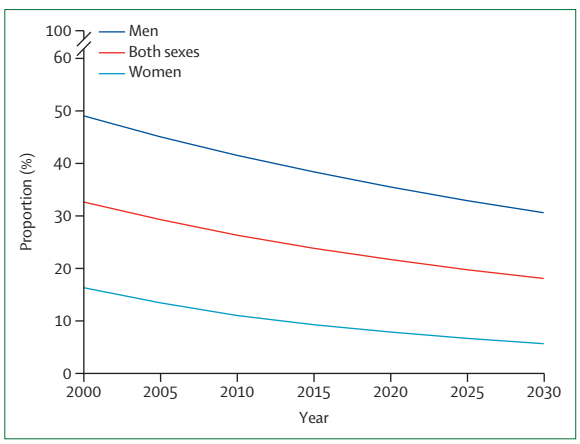

Figure 1: **Tobacco use prevalence (%), by sex over time[10]**
WHO estimates of the prevalence of tobacco use from 2000 to 2022, projected to 2030.

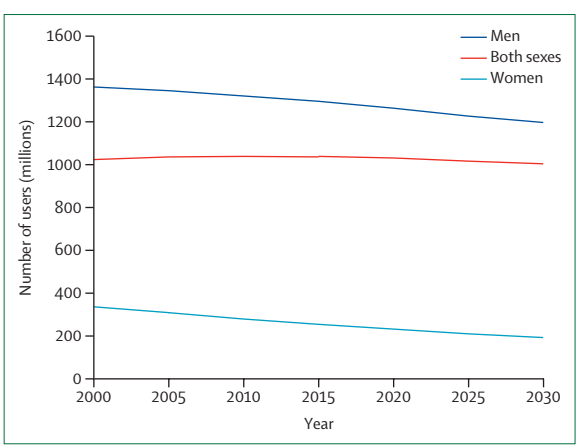

Figure 2: **Global number of tobacco users aged 15 years and older**
WHO estimates of the number of tobacco users (millions) from 2000 to 2022, projected to 2030.[10]

maintain progress everywhere. Despite some progress, many countries are not on track to meet the SDG 3.4 target and the world as a whole is not on track to reduce premature mortality from NCDs by the amount declared in the committment.[25] The disruption caused by the COVID-19 pandemic means, however, that strong data on premature mortality from NCDs during the pandemic is only available for 60 countries.[25] This incomplete evidence suggests that some among these 60 countries experienced a slowing or even reversal in their progress towards the target, whereas others might have experienced an acceleration of progress.[25] Based on the more complete 2010–16 data, women in 17 (9·7%) of 176 countries and men in 15 (8·5%) of 176 countries are expected to achieve SDG target 3.4.[26] Among high-income countries, men and women in Denmark, Luxembourg, New Zealand, Norway, Singapore, and South Korea are on track to meet the target if they maintain or surpass their 2010–16 average rate of decline in NCD-related mortalities.[26]

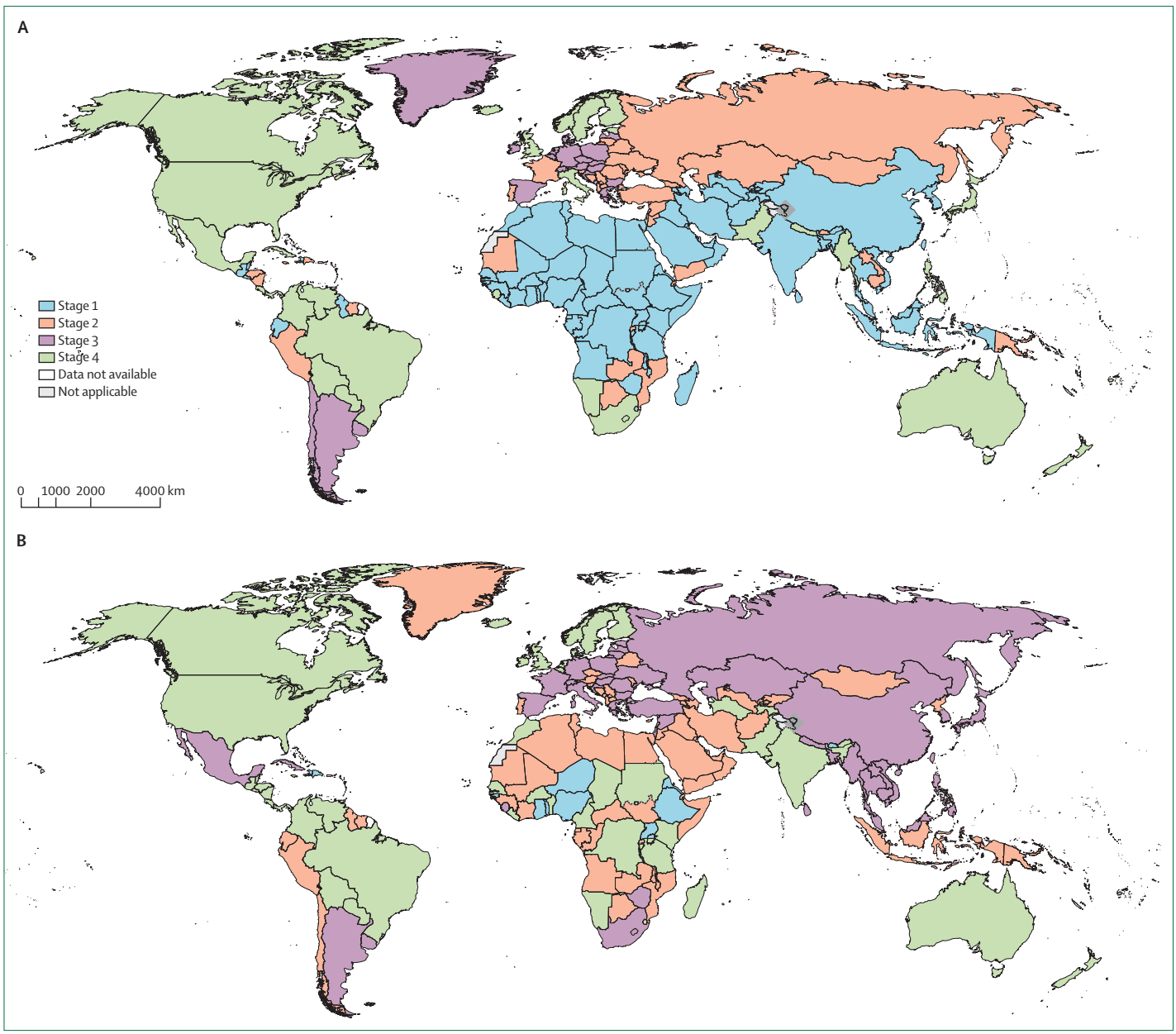

Figure 3: **Classification of countries according to stages of the tobacco epidemic in 2020, by sex**

Classification of countries according to stages of the tobacco epidemic in 2020 among women (A) and men (B). Modified from Dai and colleagues.[23] This model for explaining the evolution of the tobacco epidemic across countries postulates a starting point of stage 1 (in blue) and endpoint at stage 4 (in green). For men, the definitions of four stages are: current prevalence <15%; current prevalence now 15–65% and never declined or only declined by <10% points; prevalence has declined by >10% points but is still >25%; and prevalence has declined by >10% points and is now <25%. For women, the definitions of four stages are: current prevalence <5%; current prevalence now 5–45% and never declined or only declined by <5% points; prevalence has declined by >5% points but is still >20%; and prevalence has declined by >5% points and is now <20%. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Reducing tobacco use was also part of the WHO's nine voluntary targets to combat NCDs by 2025. WHO reported in 2024 that 56 countries were likely to have achieved at least a 30% relative reduction in tobacco use by 2025, assuming they were able to continue to implement tobacco control measures at their previous pace or faster. Another 94 countries were found to be experiencing a statistically significant downward trend but were considered unlikely to have achieved the target in 2025, in the absence of acceleration of efforts.[10]

The 56 countries currently on track to meet the reduction target represent 29% of the world's countries and 40% of the world's population.[10] But compared with the assessment in 2022, there has been a net loss of

four countries from the group expected to achieve the target.[10]

The product landscape

Although conventional tobacco products continue to dominate, the market has seen a proliferation of new nicotine products including ENDS, such as e-cigarettes, and new tobacco products, such as heated tobacco products (HTPs).[27] Figure 4 shows an overview of the size of the global tobacco market and the market share for the products within it.[27] Alongside HTPs, ENDS are generally marketed indiscriminately to all people but particularly to young people. These products are often portrayed as cessation aids and healthier alternatives to conventional cigarettes.[22] Although the industry officially presents these products as an alternative for people who smoke, in reality a major share of their marketing efforts are targeting young people, including through social media, with the help of influencers, and through the development of products with youth appeal such as e-cigarettes with various flavours and sleek designs.[22] The risks posed by the products are exacerbated and magnified by the tobacco industry's efforts to obscure the difference between these two distinct product categories. This strategy enables producers of HTPs—which are clearly tobacco products—to claim their products are similar to ENDS and classify them together with ENDS in a way that supports efforts to both lobby policy makers for favourable treatment and shape consumer perception of the product category.[10,28–30]

Conventional tobacco products include various forms of smoked tobacco such as manufactured cigarettes, roll-your-own tobacco, shisha, bidis, and kreteks.[10] Smoking remains the primary delivery mechanism for tobacco globally, with 80% of all tobacco users smoking. 16·7% of all people aged 15 years and older are current tobacco smokers.[10] Cigarettes predominate among those smoking tobacco with, 89% smoking cigarettes or 15·0% of all people aged 15 years and older.[10]

Smokeless tobacco products include chewing tobacco and newer tobacco products, such as snus (panel 1). Although less prevalent globally, these products constitute a major proportion of tobacco use in some regions. This practice is most notable in the WHO South-East Asia Region, where 18% of adults use smokeless tobacco.[10] Although 77% of all people who use smokeless tobacco live in this single region, these products are also a major concern in the WHO Eastern Mediterranean Region, where 5% of adults use smokeless tobacco.[10]

A final, new category of tobacco products, the HTPs, contrary to industry claims, are tobacco products and are not entirely smokeless, despite sometimes appearing similar to ENDS and often being deliberately confused with them by the tobacco industry when convenient for political or marketing purposes.[10,28–30]

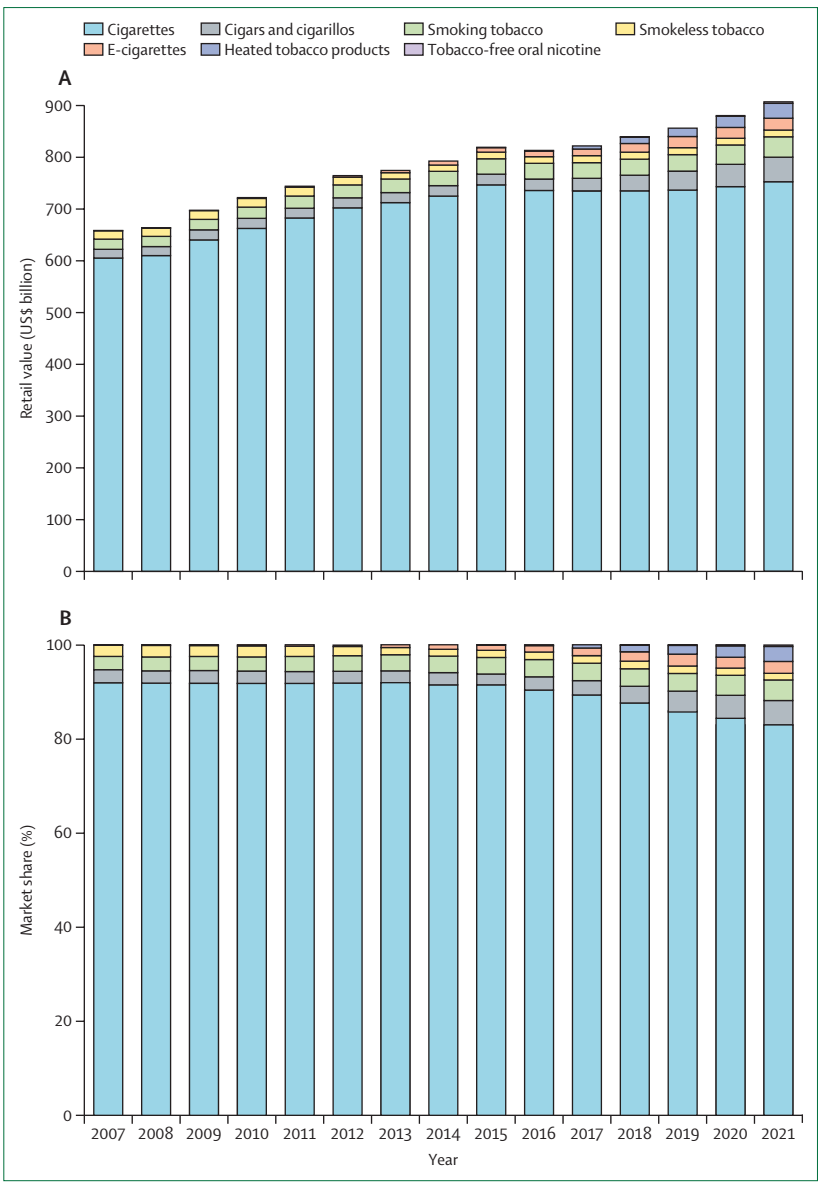

Figure 4: **Trends in global market size and market share of the seven types of tobacco or nicotine products for 97 countries, 2007–21[23]**

(A) The global market size for each product type was calculated as the sum of retail value across the 97 countries. (B) The global market share for each product type was calculated as the proportion of the sum of a product's retail value across the 97 countries. Modified from Liu and Filippidis,[27] an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0).

The main commercial and non-therapeutic nicotine products are ENDS and nicotine pouches. Understanding the prevalence of ENDS use is important as these are health-harming and addictive products and because studies show that young people who use e-cigarettes are almost three times more likely to use cigarettes later in life.[32,33] Use of these products is a particular concern among young people and, in some countries, the rates of e-cigarette use among young people have surpassed those of adults. For instance, in Canada in 2019, e-cigarette use within the last 30 days at time of survey

Panel 1: New and emerging products

According to WHO,[31] new and emerging tobacco and nicotine products must meet at least one of the following criteria:

- New or unconventional technology is used, such as vaporisation of tobacco into the lungs or use of menthol pellets in a cigarette filter
- The product type has been on the market for less than 12 years; these products include dissolvable tobacco products
- The product type has been on the market for longer than 12 years, but the market share has increased in areas in which this type of product was not traditionally used, such as smokeless tobacco products being introduced into countries where they were not previously available
- The product is marketed with the claim that it could reduce exposure to harmful chemicals

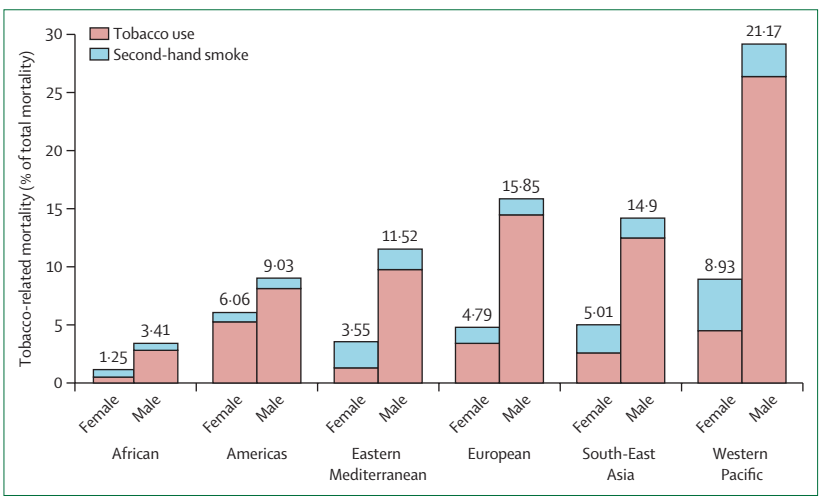

Figure 5: **Tobacco-related mortality by WHO region, sex, and exposure type.**
Data from the Global Burden of Disease Study, 2021.[5]

among schoolchildren in grades 7–9 (typically 12–15 years old) was at 11%, whereas among Canadian adults it was less than 5% in the same year.[33] In France in 2021, 14% of children in 9th grade (typically 14–15 years old) were current users of e-cigarettes, whereas less than 7% of adults were.[33]

Burden of disease

The global burden of disease and mortality attributable to tobacco use is substantial. Tobacco use continues to be a leading cause of preventable death and disability worldwide. In 2021, this substance resulted in 7·3 million deaths (95% CI 5·7–8·7) and 195 million disability-adjusted life-years (DALYs; 152–233).[5,22] For a breakdown of mortality by WHO region, sex, and between tobacco use and second-hand smoke exposure, see figure 5. Although second-hand smoke exposure results in fewer deaths than tobacco use, more than 64% of second-hand smoke-related deaths occur among women.[34] Given the persistence of high and increasing tobacco use prevalence in many countries and the long delay between use and onset of health consequences, these data have dire implications for public health and economic development in the future (figure 5).

The burden of smoking-attributable mortality varies across populations, countries, regions, and over time. In 1990, more than 20% of men's deaths in individuals older than 30 years in several countries, including the USA, Canada, much of Europe, Australia, New Zealand, Japan, southern Latin America, China, Malaysia, and the Philippines, were attributable to smoking.[23] By 2020, although the fraction of deaths due to smoking had declined in many high-income countries, this proportion remained greater than 20% in eastern and central Europe, Spain, Egypt, the Philippines, China, and Indonesia.[23]

Respiratory diseases are a major consequence of tobacco use. Approximately 30% of deaths and DALYs from chronic obstructive pulmonary disease (COPD) and about half of the deaths and DALYs from lung cancer are attributable to smoking, making it the leading cause of these major respiratory conditions. In many countries, lung cancer rates among women are beginning to exceed breast cancer mortality rates, reflecting the delayed effect of increasing smoking prevalence.[23]

The implications of new and emerging tobacco and nicotine products on the burden of disease are not yet fully understood. Although often marketed as less harmful alternatives to tobacco, they pose several risks to health and the full scope of their long-term health effects remains uncertain.[32]

In the case of ENDS, it has been established that these devices generate toxic substances, some of which are known to cause cancer and increase the risk of heart and lung disorders.[24,32] Their use is likely to be associated with asthma and COPD,[24] and can affect brain development leading to serious consequences like learning and anxiety disorders.[24] Exposure to their emissions among pregnant people can similarly affect fetal brain development.[24] Moreover, exposure to their emissions might pose risks to bystanders.[10]

It is important to note also that ENDS are often used as complements to, and not substitutes for, conventional cigarettes, and this dual use seems to be linked with increased risk of cardiovascular and respiratory conditions, compared with the single use of one of these products.[32]

Tobacco control policies

The WHO FCTC has been the foundation of global tobacco control efforts since its entry into force in 2005. An impact assessment was done after 12 years of implementation of the Convention, showing that there have been substantial gains in tobacco control, but also great variability across countries and policy areas—higher WHO FCTC implementation levels were correlated with greater reductions in smoking prevalence.[35,36]

A recent analysis by Paraje and colleagues[36] of the effect of the first 10 years of the WHO FCTC after ratification shows substantial positive effects. The treaty has led to a decrease in the prevalence of smoking in people younger than 25 years, with 24 million fewer people younger than 25 years smoking. An increase in the quitting ratio, with 2 million more people aged between 45 and 59 years quitting smoking, has also been observed.[36] Specifically, the quitting ratio at baseline was 0·34; after WHO FCTC ratification, this increased by an annual average of 0·1% for a total cumulative increase of 1·8% compared with pre-ratification trends, resulting in the estimated 2 million quitters. At least 12 million deaths are estimated to have been averted by just one decade of the WHO FCTC's implementation.[36] The article shows that countries that increased tobacco taxes by more than 10% after ratification achieved substantially better results in terms of decreases in smoking prevalence and quit ratios than those that did not increase tobacco tax by this much.[36]

This analysis contradicts an earlier 2019 study by Hoffman and colleagues,[37] which found no significant effect from the WHO FCTC's ratification on pre-existing trends. The researchers' analysis revealed a discrepancy in trends after 2003 between high-income countries and low-income and middle-income countries, and between European and Asian countries.[37] The Paraje and colleagues study,[36] however, stands out for its use of more recent data, a range of tobacco use indicators versus a reliance on only per capita cigarette consumption, a far larger country sample with 171 versus 71 countries, focus on specific age groups, consideration of implementation factors such as taxation, and an ample set of alternative statistical models. These factors make this study's evidence more compelling and directly relevant to assessing the WHO FCTC's effectiveness and impact.

The implementation of the MPOWER technical package has helped to reduce the prevalence of tobacco smoking (figure 6).[22] Without these declines, there would be 300 million more smokers today.[22] Implementation has been associated with substantial decreases in smoking prevalence. Gravely and colleagues[17] found that each additional measure implemented at the highest level between 2007 and 2014 was associated with an average decrease in smoking prevalence of 1·57% between 2005 and 2015, a relative decrease of 7·09%.

In addition, there is evidence to suggest that the effect of the WHO FCTC in general and of the MPOWER technical package in particular might be underestimated in some studies due to the non-inclusion of some benefits. For instance, many analyses do not account for the denormalisation of tobacco use or the reduction in exposure to second-hand smoke, which can have major health benefits, particularly for non-smoking adults and children.[38] Similarly, Levy and colleagues[38] noted that the effect of newly implemented policies could extend beyond reductions in smoking-attributable deaths to include benefits in other smoking-related outcomes, such as reduced adverse birth outcomes related to maternal smoking, better quality of life, lower health-care costs, and less productivity loss. Moreover, the possible effects of reductions in smokeless tobacco prevalence, which would likely bring additional public health benefits, are often not considered in impact assessments.[38]

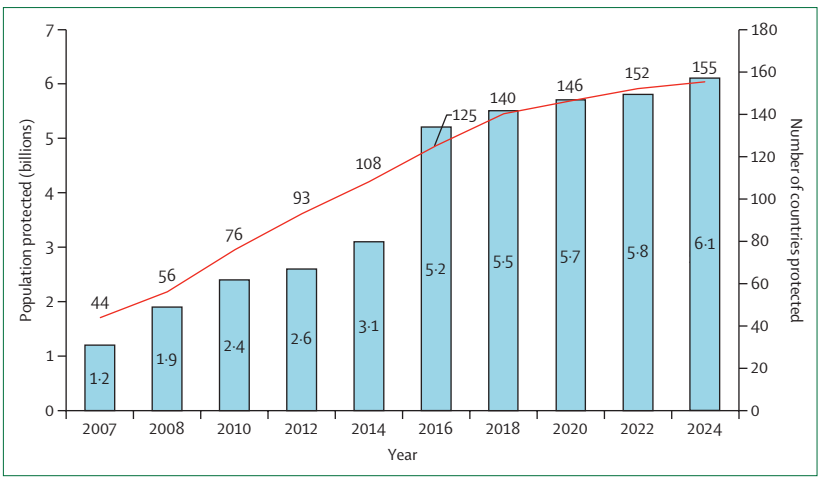

Figure 6: **Global tobacco control achievement**[22]
Global tobacco control achievement: Number of people and number of countries protected by at least one measure at the highest level of achievement from the MPOWER technical package of critical demand-reduction measures (2007–24).

Tobacco taxes

Raising taxes on tobacco products has, however, been identified as the most effective individual tobacco control measure. For example, Goodchild and colleagues[39] estimated that increasing excise tax by $1·00 per 20 cigarettes would increase the mean retail price of cigarettes by 42%. Global cigarette consumption would decrease by 18%. The amount of cigarette excise revenue generated worldwide would increase by $190 billion.[39] The additional excise revenue could help to create the fiscal space needed by countries to meet their development priorities, potentially increasing public expenditure on health by 4% globally.[39] The prevalence of daily cigarette smoking among adults would decline by 9%, translating into 66 million fewer people smoking and a decrease of 15 million smoking-attributable deaths.[39] Despite the measure's potential for unlocking immediate and medium-term revenue gains and its enormous cost-effectiveness as a health intervention, tobacco taxes are one of the measures least implemented at a best-practice level.[22] Only 1·2 billion people are living in countries with best-practice levels of implementation.[22]

Smoke-free legislation

Implementation of comprehensive smoke-free laws has also been associated with substantial health benefits.

Akter and colleagues found that smoke-free legislation was associated with a 9–10% reduction in overall cardiovascular disease events including acute myocardial infarction, coronary heart disease, cerebrovascular disease, and sudden cardiac death, a 9% reduction in cardiovascular disease-related hospitalisations, and a 16–17% reduction in respiratory disease mortality.[40] Note that these changes represent the general health effects observed after smoke-free legislation was implemented, and Akter and colleagues do not provide a single timeframe for these effects, as they analysed data from multiple jurisdictions implementing policies at different times. At present, a total of 2·6 billion people are protected with best-practice smoke-free laws.[22]

Health warnings

Graphic health warnings on tobacco products have been found to increase the knowledge among people who smoke of risks and to lead to increases in the intention to quit.[41] Graphic health warnings have been widely implemented, with 110 countries adopting such policies at the level of best practice, protecting more than 5·1 billion people.[22] Many countries are going beyond health warnings to implement plain packaging, which not only diminishes the appeal of packaging but also enhances the effect of the graphic health warnings.[42] This policy is particularly important for decreasing tobacco use uptake among children, who are more responsive to packaging signals.[43]

Advertising bans

Tobacco advertising, promotion, and sponsorship (TAPS) plays a key role in young people's initiation of tobacco use and in maintaining and increasing tobacco use among new and existing users (48). TAPS bans are associated with a 20% reduction in the odds of current smoking and a 37% reduction in the risk of smoking initiation.[44] In 2024, of the 68 countries with comprehensive TAPS bans covering just over 2 billion people, 12 were low-income countries, 38 were middle-income countries and 18 were high-income countries.[22] Although almost half of all low-income countries have a best-practice TAPS ban in place, only one-third of middle-income countries and one-quarter of high-income countries have achieved this.[22] TAPS bans have been adopted to best-practice levels at a greater pace and to a greater extent among low-income and middle-income countries compared with high-income countries.[45,46] Despite its effectiveness, this is among the most under-adopted measures of the WHO FCTC.[22,33]

Cessation support

Tobacco cessation improves quality of life and reduces the risk of premature death—smoking cessation can add about a decade to life expectancy and, although the benefits are greater when younger, cessation at any age will improve health.[47] Quitting smoking decreases the risk of lung cancer and of developing COPD.[20] Cessation services, including both pharmaceutical and behavioural interventions, have been shown to support quitting.[44] Although fewer countries have implemented comprehensive cessation services, those that have done so cover almost 2·7 billion people.[22]

Collective use of control measures

These five measures have collectively had a substantial effect. Ngo and colleagues[48] found that a one-unit increase in the MPOWER composite score was associated with a reduction of 0·2% in adult smoking prevalence and 0·3% in smoking prevalence among men. These effects are even more impressive when considered cumulatively: if a country implemented all MPOWER measures at best-practice levels, this would mean a 7·26% reduction in adult smoking prevalence.[48] The same applies when these effects are considered over time: Ngo and colleagues study looked at a 7-year period

	Low-income countries		Lower middle-income countries		Upper middle-income countries	
	Health effect per million people per year	Economic cost per million people per year	Health effect per million people per year	Economic cost per million people per year	Health effect per million people per year	Economic cost per million people per year
Raising taxes on tobacco products	1717 healthy life-years gained	I$ <0·01 million	2674 healthy life-years gained	I$ 0·01 million	3093 healthy life-years gained	I$ 0·01 million
Health warnings and standardised or plain packaging	1212 healthy life-years gained	I$ <0·01 million	2181 healthy life-years gained	I$ 0·01 million	2319 healthy life-years gained	I$ 0·01 million
TAPS bans	933 healthy life-years gained	I$ <0·01 million	1490 healthy life-years gained	I$ 0·01 million	1535 healthy life-years gained	I$ 0·01 million
Comprehensive smoke-free laws	1475 healthy life-years gained	I$ <0·01 million	2845 healthy life-years gained	I$ 0·01 million	3077 healthy life-years gained	I$ 0·02 million
Mass media campaigns	1345 healthy life-years gained	I$ 0·01 million	2516 healthy life-years gained	I$ 0·03 million	2701 healthy life-years gained	I$ 0·10 million
Cessation support	1028 healthy life-years	I$ 0·02 million	1724 healthy life-years	I$ 0·05 million	1800 healthy life-years	I$ 0·09 million

I$=international dollars.

Table: **WHO-CHOICE economic analyses for the MPOWER technical package demand-reduction measures[53]**

and showed that countries that maintain high MPOWER scores over longer periods will see a progressive accumulation of benefits that far exceed those in the initial period after adoption.[48]

These evidence-based and cost-effective measures are more effective when implemented as part of a package because they are mutually reinforcing. At the same time, it is possible to analyse their relative health effect, economic cost, and related cost-effectiveness across income groups. Based on WHO analysis, raising tobacco taxes and implementing comprehensive smoke-free laws are the two most effective and cost-effective measures within MPOWER and should be a priority for all countries.[49] At the same time, all these interventions are highly impactful and cost-effective, which means prioritisation at national level might need to account for other factors such as implementation and enforcement capacity, the existing regulatory powers available to the health sector, and the political opportunities available for fiscal and legislative reform. These findings are presented in the table.

The foundation for achievement and progress on these and all measures under the WHO FCTC is Article 5.3, which calls for the protection of public health policies with respect to tobacco control from commercial and other vested interests of the tobacco industry.[35,50] In 2023, 72% of WHO FCTC Parties reported the adoption or implementation of at least one measure recommended in the guidelines for implementation of Article 5.3.[33] Much more needs to be done, since industry interference is one of the main obstacles to the implementation of the WHO FCTC in the majority of the countries.[22] Article 5.3 and all the WHO FCTC's measures are also needed and effective in responding to new and emerging nicotine and tobacco products (panel 2).

Challenges

The overarching challenge in tobacco control is the fact that despite progress in the implementation of WHO FCTC, introduction of different measures has been uneven across countries and policy domains.[22,53] In general, the overall implementation level has also been insufficient, considering that the WHO FCTC has been in force for almost 20 years.[22] In addition, as of 2025, 12 WHO Member States encompassing about 750 million people are not yet Parties to the WHO FCTC. The consequences can be seen in the fact that, as of 2024, 40 countries had not yet adopted any single demand-reduction measure from the WHO MPOWER technical package at best-practice level, leaving almost 2 billion people vulnerable to the harms of tobacco.[22] The pace of implementation has also slowed since 2018, particularly for tobacco taxation—for which measure implementation has progressed the least.[22]

In the last session of the Conference of the Parties, the Expert Group on Forward-Looking Tobacco Control Measures was created with the mandate of identifying and describing forward-looking measures and measures that expand or intensify approaches to tobacco control (panel 3). This decision applies to tobacco products and is within the scope of Article 2.1, which encourages Parties to implement measures beyond those required by the Convention.[50,54] The

Panel 2: Responding to new and emerging nicotine and tobacco products

The introduction, increasing uptake, and aggressive marketing, particularly to young people and with misleading or fake health claims, of new and emerging tobacco and nicotine products is another major challenge. The response should be focused on the regulation of these products, which is in general insufficient with many countries having no regulations.[51] As tobacco products, HTPs are subject to the provisions of the WHO FCTC and, where they are not banned, need to be given equivalent regulatory and fiscal treatment as other tobacco products.[32] Similarly, where not banned, electronic nicotine delivery systems can be addressed with demand-reduction measures and, in particular, a focus on regulating marketing and product design to prevent unproven health claims and efforts to promote these products to young people.[32] The challenge posed by the political and public relations machine behind ENDS and heated tobacco products is focused on interfering in policy making and science, gaining access to decision making, and, ultimately, weaponising these products within a redemption narrative that aims at splintering global tobacco control.[52] As a response, Article 5·3 needs to be applied across the board for all businesses, organisations, and individuals involved in or affiliated with the tobacco and nicotine industry.

Panel 3: Implementing forward-looking tobacco control measures

For some jurisdictions concerns might exist that the tobacco industry's business model and its continued capacity to exercise power over politics and science, along with its ability to adapt and refine interference strategies, make its continued operation as a commercial enterprise an untenable barrier to progress in tobacco control. A case can be made in favour of sunsetting commercial tobacco products or the entire commercial tobacco industry as part of way of addressing the root cause of the epidemic. However, this question has not been addressed by Parties to the WHO Framework Convention on Tobacco Control (FCTC) and remains subject to further consideration.[55] There is also value in maintaining focus on determined efforts at accelerating progress on the path already set out by the demonstrated success of many countries in reducing tobacco use through high levels of WHO FCTC implementation. This focus is crucial because end-game policies—in which the goal is to entirely or near to entirely eliminate tobacco use—are likely most feasible in countries with both low smoking prevalence and high levels of WHO FCTC implementation.[56]

foundation for this decision was the uneven progress in implementation, the fact that some Parties have been advancing forward-looking tobacco control measures, together with the changing landscape of the tobacco epidemic and the ever evolving tactics of the tobacco industry.[22,33,54]

One of the two main implementation barriers identified by WHO FCTC Parties is insufficient funding.[33] Insufficient funding creates multiple constraints: little political attention, inadequate monitoring and surveillance capacities, weak enforcement of existing measures, and reduced efforts towards more ambitious tobacco control measures.[53] Although related to resourcing, enforcement of both existing and new tobacco control measures is a major issue in many countries even where resources are available. Progress in getting laws, regulations and fiscal measures through parliaments and policy making processes will not reduce tobacco use or improve health without concerted and sustained effort in enforcement—which often requires more political will and is more costly and complicated than passing or adopting the underlying instruments. Part of the solution is prioritisation: it is important for Parties to focus on the most cost-effective measures, such as protecting people from exposure to tobacco smoke (Article 8) or graphic health warnings on tobacco packages (Article 11).[39,40] After almost 20 years of being in force, these measures should be quasi-universal, since they are also part of the comprehensive mandates of ministries of health. Finally, to be able to continue monitoring the evolution of the epidemic, it is key for countries to invest in epidemiological surveillance, especially for monitoring of smoking prevalence, tobacco consumption, and mortality data.

The other main implementation barrier identified by WHO FCTC Parties is the interference of the tobacco industry.[33] The tobacco industry will never stop its efforts to undermine tobacco control until it ceases to operate as an industry. The common practices of the tobacco industry can be countered by identifying them and applying the guidelines to Article 5.3. These practices include political practices, such as the lobbying of lawmakers to block or weaken legislation,[11,12,57–69] and the suing of governments to delay or overturn laws.[11,58,70–74] The industry also engages in scientific practices, such as the spreading of false information about health risks or about doomsday consequences from the implementation of tobacco control policies,[75] and the creation of biased scientific evidence that downplays the health or economic effects of tobacco.[9,11,14,76–83] Underpinning all these efforts are the tobacco industry's funding of social programmes to falsify its public image.[9,14,84–86]

To address the industry interference challenge, it is imperative to strengthen the implementation of Article 5.3 and its guidelines,[87,88] including: minimising interactions and ensuring transparency when dealing with the tobacco industry;[88] avoiding conflicts of interest and rejecting non-binding agreements;[89] raising awareness about tobacco industry tactics to undermine public health policies;[87] and denormalising social corporate responsibility activities by the tobacco industry.[87]

Tobacco industry's interference exploits prevailing political economies in ways that can impede progress on tobacco control. This issue is particularly prevalent in countries with politically salient tobacco growing and manufacturing operations.[33] It is important to counter the tobacco industry's economic arguments by drawing on extensive existing evidence that tobacco causes far greater economic harm than benefit and that other sectors can provide equivalent economic value without the associated costs.[11,51] One promising solution for countries with tobacco farming is implementation of WHO FCTC Article 17 programmes for alternative livelihoods, such as the UN Tobacco-Free Farms Initiatives. These programmes promote economically viable alternatives to tobacco farming by identifying equivalent or more advantageous crops and providing the financing, market access, and marketability guarantees that can facilitate the agricultural transition.[36] In the case of taxes, it is important to increase the synergy with ministries of finance and other financial institutions to counteract the SCARE[1] tactics used by the tobacco industry to discourage governments considering tobacco tax increases.[90]

Beyond these across-the-board challenges for tobacco control, there are several specific challenges, responses needed, and opportunities available in respiratory diseases. This disease-specific focus is required because the complex interplay between tobacco use, other exposure-based risk factors, and communicable disease is important for lung health, treatment, and management across the life-course. These factors interact synergistically, exacerbating lung infections and chronic respiratory diseases. The global epidemiology of and risk factors for COPD, asthma, and interstitial lung disease are discussed in the other Series papers, which highlight opportunities to reduce the burden of disease.

Related to these specific challenges for lung health is the first ever WHO Director-General Special Envoy for Chronic Respiratory Diseases, established in June, 2024. This new development presents an opportunity to bring together a primary health-care approach, community and partner mobilisation, as well as new approaches to the commercial determinants of health—a framework for understanding and addressing business effects on health and health equity. The Envoy will be focused on raising awareness, mobilising support, and implementing effective solutions to improve respiratory health worldwide. The Envoy will elevate the profile of tobacco control within the broader respiratory health agenda and respiratory health within the tobacco control agenda.

Conclusions and recommendations

Addressing the challenges in tobacco control requires a multifaceted approach that combines strong policy

implementation, enhanced global cooperation, and tailored interventions for specific demographic groups. By strengthening the implementation of the WHO FCTC, countering industry interference, regulating new products, and addressing the needs of diverse populations, countries can progress in reducing the global burden of tobacco use. But this effort requires sustained political will, adequate resources, and ongoing adaptation to the evolving tobacco landscape.

Specific recommendations include: strengthening and accelerating the implementation and enforcement of the WHO FCTC with focus on the most cost-effective measures (ie, tax increases, smoke-free environments, and big graphic health warnings on tobacco packages); countering the interference of the tobacco industry in public health and science by scaling up implementation of the guidelines for implementation of Article 5.3; increasing domestic investment in tobacco control measures that have shown a high return of investment; strengthening epidemiological surveillance especially for smoking prevalence, consumption, and mortality data; and increasing research on the health consequences of the new tobacco and nicotine products, particularly on their long-term effects.

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Contributors

JM led the literature search, co-led original draft writing, led revisions in response to peer review, supported figures and visualisation, co-managed project administration, and supervised, with primary responsibility for reviewing and editing drafts. ABM led the conceptualisation, co-led original draft writing, co-managed project administration, and contributed to review and editing. DB supported conceptualisation and literature search, and contributed to review and editing. EG led data curation, figures, and visualisation, providing essential input in reviewing and editing.

Declaration of interests

We declare no competing interests.

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