

Which countries are ready for a tobacco endgame? A scoping review and cluster analysis



Sahaana Tamil Selvan, Xue Xin Yeo, Yvette van der Eijk



Various countries have set tobacco endgame targets to eliminate tobacco use by a certain year. Tobacco endgames are generally considered more feasible in countries with advanced tobacco control measures and a smoking prevalence of 15% or less. We conducted a scoping review of 563 articles sourced from news, academic literature, and grey literature to examine global tobacco endgame progress, and grouped 153 countries into clusters based on their tobacco policy implementation score and smoking prevalence to systematically identify countries that might be well positioned to succeed in a tobacco endgame. The EU, Pacific Islands, and 18 other individual countries have set tobacco endgame targets, with another seven countries described as well positioned for an endgame. These were mostly high-income countries with higher smoking prevalence. We identified 28 endgame-ready countries with advanced tobacco policies and a low smoking prevalence. Of these, only five were part of tobacco endgame movements; the remaining 23 were all low-income or middle-income countries in Africa, Latin America, or Asia. Therefore, the global tobacco endgame movement should focus more on low-income and middle-income countries with low smoking rates and advanced tobacco policies, particularly in Africa, Latin America, and Asia.

Lancet Glob Health 2024;
12: e1049–58

Saw Swee Hock School of
Public Health, National
University of Singapore and
National University Health
System, Singapore
(S Tamil Selvan MPH,
X X Yeo MPH, Y van der Eijk PhD)

Correspondence to:
Dr Yvette van der Eijk, Saw Swee
Hock School of Public Health,
National University of Singapore
and National University Health
System, 117549 Singapore
yvette.eijk@nus.edu.sg

Introduction

The Framework Convention on Tobacco Control (FCTC), a WHO treaty developed to address the devastating health, social, and economic consequences of tobacco use, affects more than 90% of the global population.¹ FCTC Parties are legally obligated to incorporate tobacco supply and demand reduction measures into their national law. Common demand reduction measures, termed MPOWER, include tobacco taxes; smokefree legislations; bans on tobacco advertising, promotion, and sponsorship; tobacco packaging and labelling restrictions; public education; and quit services. Other FCTC measures focus on protecting public health policies from tobacco industry interference, establishing tobacco control infrastructure, tackling illicit tobacco trade, regulating tobacco product content, and restricting youth access to tobacco. WHO monitors Parties' progress with a scoring system to quantify the extent to which each measure has been successfully adopted.^{2,3}

FCTC measures, progressively adopted by Parties over the years, have been highly effective in reducing smoking prevalence, reducing tobacco industry interference in policy making, and increasing public support for tobacco control, especially when implemented to a high degree.^{4–7} Tobacco taxes are a fast and cost-effective way to reduce tobacco demand in the short term while potentially generating resources for tobacco control;⁸ however, implementation progress has been fragmented and varied between countries.⁷ Some countries have yet to ratify the FCTC or enforce any effective tobacco control measures, whereas others have very advanced FCTC measures, a strong anti-tobacco climate, and low smoking prevalence.³ Some of these countries have adopted a tobacco endgame goal to eliminate, rather than reduce, tobacco use.

The tobacco endgame has been defined in variable ways, including whether e-cigarettes and other alternative nicotine products should be included in its scope, but

generally refers to a goal to reduce smoking prevalence to less than 5% by a certain year.⁹ This threshold presumes a prevalence at which tobacco use is obsolete,¹⁰ and is comparable to the global prevalence of 6% for illicit drug use.¹¹ The 2010s saw a growing academic discussion on tobacco endgames, with a range of novel proposed strategies to achieve a 5% smoking prevalence target. One of the earliest proposals was to reduce the nicotine content in tobacco products to a non-addicting amount.¹² Others proposed to reduce tobacco supply with a cap on import quotas¹³ or the volume of tobacco retailers.¹⁴ The tobacco-free generation proposal, which would ban tobacco sales to people born after a certain year,¹⁵ has gained popularity in a number of jurisdictions.¹⁶ Others have proposed smoking licenses,¹⁷ a blanket ban on tobacco sales,¹⁸ or implementation of evidence-based FCTC measures, particularly taxes, to a degree that exceeds FCTC guidelines.^{19–22}

A country's readiness to set a tobacco endgame target and sustainably pursue novel endgame measures is influenced by various factors: the strength of existing FCTC measures, smoking prevalence, political leadership, public support, and whether there is a sense of unity in the public health community.^{9,23–25} These factors interrelate; for instance, strong FCTC measures might be driven by strong political leadership, an anti-tobacco climate, and a unified public health community. Among them, the most easily quantifiable factors are FCTC measures (which the WHO monitors using a scoring system) and smoking prevalence, with a tobacco endgame generally considered more feasible in countries where smoking prevalence is 15% or less.^{9,23} Although a number of countries have announced official tobacco endgame targets, New Zealand was, before political changes announced in November, 2023,²⁶ the only country to adopt novel tobacco endgame measures into its national law to achieve a tobacco endgame target by 2025. These novel measures included a tobacco-free generation

policy, nicotine content reduction, and tobacco retailer volume reduction.²⁷ With New Zealand and various other high-income countries (HICs) leading the global tobacco endgame movement,²⁸ no study has systematically identified the other countries, especially low-income and middle-income countries (LMICs), where a tobacco endgame is likely to succeed. Furthermore, countries with a higher smoking prevalence and less advanced FCTC measures, such as Malaysia, have also announced tobacco endgame targets.²⁹ Thus, there appears to be less consensus on what attributes make a country ready to pursue a tobacco endgame.

In this Review paper, we conducted a scoping review to examine countries' tobacco endgame progress at national or regional levels, or both, and used clustering methods to identify countries that are ready for a tobacco endgame based on their smoking prevalence and FCTC progress.

Methods

Search strategy and selection criteria

For the scoping review, we searched PubMed, Embase, and Scopus from database inception to Nov 28, 2022, using the search string “(smoking OR tobacco OR cigarette*) AND endgame”. We also searched Factiva and Nexis Uni from archive inception to Nov 28, 2022 using the search string “‘tobacco endgame’ OR ‘tobacco free generation’”. These searches yielded 3948 results (figure 1). We screened out duplicates and articles that were not written in English or did not mention a national or regional tobacco endgame, leaving 523 articles. The full list is provided in the appendix (pp 1–23). We conducted follow-up searches in Google using country-specific or region-specific search terms (eg, “New Zealand smoking ban”) to fill gaps in information from the primary search, and updated our follow-up search between Jan 3 and Jan 8, 2023. This search yielded an additional 43 articles.

For the cluster analysis, we sourced data on countries' smoking prevalence and FCTC implementation from the 2021 WHO Global Progress Report on FCTC Implementation² and the 2021 WHO Report on the Global Tobacco Epidemic.³ We defined smoking prevalence as the proportion of current daily or non-daily combustible tobacco users, with the specific age range varying for each country, as reported in the 2021 WHO Global Progress Report on FCTC Implementation.² We did not include non-combustible tobacco use as countries' regulations for e-cigarettes and other alternative nicotine products vary widely and continue to evolve.³⁰

Data analysis

For the scoping review, we organised data by country or region and into a narrative. For the cluster analysis, we calculated FCTC implementation scores based on Parties' reports on ten FCTC articles. For Article 6 (tobacco taxes), we used the proportion of the retail price that constitutes taxes for the country's most popular cigarette brand. For all other articles, we used the counts reported by each Party for key indicators of each article. We then used the weighting of the FCTC scorecard, developed by an international panel of experts on the basis of the effect of each article on tobacco consumption, importance for effective tobacco policy, and availability of international guidelines³¹ to calculate the overall FCTC score for each country (appendix pp 24–27). Our scoring was consistent with the FCTC scorecard, except for the exclusion of Article 26, on financial resources, as data were not

See Online for appendix

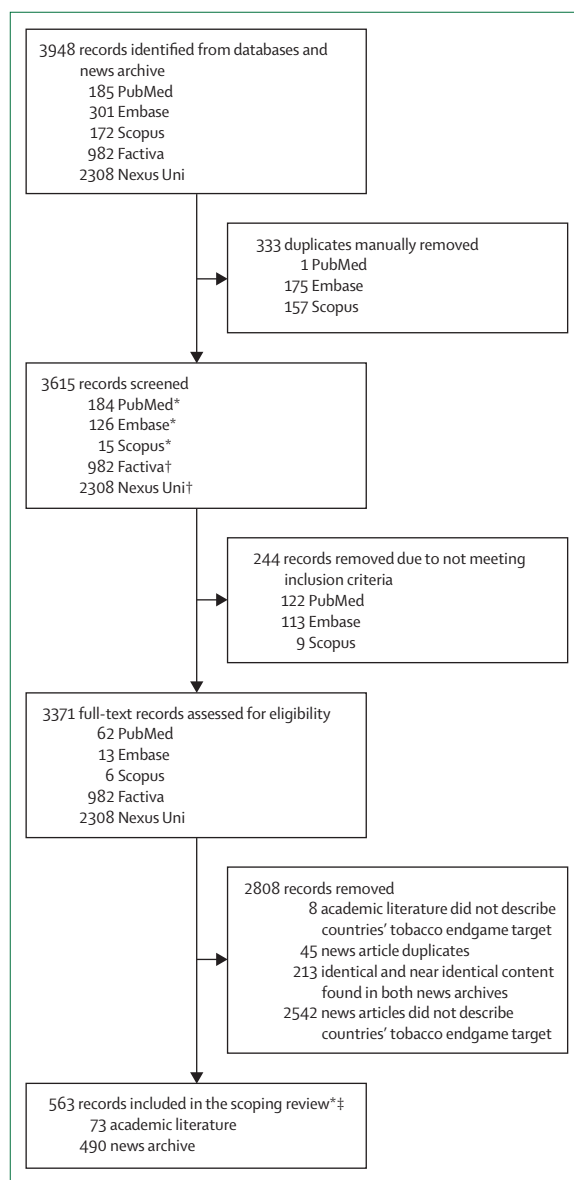


Figure 1: Study selection

*Academic literature; entire article was reviewed at the screening stage if abstract was not available. †News archive; no title and abstract screening for news articles. ‡43 articles identified in follow-up searches.

available. We excluded eight FCTC non-Parties and 27 countries with missing, incomplete, or erroneous information from analysis (appendix p 27), leaving a final set of 153 countries (appendix pp 31–34).

We analysed data using R, version 4.3.0. We assigned each country a smoking prevalence and overall FCTC score and used the World Bank income classification system to group countries as high income, upper-middle income, lower-middle income, or low income based on their 2020 per capita Gross National Income (appendix pp 31–34; income data for six countries was not available).³² We generated a scatterplot to visualise these data. Application of the k-means clustering algorithm and evaluation of the elbow point and silhouette coefficient did not provide evidence of distinct clusters (appendix pp 29–30). Hence, we grouped countries into four clusters using the median FCTC score (68%), a broad indicator of below-average or above-average FCTC progress, and 15% smoking prevalence, the threshold considered ideal for a tobacco endgame, as cutoff points (table 1). As smoking prevalence ($W=0.96$; $p=0.0004$) and FCTC score ($W=0.95$; $p<0.0001$) were found to have non-normal distributions (Shapiro-Wilk test; appendix p 28), we referred to the median and IQR for these indicators. We used MapChart, an online mapping tool, and descriptive statistics to summarise the characteristics of countries in each cluster by income level and geography, and data from the scoping review to examine countries' tobacco endgame progress in each cluster. We used Fischer's exact test with stimulation to assess differences between the four clusters by income level.

Results

In our scoping review, we identified 18 countries and two regions covering 43 countries (the EU and Pacific Islands) that have set tobacco endgame targets (table 2). All are HICs in Europe, Australasia, or North America, with the exceptions of Malaysia, Bangladesh, Bhutan, Bulgaria, and the Pacific Islands. Except for France, Bangladesh, Bhutan, and Vatican City, all defined a tobacco endgame as a smoking prevalence of less than 5%. France defined its 2030 endgame target as those who will be aged 20 years in 2030 being the first tobacco-free generation.³³ In Bangladesh, tobacco endgame was broadly defined as tobacco-free.³⁴ Bhutan and Vatican City did not set prevalence targets, but banned tobacco sales in 2004^{35,36} and 2018,³⁷ respectively. The ban in Bhutan was lifted in 2021 due to concerns over cross-border transmission of COVID-19 as a result of illicit tobacco trade.³⁸

Although Bhutan was the first country to ban tobacco sales in 2004,^{35,36} Finland was the first country to declare a smoking prevalence target of less than 5% in 2010. This target was initially set for 2040, but was brought forward to 2030 following a growing global tobacco endgame movement,^{39–42} with countries such as New Zealand setting more ambitious targets for 2025.⁴³

Cluster description		Smoking prevalence	FCTC score
Endgame ready	Above-average FCTC score and low smoking prevalence; favourable conditions for endgame	<15%	>68%
Almost endgame ready	Above-average FCTC score and a smoking prevalence of 15% or higher; prevalence might be decreasing or novel measure might be needed to reduce prevalence	≥15%	>68%
More action needed	Below-average FCTC score and smoking prevalence of 15% or higher; more FCTC implementation needed to reduce smoking prevalence	≥15%	≤68%
Early epidemic stage	Below-average FCTC score and low smoking prevalence; might still be in early stages of tobacco epidemic	<15%	≤68%

FCTC=Framework Convention on Tobacco Control.

Table 1: The four clusters used to characterise countries

	Year endgame target set	Target year for achieving endgame
Bhutan	2004	2004
Vatican City	2018	2018
New Zealand	2011	2025
Ireland	2013	2025
Pacific Islands (Cook Islands, Fiji, French Polynesia, Kiribati, Marshall Islands, Micronesia, Nauru, New Caledonia, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu)	2013	2025
Sweden	2016	2025
Finland	2010	2030
Denmark	2016	2030
England	2019	2030
Australia	2021	2030
Wales	2022	2030
France	2022	2030
Scotland	2013	2034
Canada	2018	2035
Bangladesh	2016	2040
Netherlands	2019	2040
EU (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Rep, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden)	2021	2040
Spain	2021	2040
Belgium	2022	2040
Malaysia	2022	2040

Some countries are listed twice as they are included in a regional target and have their own national target.

Table 2: Countries and regions with tobacco endgame targets

To achieve endgame targets, most countries have opted for a multipronged approach to fill in remaining FCTC implementation gaps with measures such as plain packaging, smokefree legislation, restricting youth access, advertising bans, taxes, quit support, regulation of e-cigarettes,^{19,34,39,40,44–50} and health warnings on

For more on MapChart see <https://www.mapchart.net/>

Panel: List of countries in each cluster

Endgame ready (n=28)

- Bhutan*
- Brazil
- Chad
- Colombia
- Comoros
- Costa Rica
- Ethiopia
- Ghana
- India
- Iran
- Kenya
- New Zealand*
- Nigeria
- Oman
- Pakistan
- Panama
- Qatar
- Rwanda
- Saudi Arabia
- Senegal
- Singapore‡
- Sri Lanka‡
- Sudan
- The Gambia
- Togo
- Turkmenistan
- United Arab Emirates
- UK*

Almost endgame ready (n=48)

- Albania
- Australia*
- Austria†
- Bahrain
- Belarus
- Botswana
- Bulgaria†
- Cambodia
- Canada*
- Chile
- China
- Croatia†
- Cyprus†
- Finland*
- France*
- Georgia
- Guyana
- Honduras
- Hungary†
- Ireland*
- Jordan
- South Korea

- Kyrgyzstan
- Lithuania†
- Luxembourg†
- Maldives
- Mauritius
- Moldova
- Mongolia
- Montenegro
- Myanmar
- Netherlands*
- North Macedonia
- Philippines
- Portugal†
- Samoa†
- Seychelles
- Slovakia†
- Slovenia†
- Spain*
- Syria
- Thailand
- Tonga†
- Trinidad and Tobago
- Tunisia
- Türkiye
- Uruguay‡
- Venezuela

More action needed (n=52)

- Algeria
- Armenia
- Azerbaijan
- Bangladesh*
- Belgium*
- Burundi
- Czech Republic†
- DR Congo
- Denmark*
- Egypt
- Equatorial Guinea
- Estonia†
- Fiji†
- Germany†
- Greece†
- Iraq
- Israel
- Italy†
- Japan
- Kazakhstan
- Kiribati†
- North Korea
- Kuwait
- Laos
- Latvia†

(Continues on next page)

(Panel continued from previous page)

- Lebanon
- Lesotho
- Libya
- Malaysia*
- Mauritania
- Mexico
- Nauru†
- Nepal
- Norway‡
- Palau†
- Papua New Guinea†
- Peru
- Poland†
- Romania†
- Russia
- Serbia
- Sierra Leone
- South Africa
- Suriname
- The Bahamas
- Timor-Leste
- Tuvalu†
- Ukraine
- Vanuatu†
- Viet Nam
- Yemen
- Zimbabwe

Early epidemic stage (n=25)

- Afghanistan
- Angola
- Belize
- Benin
- Bolivia
- Cabo Verde
- Cameroon
- Côte d'Ivoire
- Dominica
- Ecuador
- El Salvador
- Eswatini
- Guatemala
- Iceland‡
- Jamaica
- Liberia
- St Lucia
- Marshall Islands†
- Niger
- Paraguay
- Republic of Congo
- São Tomé and Príncipe
- Sweden*
- Tanzania
- Uzbekistan

*Country has set a national endgame target. †Country has no national endgame target but is included in a regional endgame target. ‡Country is described as good endgame contender.

individual cigarettes;^{51,52} however, England has positioned e-cigarettes as part of its endgame plan to boost cessation rates,⁵³ and the Pacific Islands region focused most of its endgame strategy on increasing taxes and reducing illicit trade.⁵⁴ France,⁵⁵ Ireland,⁵⁶ Scotland,⁵⁷ Denmark,⁵⁸ Malaysia,⁵⁹ New Zealand, England, and Wales⁶⁰ have all considered phasing out tobacco sales to younger generations, but New Zealand is the only country to have adopted this plan into national law. New Zealand also had plans to ban tobacco sales to people born after 2008, reduce nicotine content in cigarettes to a non-addicting amount, and reduce the volume of tobacco retailers by 90% by 2025,^{27,61} but on Nov 24, 2023, New Zealand's new conservative government announced its plans to repeal all three measures.⁶² The Netherlands has similarly announced plans to reduce the volume of tobacco retailers by 2024.^{46,63}

Six HICs (Iceland, Norway, Uruguay, Singapore, Hong Kong, and the USA) and one LMIC (Sri Lanka) are described as being well positioned for a tobacco endgame.^{9,22,40,64–67} Iceland, Norway, Uruguay, and Singapore are considered to have favourable conditions due to their low smoking prevalence (<15%) and strong political leadership,^{9,22,40,64} and Sri Lanka has a very low

smoking prevalence of less than 10%.⁶⁵ Hong Kong and the USA have advanced tobacco policies and have both set ambitious targets to reduce smoking prevalence to 8% and 6%, respectively; only marginally above the 5% endgame target.^{66,67}

Countries ranged widely in smoking prevalence, from 2% (Ghana) to 53% (Nauru) with a 19% median (IQR 25–12), which is more than the 15% endgame target. FCTC scores also ranged widely, from 10% (The Bahamas) to 96% (Thailand), with a 68% median (IQR 79–56). 54 (35%) of the 153 countries included in our scoping review reported a smoking prevalence of less than 15%. Only 28 (18%) of 153 reported having both ideal conditions for a tobacco endgame: a smoking prevalence of less than 15% and an above-average FCTC score (panel). Between the four clusters, we broadly observed differences in the income level of countries ($p=0.0018$), with the endgame-ready cluster having a higher proportion of low-income and lower-middle-income countries (15 [58%] of 26) and the almost endgame-ready cluster a higher proportion of HICs (22 [48%] of 46) compared with the other clusters (figure 2).

Of the countries in the endgame-ready cluster (ie, with a high FCTC score and low smoking prevalence),

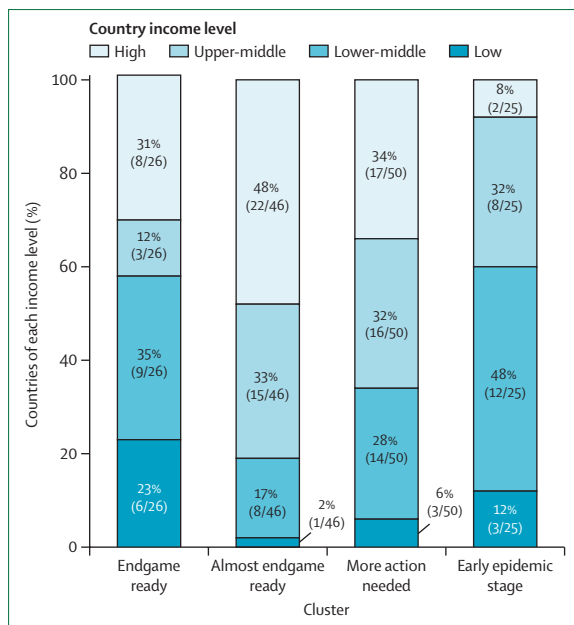


Figure 2: Distribution of countries in each cluster by income level
 Income data were not available for six countries (Jordan, North Korea, Senegal, Turkmenistan, Venezuela, and Yemen). Totals in first column sum to greater than 100% due to rounding.

Bhutan, New Zealand, and the UK (with the exception of Northern Ireland) have announced endgame targets, and Singapore and Sri Lanka have been described as well positioned for an endgame, meaning that only five (18%) of the 28 endgame-ready countries have been considered in tobacco endgame discussions. The other 23 countries were in Africa, Latin America, the Middle East, or south Asia (figure 3).

Of the countries in the almost-endgame-ready cluster (ie, with a high FCTC score but higher smoking prevalence), 20 (42%) of the 48 have been included in endgame discussions. Six (Australia, Canada, Finland, France, Ireland, and the Netherlands) have announced endgame targets, 11 (Austria, Bulgaria, Croatia, Cyprus, Hungary, Lithuania, Luxembourg, Portugal, Slovakia, Slovenia, and Spain) are included in the EU target, two (Samoa and Tonga) are included in the Pacific Islands target, and Uruguay was described as a good tobacco endgame candidate. Although countries in this cluster were geographically scattered across all continents, 36 (75%) of the 48 were in Europe or Asia (figure 3). Although Australia, Cambodia, Canada, Guyana, Ireland, and Venezuela were in this cluster, smoking prevalence in these countries was only marginally above 15%.

52 countries require more action to implement FCTC measures, given their low FCTC score and higher smoking prevalence. Of these, 20 (38%) have been included in endgame discussions. Four (Belgium, Denmark, Bangladesh, and Malaysia) have set endgame targets, Norway was described as well positioned for a tobacco endgame, and another 15 are included in the

EU endgame target (Czech Republic, Estonia, Germany, Greece, Italy, Latvia, Poland, and Romania) or Pacific Islands endgame target (Fiji, Kiribati, Nauru, Palau, Papua New Guinea, Tuvalu, and Vanuatu). Most of the countries were in eastern Europe, Africa, or Asia. This cluster had an even mixture of high-income, upper-middle-income, and lower-middle-income countries.

25 countries were in the early epidemic cluster, due to their low FCTC score and low smoking prevalence. Of these, three (12%) have been considered in endgame discussions. Sweden has a tobacco endgame target, Iceland was described as having favourable conditions for an endgame, and the Marshall Islands is included in the Pacific Islands target. Most countries in this cluster were in Africa and the Americas. 23 (92%) of the countries in this cluster were LMICs.

Discussion

Among the tobacco endgame countries (ie, countries that have set an official tobacco endgame target or have been described as a strong endgame contender), most are HICs with variable FCTC implementation progress and a smoking prevalence of more than 15%. Only five of these countries (Bhutan, New Zealand, the UK, Singapore, and Sri Lanka) had an above-average FCTC score and a smoking prevalence of less than 15%. Most countries in the endgame-ready cluster were LMICs in Africa, Latin America, the Middle East, or south Asia and have been largely neglected in endgame discussions. Although the reasons behind this are unclear, the fact that most are LMICs suggests that having fewer economic resources is currently a barrier to pursuing a tobacco endgame. Other factors that influence tobacco endgame readiness, such as political leadership, might also be weaker in these countries. Nevertheless, with a strong leadership and well planned strategy, a tobacco endgame is likely to succeed in these countries due to their low smoking prevalence and high FCTC scores.

Latin American countries in the endgame-ready cluster included Brazil, Colombia, Costa Rica, and Panama. The Latin American region has among the most FCTC implementation globally, with an associated drop in smoking prevalence of more than 50% within 15 years.⁶⁸ Brazil was the first country to implement all MPOWER measures and was the country with the largest reduction in age-standardised smoking prevalence in the 2019 Global Burden of Disease Study.⁶ Other Latin American countries (Uruguay, Venezuela, and Guyana) were in the almost-endgame-ready cluster, but have smoking rates of less than 20%. Although this region has the potential to lead in the global tobacco endgame, Uruguay is the only Latin American country to have been described as a strong endgame contender, and no Latin American countries have set a tobacco endgame target. Latin American countries, especially those with a low or rapidly reducing smoking

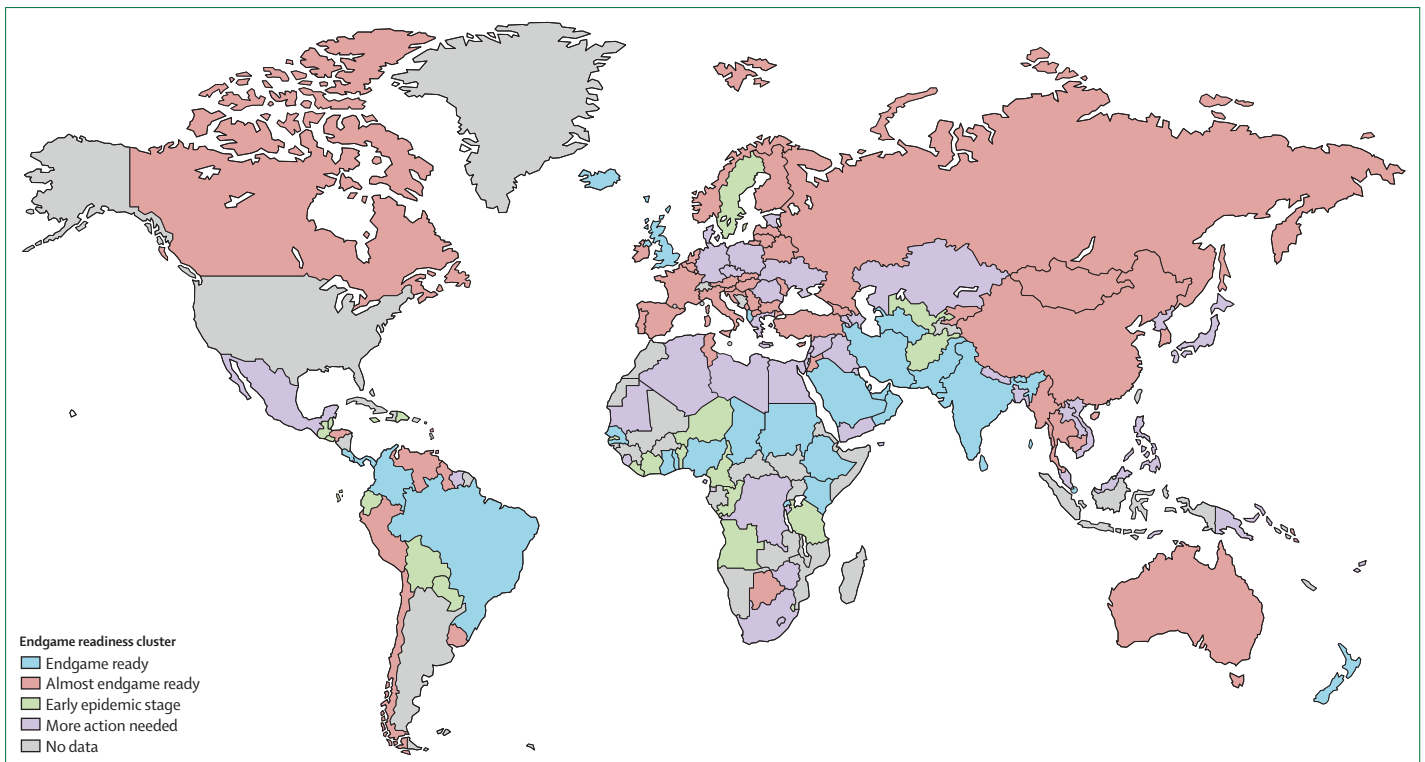


Figure 3: Countries by cluster
Created with <https://www.mapchart.net>.

prevalence, should set more ambitious tobacco endgame targets.

As tobacco endgames are contextual, endgame-ready countries might face specific challenges. Tobacco companies have used legal challenges to deter policy makers from pursuing tobacco endgame measures and are attempting to control the tobacco endgame rhetoric to push for vaping and alternative tobacco products.⁶⁹ Use of smokeless tobacco and shisha is high in south Asia and the Middle East, which might have offset the reported prevalence of combustible tobacco use.^{3,70,71} In such countries, including the use of smokeless and other tobacco forms in endgame targets is important. Despite the use of smokeless tobacco and other forms of tobacco, some countries have made considerable progress—notably India, which has seen a more than 50% reduction in smoking prevalence and introduced novel measures such as health warnings in movies with smoking scenes.⁷² Public support, which is crucial for endgame success, might be gained in different ways depending on a country's context. Countries with unique political climates, such as Bhutan (which has a constitutional monarchy and has adopted Gross National Happiness as its development indicator) and Turkmenistan (which has a highly centralised, authoritarian government with strict control over public expression and behaviour), might be well positioned to implement a complete tobacco sales ban,^{36,73} and endgames in tobacco-growing countries,

such as Zimbabwe and Malawi,⁷⁴ might need to focus on creating alternative livelihoods. African and Latin American endgame-ready countries, as well as those in the early epidemic stage, might have rises in smoking prevalence if tobacco industry investment in these regions goes unchecked,⁷⁵ but are in a good position to eliminate tobacco use while prevalence is still low. Tobacco endgames require rigorous measures to protect policy making from the vested interests of the tobacco industry.⁷⁶ According to the Global Tobacco Industry Interference Index, which monitors how rigorously governments are responding to tobacco industry interference, Ethiopia, Chad, Côte d'Ivoire, Kenya, and Panama have less industry interference and might be especially well positioned for a tobacco endgame.^{74,77}

Most countries with tobacco endgame targets reported a smoking prevalence of more than 15%. These countries are in more advanced stages of the tobacco epidemic, characterised by a decline in smoking prevalence and peak in smoking-attributed deaths.⁷⁸ Although they did not fall into the endgame-ready cluster, some of the countries have set global precedents with the world's first plain packaging mandate (Australia),⁷⁹ health warnings on individual cigarettes (Canada),⁸⁰ tobacco endgame goal (Finland),³⁹ smokefree legislation in bars and restaurants (Ireland),⁸¹ and supermarket tobacco sales ban (the Netherlands).⁸² These countries have been noted for their high FCTC scores, strong political will, and rapidly decreasing

smoking prevalence.⁹ Therefore, the 15% smoking prevalence cutoff might be too narrow, and more weight should be given to the strength of existing measures, political will, public support, and rate of smoking prevalence decline when determining whether a country is ready to pursue a tobacco endgame. Notable examples include Thailand, the Philippines, and Türkiye. Smoking prevalence in these countries ranges from 19% (Thailand) to 32% (Türkiye), but they have made substantial progress in FCTC implementation in recent years, suggesting that they might be ready to set tobacco endgame targets.^{83,84}

We also identified countries that, despite having a high smoking prevalence and low FCTC score, have a national or regional endgame target: Bangladesh, Malaysia, the EU, and the Pacific Islands. Progress in some countries is poor, notably in the Pacific Islands where smoking rates are among the highest (eg, 53% in Nauru) and FCTC scores among the lowest (eg, 21% in Tuvalu) globally. Bangladesh and Malaysia have made modest progress, with FCTC scores of 52% and 66%, respectively. Progress varies widely in the EU.⁸⁵ Where political will and resources are scarce, regional tobacco endgame targets can drive FCTC progress. In the EU, the Tobacco Products Directive and Tobacco Tax Directive have been crucial in driving tobacco policy progress across the region.⁸⁶ Tobacco taxes are a fast and cost-effective way to reduce smoking prevalence and, if earmarked for such, to generate financial resources for tobacco control. Tobacco taxes are the primary focus of the Pacific Islands endgame;⁵⁴ thus, a tobacco endgame in countries with fewer financial resources and low FCTC scores should focus on filling the gaps in FCTC progress, with special emphasis on tobacco levies or taxes to be earmarked for financing other tobacco endgame measures.

Tobacco endgame targets were generally defined as a smoking prevalence of less than 5%, to be achieved by filling FCTC implementation gaps, starting with tax increases in regions with less advanced tobacco policies (eg, the Pacific Islands) and then implementing a comprehensive suite of FCTC measures in nations with more advanced tobacco policies. Simulation studies, however, suggest that these measures alone are not enough, and that novel endgame measures, such as reducing nicotine content in cigarettes to near-zero amounts, drastic reductions in tobacco retailer volumes, or a tobacco free generation, or a combination of these measures, are necessary to achieve a 5% prevalence target.^{16,20,87,88} Therefore, countries with more advanced FCTC measures and less tobacco industry interference in policy making, such as New Zealand, are now focusing on more novel measures.^{61,63} Put together, tobacco endgames can be more inclusive by approaching their goal in a stepwise manner: raise taxes to reduce smoking prevalence and generate resources for tobacco control, fill FCTC implementation gaps to reduce smoking prevalence as much as possible, and adopt novel measures to achieve a 5% smoking prevalence target. For

all three steps, countering tobacco industry interference is crucial to ensuring their successful implementation.

Our study has several limitations. Our data are incomplete because we included only English-language articles in our scoping review, we did not search all academic databases, and we excluded 35 countries from our cluster analysis due to missing data. Notably, smoking prevalence and FCTC scores for the USA, Vatican City, Hong Kong, and six of the Pacific Islands nations, all of which were mentioned in tobacco endgame discussions, and five African nations (Uganda, Namibia, Zambia, Mozambique, and Malawi), which have seen considerable reductions in smoking prevalence in recent years,^{74,75,89} were not available. The most recent smoking prevalence and FCTC score data were from 2020–21 and might not reflect the situation as of July, 2023, especially in countries where smoking prevalence is rapidly changing or new FCTC measures were implemented after 2020. As smoking prevalence data were based on current use of combustible tobacco, it might not reflect total tobacco use, especially in countries with high rates of smokeless, shisha, and other forms of alternative tobacco products. Although our FCTC scores were based on ten FCTC Articles and weights developed by expert consensus, they do not take into account implementation of articles not included in WHO monitoring, inaccuracies in Parties' reporting, or other factors not captured in our data analysis such as compliance, public support, political leadership, or rate of smoking prevalence change.

Contributors

STS and XXY contributed to the data collection, data analysis, and writing. YvdE contributed to the conceptualisation, data analysis, and writing. All authors had access to the raw data, reviewed and approved the final draft before submission, and had final responsibility for the decision to submit the manuscript for publication.

Declaration of interests

We declare no competing interests.

Acknowledgments

This project was funded by a Tier 1 Academic Research Fund from the Singapore Ministry of Education (A-0002078–00–00) and supported by funding from the Saw Swee Hock School of Public Health. The funder played no role in the study or final decision to publish.

Editorial note: The Lancet Group takes a neutral position with respect to territorial claims in published maps and institutional affiliations.

References

- 1 WHO. Tobacco. July 31, 2023. <https://www.who.int/news-room/fact-sheets/detail/tobacco> (accessed Aug 10, 2023).
- 2 Secretariat of the WHO Framework Convention on Tobacco Control. 2021 global progress report on implementation of the WHO Framework Convention on Tobacco Control. Feb 9, 2022. <https://fctc.who.int/publications/i/item/9789240041769> (accessed July 7, 2023).
- 3 WHO. WHO report on the global tobacco epidemic: addressing new and emerging products. July 27, 2021. <https://www.who.int/publications/i/item/9789240032095> (accessed April 14, 2023).
- 4 Ngo A, Cheng KW, Chaloupka FJ, Shang C. The effect of MPOWER scores on cigarette smoking prevalence and consumption. *Prev Med* 2017; **105S**: S10–14.
- 5 Gravely S, Giovino GA, Craig L, et al. Implementation of key demand-reduction measures of the WHO Framework Convention on Tobacco Control and change in smoking prevalence in 126 countries: an association study. *Lancet Public Health* 2017; **2**: e166–74.

- 6 Reitsma MB, Kendrick PJ, Ababneh E, et al. Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and attributable disease burden in 204 countries and territories, 1990–2019: a systematic analysis from the Global Burden of Disease Study 2019. *Lancet* 2021; **397**: 2337–60.
- 7 Chung-Hall J, Craig L, Gravely S, Sansone N, Fong GT. Impact of the WHO FCTC over the first decade: a global evidence review prepared for the Impact Assessment Expert Group. *Tob Control* 2019; **28** (suppl 2): s119–28.
- 8 Chaloupka FJ, Yurekli A, Fong GT. Tobacco taxes as a tobacco control strategy. *Tob Control* 2012; **21**: 172–80.
- 9 McDaniel PA, Smith EA, Malone RE. The tobacco endgame: a qualitative review and synthesis. *Tob Control* 2016; **25**: 594–604.
- 10 Moon G, Barnett R, Pearce J, Thompson L, Twigg L. The tobacco endgame: the neglected role of place and environment. *Health Place* 2018; **53**: 271–78.
- 11 UN Office on Drugs and Crime. UNODC World Drug Report 2021: pandemic effects ramp up drug risks, as youth underestimate cannabis dangers. June 24, 2021. https://www.unodc.org/nigeria/en/unodc-world-drug-report-2021_pandemic-effects-ramp-up-drug-risks-as-youth-underestimate-cannabis-dangers.html#:~:text=According%20to%20the%20latest%20global,suffer%20from%20drug%20use%20disorders (accessed May 22, 2023).
- 12 Benowitz NL, Henningfield JE. Establishing a nicotine threshold for addiction. The implications for tobacco regulation. *N Engl J Med* 1994; **331**: 123–25.
- 13 Thomson G, Wilson N, Blakely T, Edwards R. Ending appreciable tobacco use in a nation: using a sinking lid on supply. *Tob Control* 2010; **19**: 431–35.
- 14 Pearson AL, van der Deen FS, Wilson N, Cobiac L, Blakely T. Theoretical impacts of a range of major tobacco retail outlet reduction interventions: modelling results in a country with a smoke-free nation goal. *Tob Control* 2015; **24**: e32–38.
- 15 Khoo D, Chiam Y, Ng P, Berrick AJ, Koong HN. Phasing-out tobacco: proposal to deny access to tobacco for those born from 2000. *Tob Control* 2010; **19**: 355–60.
- 16 Zeng Z, Cook AR, van der Eijk Y. What measures are needed to achieve a tobacco endgame target? A Singapore-based simulation study. *Tob Control* 2023; published online June 6. <https://doi.org/10.1136/tc-2022-057856>
- 17 Chapman S. The case for a smoker's license. *PLoS Med* 2012; **9**: e1001342.
- 18 Singh A, Petrović-van der Deen FS, Carvalho N, Lopez AD, Blakely T. Impact of tax and tobacco-free generation on health-adjusted life years in the Solomon Islands: a multistate life table simulation. *Tob Control* 2020; **29**: 388–97.
- 19 Cobiac LJ, Ikeda T, Nghiem N, Blakely T, Wilson N. Modelling the implications of regular increases in tobacco taxation in the tobacco endgame. *Tob Control* 2015; **24**: e154–60.
- 20 Chaiton M, Dubray J, Guindon GE, Schwartz R. Tobacco endgame simulation modelling: assessing the impact of policy changes on smoking prevalence in 2035. *Forecasting* 2021; **3**: 267–75.
- 21 Doan TTT, Tan KW, Dickens BSL, Lean YA, Yang Q, Cook AR. Evaluating smoking control policies in the e-cigarette era: a modelling study. *Tob Control* 2020; **29**: 522–30.
- 22 van der Eijk Y. Development of an integrated tobacco endgame strategy. *Tob Control* 2015; **24**: 336–40.
- 23 Thomson G, Edwards R, Wilson N, Blakely T. What are the elements of the tobacco endgame? *Tob Control* 2012; **21**: 293–95.
- 24 Malone RE. Tobacco endgames: what they are and are not, issues for tobacco control strategic planning and a possible US scenario. *Tob Control* 2013; **22** (suppl 1): i42–44.
- 25 Malone RE. The race to a tobacco endgame. *Tob Control* 2016; **25**: 607–08.
- 26 Mao F. New Zealand smoking ban: Māori mourn loss of hard-won smoking reform. BBC, Dec 11, 2023. <https://www.bbc.com/news/world-asia-67574419> (accessed March 17, 2024).
- 27 McClure T. New Zealand passes world-first tobacco law to ban smoking for next generation. *The Guardian*, Dec 13, 2022. <https://www.theguardian.com/world/2022/dec/13/new-zealand-passes-world-first-tobacco-law-to-ban-smoking-by-2025> (accessed April 18, 2023).
- 28 Puljević C, Morphet K, Hefler M, et al. Closing the gaps in tobacco endgame evidence: a scoping review. *Tob Control* 2022; **31**: 365–75.
- 29 Amul GGH, Ong SE, Mohd Khalib A, Yoong JS-Y. Time for tobacco-free generations in the Western Pacific? *Lancet Reg Health West Pac* 2022; **24**: 100530.
- 30 Global Tobacco Control. Country laws regulating e-cigarettes. 2023. <https://www.globaltobaccocontrol.org/en/policy-scan/e-cigarettes> (accessed May 17, 2023).
- 31 Southeast Asia Tobacco Control Alliance. FCTC Scorecard: measuring implementation of the WHO Framework Convention on Tobacco Control. Bangkok: Southeast Asia Tobacco Control Alliance, 2021.
- 32 The World Bank. World Bank country and lending groups. 2023. <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups> (accessed Aug 20, 2023).
- 33 Ministère de la Santé, Ministère de l'Action et des Comptes Publics. Programme National De Lutte Contre Le Tabac 2018–2022. https://sante.gouv.fr/IMG/pdf/180702-pnlnt_def.pdf (accessed April 22, 2023).
- 34 Ahmad QK. Realising the vision of a tobacco free Bangladesh by 2040. *The Business Standard*, Nov 14, 2022. <https://www.tbsnews.net/thoughts/realising-vision-tobacco-free-bangladesh-2040-531418> (accessed May 8, 2023).
- 35 Hefler M, Bianco E, Bradbrook S, Arnold D, Dorotheo EU. What facilitates policy audacity in tobacco control? An analysis of approaches and supportive factors for innovation in seven countries. *Tob Control* 2022; **31**: 328–34.
- 36 Givel MS. History of Bhutan's prohibition of cigarettes: implications for neo-prohibitionists and their critics. *Int J Drug Policy* 2011; **22**: 306–10.
- 37 Gallus S, Cattaruzza MS, Gorini G, Faggiano F. Vatican beats Italy 1–0 in the tobacco endgame. *Tob Control* 2019; **28**: 239–40.
- 38 Aneja K, Gopal S. Bhutan reverses sales ban on tobacco. Feb 1, 2023. <https://blogs.bmj.com/tc/2023/02/01/bhutan-reverses-sales-ban-on-tobacco/> (accessed May 9, 2023).
- 39 Timberlake DS, Laitinen U, Kinnunen JM, Rimpela AH. Strategies and barriers to achieving the goal of Finland's tobacco endgame. *Tob Control* 2020; **29**: 398–404.
- 40 Linnansaari A, Ollila H, Pisinger C, Scheffels J, Kinnunen JM, Rimpelä A. Towards Tobacco-Free Generation: implementation of preventive tobacco policies in the Nordic countries. *Scand J Public Health* 2022; **51**: 1108–21.
- 41 Sormunen MA, Karjalainen S. The tobacco endgame: experiences from Finland. In: Gispén ME, Toebes B, eds. Human rights and tobacco control. Cheltenham: Edward Elgar, 2020: 223–36.
- 42 Ministry of Social Affairs and Health. Working group proposals on how to make Finland tobacco-free by 2030. Jan 31, 2023. <https://valtioneuvosto.fi/en/-/1271139/working-group-proposals-on-how-to-make-finland-tobacco-free-by-2030> (accessed April 19, 2023).
- 43 Mohd Hairi F. Malaysia makes case for smoking end game. 360info, May 31, 2022. <https://360info.org/malaysia-makes-case-for-smoking-end-game/> (accessed May 8, 2023).
- 44 Edwards R, Johnson E, Stanley J, Waa A, Ouimet J, Fong GT. Support for New Zealand's Smokefree 2025 goal and key measures to achieve it: findings from the ITC New Zealand Survey. *Aust N Z J Public Health* 2021; **45**: 554–61.
- 45 Tobacco and Alcohol Control Unit, Department of Health. Tobacco Free Ireland Action Plan. 2020. <https://assets.gov.ie/15942/ebab88a03d8f42bca3498db35f900125.pdf> (accessed April 19, 2023).
- 46 Nationaal Preventie Akkoord. The national Prevention Agreement: a healthier Netherlands. June 30, 2019. <https://www.government.nl/documents/reports/2019/06/30/the-national-prevention-agreement> (accessed April 22, 2023).
- 47 Welsh Government. A smoke-free Wales: our long-term tobacco control strategy. July 26, 2022. <https://www.gov.wales/tobacco-control-strategy-wales-html> (accessed May 8, 2023).
- 48 Cellule Générale de Politique Drogues. Stratégie interfédérale - 2022–2028 pour une génération sans tabac. Dec 14, 2022. https://organesdeconcertation.sante.belgique.be/sites/default/files/documents/2022_12_14_strategie_interfederale_tabac_et_annexe_final_fr.pdf (accessed April 22, 2023).

- 49 European Commission. Europe's Beating Cancer Plan: communication from the commission to the European Parliament and the Council. Brussels: European Commission, 2021.
- 50 European Network of Smoking and Tobacco Prevention. Announcement of the new Belgian strategy for a tobacco free generation. <https://ensp.network/announcement-of-the-new-belgian-strategy-for-a-tobacco-free-generation/> (accessed April 22, 2023).
- 51 The Newsroom. Radical new plans revealed to turn Scotland smoke free by 2034. *The Scotsman*, June 22, 2018. <https://www.scotsman.com/news/politics/radical-new-plans-revealed-to-turn-scotland-smoke-free-by-2034-280901> (accessed April 29, 2023).
- 52 Yousif N. Every Canadian cigarette will soon carry a health warning. *BBC News*, May 31, 2023. <https://www.bbc.co.uk/news/world-us-canada-65755793> (accessed April 3, 2024).
- 53 Meikle J. Vaping: e-cigarettes safer than smoking, says Public Health England. *The Guardian*, Aug 19, 2015. <https://www.theguardian.com/society/2015/aug/19/public-health-england-e-cigarettes-safer-than-smoking> (accessed April 3, 2024).
- 54 WHO. Tobacco free for a healthy Pacific. Oct 4, 2013. <https://www.who.int/westernpacific/about/how-we-work/pacific-support/news/detail/04-10-2013-tobacco-free-for-a-healthy-pacific> (accessed April 3, 2024).
- 55 Meddings S. Philip Morris uncovers the two faces of Big Tobacco. *The Sunday Times*, July 17, 2021. <https://www.thetimes.co.uk/article/philip-morris-uncovers-the-two-faces-of-big-tobacco-jhrvc6w93> (accessed April 22, 2023).
- 56 Action on Smoking & Health. New Zealand is changing the rules: start dumping your tobacco stocks now. July 25, 2022. <https://ash.org/new-zealand-is-changing-the-rules-start-dumping-your-tobacco-stocks-now/> (accessed April 19, 2023).
- 57 Bakht S. Young Scots face total smoking ban with plan to raise age limit. *The Sunday Times*, June 11, 2022. <https://www.thetimes.co.uk/article/young-scots-face-total-smoking-ban-with-plan-to-raise-age-limit-62cjsrctf> (accessed April 29, 2023).
- 58 The Local Denmark. Explained: why is there pressure on Denmark to ban cigarette candy. July 11, 2022. <https://www.thelocal.dk/20220711/explained-why-is-there-pressure-on-denmark-to-ban-cigarette-candy> (accessed April 22, 2023).
- 59 Sofia N. Malaysia may join New Zealand in effort to ban some tobacco sales. *The Business Times*, July 22, 2022. <https://www.businesstimes.com.sg/international/malaysia-may-join-new-zealand-effort-ban-some-tobacco-sales> (accessed May 8, 2023).
- 60 Gregory J. Rishi Sunak defends his plan to ban smoking for younger generation. *BBC*, Oct 5, 2023. <https://www.bbc.co.uk/news/uk-67010681> (accessed March 17, 2024).
- 61 The Beehive. New Zealand records lowest smoking rate ever. Nov 17, 2022. <https://www.beehive.govt.nz/release/new-zealand-records-lowest-smoking-rate-ever#:~:text=Statistics%20released%20today%20show%20New,Health%20Dr%20Ayesha%20Verrall%20said> (accessed April 18, 2023).
- 62 Channel News Asia. New Zealand to scrap generational smoking ban to help pay for promised tax cuts: reports. Nov 27, 2023. <https://www.channelnewsasia.com/world/new-zealand-smoking-generation-ban-scrapped-fund-tax-cuts-3947791> (accessed March 17, 2024).
- 63 Kong AY, Henriksen L. Retail endgame strategies: reduce tobacco availability and visibility and promote health equity. *Tob Control* 2022; 31: 243–49.
- 64 Chatterjee M, Arora M, Yadav A, Shrivastav R, Sharma N, Reddy KS. Mobilizing youth for a tobacco-free society: NMT 21C (No More Tobacco in the 21st Century). *Glob Heart* 2014; 9: e17.
- 65 Mather A. The world's eyes are on us over push to ban smoking for those born after 2000. *Hobart Mercury*, Oct 11, 2014. <https://www.themercury.com.au/lifestyle/the-worlds-eyes-are-on-us-over-push-to-ban-smoking-for-those-born-after-2000/news-story/814e7b77c8c8549f2b88e0b36d4d43cc> (accessed April 19, 2023).
- 66 Healthy People 2030. Reduce current cigarette smoking in adults — TU02. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/tobacco-use/reduce-current-cigarette-smoking-adults-tu-02> (accessed May 24, 2023).
- 67 Hong Kong Council on Smoking and Health. Tobacco endgame. <https://www.smokefree.hk/page.php?id=98&lang=en&preview=> (accessed April 3, 2024).
- 68 Sónora G, Reynales-Shigematsu LM, Barnoya J, Llorente B, Szklo AS, Thrasher JF. Achievements, challenges, priorities and needs to address the current tobacco epidemic in Latin America. *Tob Control* 2022; 31: 138–41.
- 69 Bostic C, Bianco E, Hefler M. Progress, challenges and the need to set concrete goals in the global tobacco endgame. *Rev Panam Salud Publica* 2022; 10: e118.
- 70 WHO. WHO global report on trends in prevalence of tobacco use 2000–2025, fourth edition. Nov 16, 2021. <https://www.who.int/publications/i/item/9789240039322> (accessed Sept 12, 2022).
- 71 Siddiqi K, Shah S, Abbas SM, et al. Global burden of disease due to smokeless tobacco consumption in adults: analysis of data from 113 countries. *BMC Med* 2015; 13: 194.
- 72 Suliankatchi Abdulkader R, Sinha DN, Jeyashree K, et al. Trends in tobacco consumption in India 1987–2016: impact of the World Health Organization Framework Convention on Tobacco Control. *Int J Public Health* 2019; 64: 841–51.
- 73 Bagcchi S. Turkmenistan bans tobacco sales. *Lancet Respir Med* 2016; 4: 180.
- 74 African Tobacco Control Alliance. Africa tobacco industry interference index. October, 2023. <http://index2023.atca-africa.org/2023-Africa-Regional-Report-on-Tobacco-Industry-Interference-Index-VF.pdf> (accessed Jan 6, 2024).
- 75 Egbe CO, Magati P, Wanyonyi E, Sessou L, Owusu-Dabo E, Ayo-Yusuf OA. Landscape of tobacco control in sub-Saharan Africa. *Tob Control* 2022; 31: 153–59.
- 76 Amul GGH, Tan GPP, van der Eijk Y. A systematic review of tobacco industry tactics in southeast Asia: lessons for other low- and middle-income regions. *Int J Health Policy Manag* 2021; 10: 324–37.
- 77 Global Center for Good Governance in Tobacco Control. Índice regional de interferencia de la industria tabacalera en países de América Latina y el Caribe 2023. <https://globaltobaccoindex.org/upload/assets/RvyInadqc13p7MTTKvIda5RUWfA4UegHsUFesyU5jOc2NWAI77.pdf> (accessed April 4, 2024).
- 78 Ali AY, Safwat T, Onyemelukwe G, et al. Smoking prevention and cessation in the Africa and Middle East region: a consensus draft guideline for healthcare providers—executive summary. *Respiration* 2012; 83: 423–32.
- 79 Mitchell AD, Studdert DM. Plain packaging of tobacco products in Australia: a novel regulation faces legal challenge. *JAMA* 2012; 307: 261–62.
- 80 Government of Canada. Canada's tobacco strategy. July 10, 2023. <https://www.canada.ca/en/health-canada/services/publications/healthy-living/canada-tobacco-strategy.html#a4> (accessed May 8, 2023).
- 81 Currie LM, Clancy L. The road to smoke-free legislation in Ireland. *Addiction* 2011; 106: 15–24.
- 82 Willemsen MC, Been JV. Accelerating tobacco control at the national level with the smoke-free generation movement in the Netherlands. *NPJ Prim Care Respir Med* 2022; 32: 58.
- 83 Mackay JM, Dorotheo EU, Assunta M, Ritthiphakdee B. Tobacco control in Asia-Pacific: wins, challenges and targets. *Tob Control* 2022; 31: 146–49.
- 84 Elbek O, Kılınc O, Salepci B, et al. Tobacco control in Turkey in the light of the global adult tobacco survey. *Turk Thorax J* 2021; 22: 90–92.
- 85 Joossens L, Olfir L, Feliu A, Fernandez E. The Tobacco Control Scale 2021 in Europe. Brussels: Smoke Free Partnership, Catalan Institute of Oncology, 2022.
- 86 Willemsen MC, Mons U, Fernández E. Tobacco control in Europe: progress and key challenges. *Tob Control* 2022; 31: 160–63.
- 87 Skinner A, Walker P, Atkinson JA, et al. Policy options for endgame planning in tobacco control: a simulation modelling study. *Tob Control* 2021; 30: 77–83.
- 88 Ouakrim DA, Wilson T, Waa A, et al. Tobacco endgame intervention impacts on health gains and Māori:non-Māori health inequity: a simulation study of the Aotearoa/New Zealand Tobacco Action Plan. *Tob Control* 2023; published online Jan 10. <https://doi.org/10.1136/tc-2022-057655>.
- 89 The World Bank. Prevalence of current tobacco use (% of adults). 2024. <https://genderdata.worldbank.org/indicators/sh-prv-smok/?gender=total&year=2020> (accessed Jan 6, 2024).