

FOUNDATION FOR A SMOKE-FREE WORLD HEALTH, SCIENCE, & TECHNOLOGY (HST) PRELIMINARY AGENDA FOR PUBLIC COMMENT

THE CONTEXT FOR THE FOUNDATION'S PRELIMINARY HST AGENDA

Innovation turned smoking into a major public health issue

Smoking tobacco became a major cause of death and disability starting in the early part of the 20th century. This change was driven by technological innovation that enabled the mass production of low-priced cigarettes, and by innovations in sales and marketing that stimulated demand to meet this increased supply. In the UK, for example, cigarettes accounted for less than 20% of all tobacco consumed by men at the beginning of the 20th century and 80% by the 1940s; and cigarettes have always been the main form of tobacco use by women in the UK.¹

The world has made progress on smoking...

Large epidemiologic studies as early as the 1940s and '50s linked cigarette smoking and lung cancer, but it took decades to establish consensus on the harms of smoking. This was due to the long time-lag between exposure and adverse health outcomes, the need to develop new research techniques to assess outcomes not uniquely attributable to smoking, and the tobacco industry's sustained and organized efforts to undermine the growing scientific consensus. The 1964 Report of the Advisory Committee to the US Surgeon General was a milestone in driving acceptance of the causal relationship between smoking and disease and led to some early measures to curb smoking. These in turn drove early declines in smoking prevalence, particularly in high-income countries, e.g., the US (from 42% in 1965 to 25% in 1997)² and the UK (from 52% for men in 1972 to 32% in 1997).¹

The World Health Organization's Framework Convention for Tobacco Control (WHO FCTC) opened for signing in 2003 and is now legally binding in 181 ratifying countries. It is the most comprehensive effort to date to reduce tobacco use, with articles that address not only demand reduction, but also supply-side issues such as illicit trade, second-order consequences such as the livelihoods of tobacco farmers, and the need for ongoing research.^{3,4}

Implementation of the FCTC has largely focused on a subset of these articles to protect the public from second-hand smoke, reduce smoking initiation and encourage cessation, prevent tobacco industry marketing, and monitor progress. These are described in the MPOWER package,⁵ launched in 2008: (1) Monitor tobacco use and prevention policies; (2) protect people from tobacco smoke; (3) offer help to quit tobacco use; (4) warn about the dangers of tobacco; (5) enforce bans on tobacco advertising, promotion, and partnership; and (6) raise taxes on tobacco. Currently, 4.7 billion people are covered by at least one MPOWER intervention at the national level.⁶

...but much more needs to be done

The global prevalence of smoking peaked in the 1980s and has been falling since then, from 41% to 31% for men by 2012, and from 11% to 6% for women by 2012.⁷ Since 2000, smoking prevalence for men has fallen in 125 countries and for women, in 155.⁸

This progress nonetheless masks significant challenges:

- More people now smoke: the number of people who smoke has increased from around 720 million in 1980 to approximately a billion today,⁶ as population growth has outstripped prevalence reduction everywhere except in countries with a high social development index.
- The demographics have changed: today, 80% of people who smoke live in low- and middle-income countries⁸ (e.g., 260 million in China, 104 million in India,ⁱ 54 million in Indonesia),¹⁰ many with limited ability to implement and enforce tobacco control policies. In high-income countries, smoking is increasingly concentrated in vulnerable populations and in people with lower incomes or educational attainment (see below).
- A billion lives are at risk: a billion people who use tobacco—mostly smokers—will die because of it over the course of this century, ten times as many as died from smoking in the 20th century. Most of these deaths will be in low- and middle-income countries, whereas most of the last century's deaths were in high-income countries.¹¹

THE OPPORTUNITY

Preventing a billion deaths in this century by accelerating FCTC implementation

The need to rapidly drive down death and disability from smoking is clear, and there are a number of avenues to pursue:

- Likely the fastest way is to help current smokers to quit as quickly as possible: smokers who quit before age 40 reduce by more than 90% their risk of excess mortality compared to those who continue to smoke, and even those who quit at age 50 reduce their risks by more than 50%.^{12,13}
- Continuing to prevent smoking initiation will, of course, remain extremely important, while recognizing that the main health benefits of efforts today will appear after 2050.¹¹ Similarly, it will be important to continue to protect the public from the harms of second-hand smoke.

ⁱ Recognizing that in some countries, and particularly in India, a significant amount of harm is caused by oral use of unrefined smokeless tobacco preparations. Helping users of these products to quit or reduce their risks by switching to less harmful substitutes is also in scope for the Foundation's activities.

- Harm reduction, for those who cannot quit or do not want to quit, must be explored, especially in light of recent technological innovation and the rapid pace of change in this area.
- All these efforts must be designed to be implemented effectively, not just in high-income countries but also in low- and middle-income countries where most smokers live.

Looking at these avenues through the lens of the FCTC, it is necessary both to accelerate the implementation of MPOWER and to drive implementation of the other key articles.

Accelerating the effective implementation of MPOWER is already a priority. It has become a major area of focus for Bloomberg Philanthropies with further financial support from the Bill & Melinda Gates Foundation, technical support from WHO, and implementation support by a range of partners. In this approach, the main levers for driving improvement are policy levers, and governments are the main agents of change and scale-up.

Implementing the rest of FCTC, and closing four gaps in particular, in countries with the greatest need, is also required (Exhibit 1):

- (1) *Reducing smoking-related harm in specific population segments:*** Smoking in women is of growing concern. The boy:girl tobacco use ratio is smaller than the men:women ratio in many countries, with some reversals.¹⁴ The consequences of this trend in 20-25 years for women's health will be significant. Smoking during pregnancy also continues to be an issue in many countries.

Smoking prevalence remains high in vulnerable populations, including indigenous peoples,^{15,16,17} people with serious mental health disorders,¹⁸ people with TB¹⁹ or HIV/AIDS,²⁰ and military personnel²¹ and veterans.²²

In high-income countries, smoking is increasingly concentrated in people with lower income or educational attainment. In the US, it is highest among people with a high school equivalency certificate (34%) and lowest among those with a graduate degree from university (4%);²³ smoking rates are higher among Americans making less than \$20,000 a year (26%) than those making \$20,000 a year or more (14%).²⁴ Similar observations have been made in France and Germany.²⁵

- (2) *Providing effective tools to help smokers quit:*** FCTC Article 14, which is part of MPOWER, focuses on offering cessation support. However, existing products and services to help smokers quit have low effectiveness, with 6- to 12-month abstinence rates of 2-5% for behavioral interventions and 6-15% for pharmaceutical products.²⁶
- (3) *Offering harm reduction options alongside cessation:*** FCTC Article 1(d) includes harm reduction in the definition of tobacco control, but this option is not covered in MPOWER. There is little research on harm reduction: over the past 10 years, there have been two orders of magnitude fewer academic publications on smoking harm reduction compared to smoking cessation.²⁷
- (4) *Expanding research and scientific collaboration:*** FCTC Articles 20 & 22 focus on research and scientific cooperation. Eighty percent of smokers today live in low- and middle-income countries, but most research today is led by centers in the US and Europe.

Funding for research is also limited, particularly outside the US: Of the \$31.4 billion in development assistance for global health in 2011, only \$68 million went to tobacco control.²⁸ Among the top funders for tobacco control, the Bloomberg Tobacco Free Initiative explicitly does not fund basic research, academic studies, or cessation services,²⁹ and the Bill & Melinda Gates Foundation's focus is on preventing initiation by new smokers, decreasing overall tobacco use, and reducing exposure to secondhand smoke.³⁰

From the perspective of new researchers, a recent article focusing on high-income countries highlights the shortage of academic positions related to tobacco control, and the importance of seeking experience outside of traditional academic settings along with incorporating the innovative research methods that have evolved over the last decade.³¹ The picture in lower-income countries is even less positive, especially given the historic need to build institutional and human capacity for research to address noncommunicable diseases (NCDs) in these countries.

Harnessing innovation to drive a consumer-oriented approach

A century ago, innovation, in the form of the mass-produced cigarettes and their marketing, drove the dramatic increase in death and disability from smoking. Today, innovation—properly harnessed—can help close the four gaps in FCTC implementation and reduce future harm from smoking. Two technological innovations are particularly relevant:

(1) Tools to help people measure and change their behavior

Smartphones and consumer-oriented sensors and apps have become widely used over the past decade, including in many low- and middle-income countries. Smokers can use these tools to better measure and understand their own smoking behavior and its impact on their health, and to receive customized feedback and intervention to help them quit or smoke less. These tools can also be used at scale in low- and middle-income countries, as shown by the 'BeHealthy, BeMobile' mCessation initiative run by WHO and the International Telecommunication Union in India.³² They can also be used by researchers in observational and interventional studies.

(2) Products that deliver nicotine with significantly less harm

Nicotine creates dependence but does not itself cause the harms associated with smoking.³³ Most of the harm from smoking is caused by chemicals created by burning tobacco, a notion articulated as early as 1976: "People smoke for the nicotine, but they die from the tar."³⁴ Sweden's experience with snus, a refined smokeless tobacco product, suggests that it is significantly less harmful than smoking.³⁵ The miniaturization of batteries, sensors, and control systems has led to the development of consumer products that can deliver nicotine without the combustion of tobacco, or indeed without any tobacco. These products are not completely harmless, and more research is needed to establish their specific harm profiles, but their greatly reduced levels of toxins and evidence from biomarkers suggests that they should have far lower risk than smoking,^{39,40} a view that has led the UK Royal College of Physicians and Public Health England to support their use to reduce smoking. Smokers can use these products either to help them transition to complete cessation or to deliver the physiological or psychological experiences they seek with far lower exposure to the harmful substances in smoke.

It is important that these two innovation categories are both *consumer* products, available in many different forms and evolving in response to consumer demand, rather than medically prescribed treatments. There is great variety in the reasons why people smoke, in their smoking behaviors, in their willingness and readiness to quit, and in the type and amount of help that they need to quit. There is also increasing recognition that some smokers experience pleasure from nicotine or from the rituals of smoking, and would seek to reduce their harm rather than quit.^{36,37} These tools and products can help people who smoke to find the best solutions for their needs and wants; they bring new companies into the market; and they challenge incumbent tobacco companies to innovate their product portfolios beyond cigarettes.

Tobacco control to date has been driven by policy levers, with governments as change and scale-up agents. These new technologies enable people who smoke—consumers—to themselves be change agents and leverage the scale-up capacity of the private sector. The opportunity that we see is to accelerate the end of smoking-related death and disability by complementing the existing tobacco control approach with a consumer-oriented approach—appropriately regulated—to help smokers quit or switch to significantly less harmful alternatives.

THE FOUNDATION'S ROLE AND PRELIMINARY HST AGENDA

Foundation for a Smoke-Free World's role

The Foundation for a Smoke-Free World (FSFW) is an independent philanthropic foundation whose purpose is to improve global health by ending smoking in this generation (see our website www.smoke-freeworld.org for the Foundation's work, and the Appendix for more information on the Foundation's independence).

The Foundation believes that there is now an opportunity to accelerate the end of smoking by driving a transformation of the entire tobacco and nicotine ecosystem including people who smoke, physicians and healthcare providers, payors and insurers, policy-makers and regulators, the entire supply chain from tobacco farmers to manufacturers of tobacco and nicotine products, and researchers and innovators. Such a transformation builds on the comprehensive set of activities described in the WHO FCTC. It includes work in health, science, and technology (HST) to accelerate quitting and switching; in agriculture to help smallholding tobacco farmers find alternative livelihoods; and in influencing industry to move quickly away from cigarettes towards significantly reduced risk products.

Preliminary HST agenda

In its health, science, and technology (HST) work, the Foundation seeks to complement ongoing tobacco control efforts and focus on the four FCTC gaps in countries where most smokers live, with a smoker-oriented agenda to accelerate quitting and switching (Exhibit 2).

A consumer-focused approach to accelerating quitting or switching strives to help people who smoke to change their behavior and to engage their influencers (family and friends; physicians and other healthcare providers; media; health insurers and payors; policy-makers; and other mediators [e.g., academics, think tanks, consumer groups, and charities]) to support that change:

- The Foundation’s HST work will focus heavily on smokers to understand their needs and wants; engage them in research, product design, and policy discussions; help them quit or switch as part of a broader effort to improve their overall health; and promote solutions that are appropriate for older adults, for both men and women, and for different vulnerable populations.
- The Foundation’s HST work will engage all stakeholders; work with scientists across academia, government, and industry; and support public-private partnerships.

As with all consumer-oriented approaches, the HST agenda will focus largely on the levers of *consumer perceptions*, *product characteristics*, and *price*. For smokers to more quickly reduce their health risks by quitting or switching to the least harmful product (or combination of products) that meets their individual needs, they require:

- **Perception** and correct understanding of the health benefits of quitting or switching; of how quickly these benefits may be realized, even after many years of smoking; and of which product ingredients are responsible for the dependence, the harms, and the pleasure they experience—and, in particular, the role of nicotine
- **Products** and services that are genuinely attractive for quitting or switching. These must be highly effective (for cessation) or much less harmful (for switching) and must also meet individual smokers’ unique physiological, sensory, emotional, and social needs
- **Pricing** and price differentials that encourage quitting or switching to the least harmful acceptable products, while discouraging uptake by nonsmokers. (Other economic incentives such as health insurance and life insurance premiums that are proportional to product risk can play an important role.)

To drive perceptions, and pricing in ways that accelerate quitting or switching, the preliminary HST agenda includes three activities:

1. *Funding research that*
 - Answers consumers’, physicians’, regulators’, and other stakeholders’ questions across perceptions, products, and pricing
 - Strengthens research capacity in countries where most smokers live
2. *Creating funding mechanisms to stimulate innovation and bring to market*
 - Significantly more effective cessation products
 - Affordable cessation and reduced-risk products for low- and middle-income countries
3. *Funding data-gathering and analytics to measure progress and to inform the actions of consumers, policy-makers, researchers, other stakeholders, and the Foundation itself*

Funding research and strengthening research capacity

There is a clear need for more research to answer stakeholders’ key questions, and for strengthening research capacity in countries where most smokers live. A number of organizations have laid out research gaps, including WHO,³⁸ the US National Academies of Science, Engineering, and Medicine (NASEM),³⁹ and Public Health England.⁴⁰

There are exciting opportunities to use advances in science and technology to conduct research on smoking in ways that were not previously possible, practical, or affordable, including:

- Mobile and internet-enabled devices to monitor smoking behavior accurately through wearable exposure monitors, and to provide just-in-time and context-appropriate support messages for cessation attempts⁴¹
- Behavioral psychology and behavioral economics to better understand the drivers of consumer choice, especially regarding substituting products for cessation and harm reduction,⁴² and the drivers of success and failure in behavior change
- Data science and machine learning approaches to combine and analyze large genetic, physiological, and behavioral datasets to yield new understanding and inform future research⁴³
- Nanotechnology, for example, synthetic biomarkers (currently being explored to improve cancer detection)⁴⁴ for the early detection of smoking-related harms
- Systems science and implementation research (e.g., to assess the synergies of multi-initiative rather than “silver bullet” strategies to reduce smoking harm)

The Foundation’s approach to funding and supporting research

The Foundation will fund research primarily through *major, multi-year grants* to research institutions and global research networks. These entities will be free to design their own detailed research program under the supervision of their scientific advisory and institutional review boards, in order to find robust and reliable answers to the high-level questions on our research agenda. The Foundation will also fund *different approaches in parallel* to explore the same research question.

The Foundation will expect its grantees to:

1. *Engage people who smoke or use nicotine* in the design and conduct of research, across age groups and gender, and including smokers from vulnerable populations
2. *Strengthen research capacity* in countries where most smokers live, both through direct partnerships and through building of global networks of research institutions spanning low-, middle-, and high-income countries
3. *Attract the best researchers* with relevant expertise from diverse fields, including those who are not currently engaged in research on smoking
4. *Apply a broad range of research techniques and analyses* (e.g., building large transnational cohorts of users to document lived experience over time, looking at new ways to measure health outcomes and exposures; designing appropriate intervention experiments)
5. Conduct research and publish according to *Open Science principles*, including declaring hypotheses and proposed analyses up-front, making raw data available for reanalysis, publishing all results whether positive or negative, and publishing in journals that offer open access

Potential research questions

New and better tools for research

- Biomarkers of exposure and future harm:
 - *What biomarkers of exposure can describe a person’s current smoking status (smoker, tobacco user, nicotine user, dual user, etc.)?*
 - *What early biomarkers can predict future harms from smoking?*
- Product characterization:
 - *What are the contents and toxicities of tobacco- and nicotine-containing products available in different countries?*
 - *How can better and cheaper assays for these be developed, especially for use in low- and middle-income settings?*

Outcomes research

- Using the latest technology: *what should a technology-enabled 21st century cohort study look like?*
- Benefits of quitting or switching in high-risk populations of smokers: *what are the outcomes, their timing, and their variation by gender?*
 - *Chronic health conditions (e.g., cardiovascular disease, chronic obstructive pulmonary disease, diabetes, multiple morbidities)*
 - *HIV/AIDS and tuberculosis*
 - *Schizophrenia and other serious mental health conditions*
 - *At-risk populations (e.g., indigenous populations, veterans)*
 - *Otherwise healthy smokers aged over 50*
- Long-term health outcomes of using alternative nicotine delivery systems: *large-scale, long-duration, international cohort studies to assess:*
 - *Absolute and relative harms of products, by specific harm or disease*
 - *Dose-response-time relationships between exposures and outcomes*
 - *Effectiveness of different cessation and harm-reduction interventions*
 - *Differences in outcomes across gender, age, and other characteristics*

Research to improve the effectiveness of cessation and harm reduction interventions

- Smoker characterization and tailoring of quitting/switching approaches:
 - *How can smokers be characterized by smoking history, genetic, physiological, psychological, and social factors?*
 - *How can such a characterization lead to more effective approaches to quitting or switching for different types of smoker?*
- The role of other health-related behaviors, notably physical activity: *how can these be used to increase the likelihood of quitting or switching?*
- Dependence and addiction science: *what are the physiological and psychological bases of dependence, and how can these be addressed to make quitting easier?*

- Behavioral psychology and behavioral economics: *what are the drivers of success and failure in behavior change in smoking and other unhealthy behaviors?*

Research on policy-level enablers of smoking cessation and harm reduction

- Effective communication of risk and harm levels: *what are the most effective ways to communicate the harm levels of different products, and of nicotine vs. smokeless tobacco vs. tobacco smoke?*
 - *To smokers and nonsmokers, by gender, by education, and by socioeconomic status*
 - *To physicians and other healthcare providers*
- Pricing: *what are optimal pricing and tax policies for cessation and reduced-risk products to accelerate quitting smoking or switching to reduced-risk products?*

Systems science and implementation research:

- Lessons from different countries' experiences: *what can be learned about helping smokers quit or switch, from:*
 - *Countries with large-scale experimentation with potentially less harmful alternatives to cigarettes? (e.g., Japan, Sweden, UK)*
 - *Countries in which the prevalence of smoking has always stayed very low?*
 - *Countries in which the prevalence of smoking has decreased very sharply?*
- Portfolios of interventions: *how can a portfolio of synergistic interventions be constructed to drive a “tipping point” in smoking cessation and harm reduction?*

Stimulating innovation

Quitting smoking is hard, and most smokers have trouble quitting without help. The Foundation's recent global poll of smokers (<https://www.smokefreeworld.org/state-smoking>) shows that this is still the case across a large number of countries. Current smoking cessation tools (products and services) have low effectiveness, with 6- to 12-month abstinence rates of 2-5% for behavioral interventions and 6-15% for pharmaceutical products.²⁶ The pharmaceutical research and development pipeline for new smoking-cessation products is sparse. Many apps are now available to help smokers quit, but very few if any have been rigorously tested and validated for efficacy.

In low- and middle-income countries where most smokers live, this problem is compounded by the poor availability and affordability of existing smoking-cessation products. A similar picture is expected for reduced-risk products.

The Foundation will support work to understand the underlying drivers of low innovation in this field, and to stimulate innovation to more rapidly develop smoking-cessation tools and reduced-risk products that are highly effective, acceptable from a consumer's point of view, and affordable in low- and middle-income settings.

Potential innovation questions:

- *How can we develop highly effective smoking cessation tools (e.g., with >50% 12-month effectiveness)? How can these be optimized for men and women, for older smokers, for vulnerable populations, and for other types of people who smoke?*
- *How can we make cessation tools and reduced-risk products accessible and affordable for people in low- and middle-income countries?*

Funding data-gathering and analytics

The environment for smokers in many countries is changing rapidly, whether due to the introduction of new reduced-risk products or changes in product prices or regulations. It will be important to have up-to-date (ideally real-time) data available and analyzable at national and sub-national levels to track progress and to inform the actions of consumers, regulators, and other stakeholders, and to continually refine the Foundation's own activities. Such data include:

- Data to complement what is already being collected by the Global Adult and Youth Tobacco Surveys, in particular smoking cessation rates and the prevalence of ex-smokers in the population
- Surveys of population perceptions, intentions, and behaviors related to smoking and use of other nicotine products, cessation, and harm reduction
- Surveys of physicians' and other healthcare professionals' perceptions and understanding of issues related to smoking, cessation, and harm reduction
- Surveys of media coverage of cessation and harm reduction, focusing on the scientific correctness of the content
- Real-time information on product availability, prices, and sales volumes: cigarettes, cessation tools, reduced-risk products
- Up-to-date information on legislation and regulation, on their alignment with the best available scientific evidence, and on the effectiveness of their implementation and enforcement

EXHIBITS

Exhibit 1: FCTC, MPOWER, and Gaps

Health, science, & technology-related FCTC articles:	Existing focus	Gaps
Preamble		• Limited focus on indigenous peoples, women, young girls, and on gender-specific strategies
<i>Part I: Introduction</i>		
1 Use of terms		• Very limited work on harm reduction, which is part of the definition of tobacco control
<i>Part II: Objective, guiding principles and general obligations</i>		
4 Guiding Principles		• Limited focus on indigenous individuals and communities, and on gender-specific risks
<i>Part III: Tobacco demand reduction</i>		
6 Price and tax measures	MPOWER	
7 Non-price measures	MPOWER	
8 Protection from exposure to tobacco smoke	MPOWER	
9 Regulation of the contents of tobacco products		• Limited focus on testing and regulating contents and emissions of tobacco and nicotine products, particularly in low- and middle-income countries
10 Regulation of tobacco product disclosures	MPOWER	
11 Packaging and labeling of tobacco products	MPOWER	
12 Education, communication, training, & public awareness	MPOWER	
13 Tobacco advertising, promotion, and sponsorship	MPOWER	
14 Tobacco dependence treatment and cessation support	MPOWER	• Few effective tools available to support cessation, with very little in development
<i>Part IV: Tobacco supply reduction</i>		
15 Illicit trade in tobacco products	MPOWER	
16 Sales to and by minors	MPOWER	
<i>Part VII: Scientific and technical cooperation</i>		
20 Research, surveillance, and information exchange	MPOWER	• Very little research led from countries where most smokers live; limited research funding
22 Scientific, technical, and legal cooperation		

Exhibit 2: Foundation's HST Agenda



Four gaps

- Reducing smoking-related harm in specific population segments
- Providing effective tools to help smokers quit
- Offering harm-reduction options
- Expanding research and scientific collaboration

FSFW: Ecosystem-wide transformation			
HST	Agriculture & Livelihoods	Influencing Industry	
<p>Support</p> <p>MPOWER</p> <p>Complement MPOWER:</p> <ul style="list-style-type: none"> Fund research and strengthen research capacity Stimulate product and service innovation Fund data-gathering and analytics 	<p>Better <i>perception</i> and understanding of benefits of quitting or switching, and of the drivers of dependence, harm, and pleasure</p> <p>Broader range of attractive, accessible, and effective <i>products and services</i> for quitting or switching</p> <p><i>Prices and price differentials</i> that encourage quitting or switching while discouraging uptake by nonsmokers</p>	<p>Rapid reduction in smoking-related death and disability through:</p> <ul style="list-style-type: none"> • Many smokers quitting more quickly • Other smokers switching to less harmful alternatives 	

APPENDIX: THE FOUNDATION'S INDEPENDENT STATUS

The Foundation for a Smoke-Free World (FSFW) is an independent non-profit US corporation with US IRS 501(c)(3) status, fulfilling their requirements for independence. It is currently funded by a pledge agreement with Philip Morris International (PMI), which provides FSFW with US\$80 million annually for 12 years, starting in 2018. The Foundation also seeks additional sources of funding.

The Foundation's governance and leadership are entirely independent of its funding source. It will conduct its activities free of any commercial influence and ensure the scientific independence and integrity of the research that it supports. These elements are detailed in the Foundation's Certificate of Incorporation (esp. Third section), available at https://www.smokefreeworld.org/sites/default/files/uploads/certificate_of_incorporation.pdf as well as in the Foundation's Bylaws (esp. articles VIII and IX), available at https://www.smokefreeworld.org/sites/default/files/uploads/foundation_for_a_smoke-free_world_inc._-_first_amended_and_restated_bylaws.pdf.

The Foundation has also carefully reviewed the criteria for accepting tobacco industry funding laid out by Cohen, Zeller, et al. in 2009, aligned its governance, management, and operations to adhere to this criteria, and laid this out in detail at https://www.smokefreeworld.org/sites/default/files/uploads/careers/fsfw_cohen_criteria_061118_v1.2.pdf

The Foundation's pledge agreement with PMI, available at https://www.smokefreeworld.org/sites/default/files/uploads/foundation_for_a_smoke-free_world_pledge_agreement.pdf, also allows it to pursue its purpose in a fully independent manner, without any influence from the funder. The agreement:

- Binds PMI to provide FSFW with US\$80 million annual for 12 years, as long as the Foundation operates in line with its stated mission, as attested to by the Foundation's Board of Directors (which has no industry representation) and by independent external auditors hired by the Board and paid by the Foundation
- Recognizes FSFW's legal and operational independence, and excludes PMI from having any position, role, or influence over the Foundation's governance, Board of Directors, strategic decision-making, or day-to-day operations
- Reinforces the Foundation commitment to supporting high-quality, peer-reviewed research
- Notes that FSFW's acceptance of funds does not constitute an endorsement by the Foundation of any of PMI's activities or products
- Places no restrictions on the Foundation's activities, including activities that may be critical of the tobacco industry

REFERENCES

- 1 Davy M. Time and generational trends in smoking among men and women in Great Britain, 1972-2004/05. *Health Statistics Quarterly* 32, Winter 2006: 35-43
- 2 *MMWR* Nov 5, 1999 / 48(43):986-993
- 3 http://www.who.int/fctc/text_download/en/. WHO. Accessed 5 June 2018.
- 4 Yach, D. The origins, development, effects, and future of the WHO Framework Convention on Tobacco Control; a personal perspective. *The Lancet* 2014 May 17; 383(9930): 1771-1779
- 5 <http://www.who.int/tobacco/mpower/en/>. WHO. Accessed 5 June 2018.
- 6 WHO Report on the global tobacco epidemic, 2017: Monitoring tobacco use and prevention policies. World Health Organization, 2017.
- 7 Ng M, Freeman MK, Fleming, TD. Smoking Prevalence and Cigarette Consumption in 187 Countries, 1980-2012. *JAMA*. 2014;311(2):183-192.
- 8 Bilano V, Gilmour S, Moffiet, T, et al. Global trends and projections for tobacco use, 1990–2025: an analysis of smoking indicators from the WHO Comprehensive Information Systems for Tobacco Control. *The Lancet* 2015 Mar 14; 385(9972): 966 – 976.
- 9 Institute for Health Metrics and Evaluation. *Tobacco Visualization*. University of Washington, 2017. <http://vizhub.healthdata.org/tobacco/>. (Accessed 5 July 2018)
- 10 The Tobacco Atlas. American Cancer Society and Vital Strategies, 2018. <http://tobaccoatlas.org> (Accessed 5 August 2018: daily smokers aged >=10)
- 11 Jha P. Expanding smoking cessation world-wide. *Addiction*. 2018; 113(8):1392-1393
- 12 Pirie K, Peto R, Reeves GK, Green J, Veral V. The 21st century hazards of smoking and benefits of stopping: a prospective study of one million women in the UK. *The Lancet*. 2013 Jan 12; 381(9861): 133-141
- 13 Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 years' observations on male British doctors. *BMJ* 2004; 328:1519-1533
- 14 Warren CW, Lea V, Lee J, Jones NR, Asma S, and McKenna M. Changes in tobacco use among 13-15 year olds between 1990 and 2008: Findings from the Global Youth Tobacco Survey. *Glob Health Promot*. 2009; 16:38-90
- 15 Tobacco Use in Racial and Ethnic Populations. <http://www.lung.org/stop-smoking/smoking-facts/tobacco-use-racial-and-ethnic.html>. American Lung Association. Accessed 1 June 2018.
- 16 Jetty R. Tobacco use and misuse among Indigenous children and youth in Canada. *Paediatrics & Child Health*. 2017 Oct 1; 22(1): 395–399.
- 17 Aboriginal and Torres Strait Islander Health Performance Framework 2014 Report. <https://www.pmc.gov.au/sites/default/files/publications/indigenous/Health-Performance-Framework-2014-tier-2-determinants-health/215-tobacco-use.html>. Australian Office of the Prime Minister and Cabinet. Accessed 1 June 2018.
- 18 National Behavioral Health Network for Tobacco & Cancer Control. <https://www.thenationalcouncil.org/consulting-best-practices/national-behavioral-health-network-tobacco-cancer-control/>. National Council for Behavioral Health. Accessed 1 June 2018.
- 19 Siddiqi K and Lee ACK. An integrated approach to treat tobacco addiction in countries with high tuberculosis incidence. *Trop Med Intl Health*. 2009; 14(4):420-428.
- 20 Mdege ND, Shah S, Ayo-Yusuf OA, Haki J, Siddiqi K. Tobacco use among people living with HIV: analysis of data from Demographic and Health Surveys from 28 low-income and middle-income countries. *Lancet Glob Health*. 2017 Jun; 5(6): e578–e592.
- 21 Department of Defense 2011 Health Related Behaviors Survey of Active Duty Military Personnel. United States Department of Defense, 2013.
- 22 Odani S, Agaku IT, Graffunder CM, Tynan MA, Armour BS. Tobacco Product Use Among Military Veterans — United States, 2010–2015. *MMWR Morb Mortal Wkly Rep* 2018;67:7–12.
- 23 U.S. National Cancer Institute. A Socioecological Approach to Addressing Tobacco-Related Health Disparities. National Cancer Institute Tobacco Control Monograph 22. NIH Publication No. 17-CA-8035A. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2017.
- 24 Jamal A, King BA, Neff LJ, Whitmill J, Babb SD, Graffunder CM. Current cigarette smoking among adults – United States, 2005-2015. *MMWR Morb Mortal Wkly Rep*. 2016;65(44):1205-11.
- 25 Pampel F, Legleye S, Goffette C, Piontek D, Kraus L, Khlat M. Cohort changes in educational disparities in smoking: France, Germany and the United States. *Soc Sci Med*. 2015; 127:41-50.
- 26 West R., Raw M., McNeill A., et al. Health-care interventions to promote and assist tobacco cessation: a review of efficacy, effectiveness and affordability for use in national guideline development. *Addiction*. 2015; 110: 1388–1403.
- 27 Pubmed journal article search (2007-2017): articles containing both terms in title or abstract. Search terms used: 'smoking' AND 'cessation', 'smoking' AND 'harm reduction'
- 28 Bollyky T and Fidler D. Has a global tobacco treaty made a difference? *The Atlantic*. 28 Feb 2015. <https://www.theatlantic.com/health/archive/2015/02/has-a-global-tobacco-treaty-made-a-difference/386399/>. Accessed 31 May 2018.
- 29 Tobacco Free Initiative. http://www.who.int/tobacco/about/partners/bloomberg/grants_qa/en/index2.html. World Health Organization. Accessed 31 May 2018.
- 30 Tobacco Control: What we do. <https://www.gatesfoundation.org/What-We-Do/Global-Policy/Tobacco-Control>. Bill & Melinda Gates Foundation. Accessed 31 May 2018.
- 31 Kleykamp BA, Gipson CD, Maynard OM, Treur JL, Oliver JA. Rethinking the Career Landscape for Nicotine and Tobacco Trainees and Early Career Professionals. *Nic Tob Res*. 2018; 1-5.
- 32 Gopinathan P, et al. Self-reported quit rates and quit attempts among subscribers of a mobile text messaging-based tobacco cessation programme in India. *BMJ Innov* 2018; 0:1-8
- 33 Gottlieb S and Zeller M. A Nicotine-Focused Framework for Public Health. *N Engl J Med* 2017; 377:1111-1114.
- 34 Russell, MJ. Low-tar medium-nicotine cigarettes: a new approach to safer smoking. *BMJ* 1976; 1:1430-1433
- 35 Levy et al. The relative risks of a low-nitrosamine smokeless tobacco product compared with smoking cigarettes: estimates of a panel of experts (December 2004). Available at: <https://www.ncbi.nlm.nih.gov/pubmed/15598758>
- 36 Abrams DA, Glasser AM, Pearson JL, Villanti AC, Collins LK, Niaura RS. Harm Minimization and Tobacco Control: Reframing Societal Views of Nicotine Use to Rapidly Save Lives. *Annu Rev. Public Health* 2018; 39:193–213.
- 37 Fidler, JA, West, R. Self-perceived smoking motives and their correlates in a general population sample. *Nic & Tob Res*. 2009 Oct;11(10):1182-1188, <https://doi.org/10.1093/ntr/ntp120>
- 38 WHO Report on the global tobacco epidemic, 2017: Monitoring tobacco use and prevention policies. World Health Organization, 2017.
- 39 Public Health Consequences of E-Cigarettes. National Academies of Science, Engineering, Medicine, 2018.
- 40 Evidence review of e-cigarettes and heated tobacco products. Public Health England, 2018.
- 41 Munafa, M How Can Technology Support Smoking Cessation Interventions? *Nicotine & Tobacco Research*. 2017, 271–272.
- 42 Johnson, MW, Johnson PS, Rass O, Pacek LR. Behavioral economic substitutability of e-cigarettes, tobacco cigarettes, and nicotine gum. *J Psychopharmacol*. 2017 Jul;31(7):851-86.
- 43 OECD Science, Technology and Innovation Outlook 2016. OECD Publishing, 2016.
- 44 Bhatia, Sangeeta. This tiny particle could roam your body to find tumors. TED May 2016. Lecture.