



The Future of Tobacco Control: New Research Directions for Ending the Pandemic in Mexico

Movimiento Pro-Vecino

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Executive summary

This report examines the challenges and opportunities in combating the tobacco epidemic in Mexico. The primary findings and recommendations are:

- According to the Encuesta Nacional de Salud y Nutrición (ENSANUT) data, the prevalence of smoking in Mexico has fluctuated, with a significant reduction from 21.4% in 2000 to 16.8% in 2019, followed by an increase to 19.5% in 2022, largely influenced by the global COVID-19 pandemic. The Global Adult Tobacco Survey (GATS) indicates an increase in the number of smokers by 3.4 million between 2009 and 2023, highlighting the need for more effective tobacco control measures.
- Despite the adoption of the WHO Framework Convention on Tobacco Control (FCTC), enforcement and compliance issues persist. Various measures, such as warning labels, smoking cessation programs, and smoke-free policies, have been implemented with varying degrees of success, but significant gaps remain.
- The Mexican health system faces challenges including constant legal reforms, budget reductions, and an extensive network of institutions that complicate coordinated action. Recent health reforms aimed to centralize health service provision have faced issues of under-expenditure and service gaps, complicating the effective implementation of tobacco control measures.
- The health burden of smoking is projected to increase, with current trends indicating a significant rise in mortality attributable to smoking over the next decades, necessitating comprehensive public health interventions.
- There is a critical need for innovative and effective alternatives to traditional tobacco control measures, including the adoption of new risk reduction strategies and the role of economic research to inform policy.
- There is need for a new research agenda focused on risk reduction and innovative strategies centered on individual decisions rather than restrictions and prohibitions, emphasizing the importance of sustained evidence-based tobacco regulation.

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Chapter 1

Introduction

Since its inception in February 1998, Movimiento Pro-Vecino, a dedicated non-profit organization, has been steadfast in its mission to *improve the quality of life for the inhabitants of cities and municipalities throughout Mexico, fostering an environment of freedom, responsibility, and active participation*. In alignment with this mission, our recent initiatives have embraced the principles of open science to generate independent, impactful research focused on critical public health issues, including the global tobacco epidemic.

A pressing issue that has been part of the public discussion in Mexico has been the global tobacco epidemic and the steps that the Mexican state as a whole has implemented to curb it. Globally, tobacco regulation is one of the tools modern societies have implemented to reduce the impact of one of the leading causes of death, illness, and poverty. According to WHO 2023, there are 8 million deaths related to tobacco a year and tobacco use continues to be one of the biggest public health threats. Since 2003, many member states of the World Health Organization (WHO) have adopted the WHO Framework Convention on Tobacco Control (FCTC) and have enacted regulations that address this public health crisis.

In Mexico, the situation is particularly dire; the country has also ratified the WHO Framework Convention on Tobacco Control (FCTC) to combat the tobacco epidemic. Despite these efforts, tobacco use remains a significant public health issue. The adoption of FCTC guidelines has spurred legislative reforms, but enforcement and compliance issues persist, necessitating continuous monitoring and adaptation of strategies.

This pressing issue touches every citizen, and by contributing to a foundational dialogue, we aim to enlighten both the general public and the research community, fostering informed decisions and policies.

According to the most recent Encuesta Nacional de Salud y Nutrición (EN-SANUT), smoking prevalence in Mexico is on the rise, signaling a red alarm for public health officials and policy makers. This increase in tobacco use not only poses a significant threat to public health but also imposes a considerable fiscal burden on an already underfunded health system. There is a critical need for

improved efforts to counteract the growing prevalence of smoking and mitigate its health and economic impacts on Mexican society.

Our research aims to address these concerns by:

- Establishing a clear understanding of the current trends in smoking prevalence in Mexico.
- Hypothesizing potential root causes for the observed increase in smoking rates.
- Exploring potential societal actions, which could be regulatory in nature or alternative in nature, to address these trends.
- Analyzing the issue from a scientific viewpoint, we employ formal methodologies to ensure the rigor of our findings.
- Opening the discussion to include innovative and potentially effective alternatives to traditional tobacco control measures.

This document is the culmination of extensive research that probes the depths of the tobacco pandemic in Mexico, scrutinizing the myriad actions taken by various stakeholders to mitigate this pressing public health challenge. Our findings not only reflect a comprehensive analysis of existing data, but also highlight the urgent need for continued, vigorous efforts in tobacco control. A systematic review of quantitative data sources was performed, comparing the different advantages and disadvantages of statistical projects in Mexico and their suitability to measure the extent of the tobacco pandemic. In parallel, a wide and extensive compilation of different regulations was conducted at a national, state, and local level. The aggregate effort culminated in research materials that were expected to be published.

The second chapter of this paper will address the context of tobacco regulation, while the third will focus on its evolution Mexico since the first actions in line with global developments led by the World Health Organization (WHO). The fourth chapter will examine the long-term trends that can be appreciated from public data sources, particularly the Encuesta Nacional de Salud y Nutrición (ENSANUT) and Global Adult Tobacco (GATS) surveys. The fifth chapter will discuss the results of the regulation in light of these statistics, while the sixth chapter will provide a hypothesis on why this happened. The seventh chapter will study the consequences of following the current trends. Finally, the eighth chapter will make a case for a new research agenda in Mexico focusing on risk reduction and the key questions that future research should solve.

In conclusion, as Movimiento Pro-Vecino continues to champion the cause of public health through rigorous research and advocacy, this study underscores the critical importance of sustained evidence-based tobacco regulation. By laying out a roadmap informed by our findings, we advocate for strategies that are both innovative and grounded in real-world effectiveness. We call on policymakers, community leaders, and health professionals to join us in this vital endeavor to ensure a healthier future for all Mexicans.

Chapter 2

The context of tobacco control

There are different approaches that seek to explain smoking and the role of regulation in tobacco control. A first step in understanding smoking is to define the person who smokes. There are two concepts of interest for the purposes of this article: the "tobacco user," according to the WHO Framework Convention, and the "smoker" in the regulations of Latin America and the United States, regions that implemented the FCTC at about the same time. Mexico uses the FCTC definition to delimit where, at what ages, and who pays taxes for tobacco use. The Diagnostic and Statistical Manual of Mental Disorders (DSM V) lists smoking as an addiction. It is a complex addiction with physical, psychological, and social components. Addiction is considered when there is a compulsive need to consume another substance, in this case, nicotine, to experience its stimulant effects (Corvalán B. 2017).

One of the theoretical transitions in public policy on tobacco control has been the partial abandonment of the rational choice approach for the harm reduction approach. Rational choice has been the most widely used model to understand smoking. Sabia and Rees (2014) study the economic model of addiction based on rational and forward-looking expectations. Smokers voluntarily begin the addiction path with complete information about the risks of current and future cigarette smoking versus health costs, and then make an optimal decision. Based on this rationality, the most common public policy measures have been proposed: cigarette taxes and school programs on smoking. The results report that, in the current state of the programs, these interventions appear to be moderately successful at best (Sabia and Rees 2014). In Sabia and Rees's review of the rational choice approach, the externality argument for public intervention is based on the premise that smoking causes negative externalities and, therefore, government intervention would make up for the utility of nonsmokers. According to the authors, contemporary cigarette taxes are approximately equal to the externality.

The second rational choice argument is imperfect information about the future health costs of smoking. A measure such as mandatory warning labels responds to this problem. Some studies have discussed whether both smokers and nonsmokers underestimate or overestimate the risks of smoking-related diseases because of these ads. Finally, time-inconsistent preferences with addiction patterns are the basis for arguing that government intervention may improve welfare when addiction represents a barrier to rationality. However, this approach has limitations in explaining when prices do not dissuade behaviors or in answering certain questions: how to communicate information to different age groups, what to do with changing preferences about smoking? An alternative is the theoretical framework of externalities and social costs. With respect to policy bias, some authors have argued that "policy [externality correction] depends only on a subset of variables or their imperfect policies" (Jacobsen et al. 2020).

Another alternative is the concept of harm reduction, which refers to interventions aimed at reducing the negative effects of health behaviors, without necessarily completely extinguishing such behaviors. Some classic themes in the literature on this concept beyond smoking are syringe exchange, sex work, and eating disorders. Analyzing the case of HIV syndrome in the U.S., researchers establish six principles of harm reduction: humanism, pragmatism, individualism, autonomy, incrementalism, and constant accountability. Applying harm reduction principles in health care settings can improve clinical care outcomes, as the quality of the provider-patient relationship affects health outcomes and treatment adherence. Harm reduction can be a universal precaution that applies to all people, regardless of whether they reveal negative health behaviors, as health behaviors are not binary or linear, but operate along a continuum based on a variety of individual and social determinants (Hawk et al. 2017).

However, the harm reduction approach is where the objective of tobacco regulation comes in, which seeks to stop the health risks associated with nicotine consumption. In Campus et al.'s evaluation of e-cigarette policies in 97 countries, they noted that, given their epidemiological trajectories, countries concerned with harm reduction "may choose to enact prohibitive regulations that restrict supply and impose higher taxes that reduce demand" (Campus et al. 2021). Regulations that equate smoked tobacco products with disruptive smokeless tobacco technologies may have adverse effects: they "will harm smokers who wish to quit and further embed smoking as the most accessible option for nicotine consumption (perversely privileging cigarettes)" (Beaglehole et al. 2019). Similar approaches with respect to tax reform for products with added sugar have proven ineffective in achieving their policy objectives (see Aguilar, Gutierrez, and Seira (2021)), demonstrating that restrictive policies under the harm reduction approach are also not fully effective.

Relative risk perception has regained importance in light of new tobacco products. It is also a factor that intersects the harm reduction approach and regulation as a tool for tobacco control. There is a discrepancy between current evidence and public perceptions of the relative risk of various tobacco products. Kiviniemi and Kozlowski (2015) study the public knowledge patterns of the relative harms of different tobacco products. Using a population survey of

U.S. adults, participants reported their perceptions of the relative risks of e-cigarettes and smokeless tobacco relative to traditional cigarettes. About 65% of respondents reported that neither cigarette was less harmful than any other. Slightly more than half said that e-cigarettes are safer than regular cigarettes. In contrast, only 9% of respondents perceived some smokeless tobacco products to be safer. Only 3.5% of respondents had relative risk perception patterns in line with current scientific evidence for all three modalities (Kiviniemi and Kozlowski 2015).

Arora et al. (2020) traced the effects of regulation on smokeless tobacco, a product used by more than 300 million people worldwide. Within the FCTC, the researchers analyzed what has been written about smokeless tobacco and its impact between 2005 and 2021 in 11 databases. They examined concepts such as prevalence, consumption, cessation, and health effects of smokeless tobacco. Fifty-seven countries had policies targeting smokeless tobacco, of which 17 had policies outside the FCTC. Eighteen studies evaluated impact; these found that policies were associated with reductions in prevalence: between 4.4% and 30.3% for taxes and between 22.2% and 70.9% for multidimensional policies (Arora et al. 2020).

Laura Zavala-Arciniega et al. (2021) surveyed Mexican adult smokers and estimated sensory binomial models to estimate the frequency of consumption of some tobacco and related products. They found that people who consume both cigarettes and e-cigarettes, referred to as dual users, belong to a younger age group and have higher educational levels, have a higher risk profile than exclusive smokers, present higher levels of tobacco dependence, and have recently tried to quit smoking (Laura Zavala-Arciniega et al. 2021). The authors' findings mainly align with global trends in dual consumption, except for the rate of cigarette dependence, suggesting that it may be more difficult for dual smokers to quit.

Finally, Martín-Álvarez et al. (2023) analyzed the diffusion or spread of heated tobacco products in the market through a Bass Diffusion Model and monthly sales data in Spain. They found that these products have been marketed as healthier and therefore "diffused just like additive-free and ultra-thin cigarette brands [...] this diffusion is mainly due to the imitation effect of consumers, who might be thinking that they are imitating a 'healthy' way of smoking" (68).

2.1 MPOWER adoption in the United States

The MPOWER framework is a set of six evidence-based tobacco control measures that was introduced by the World Health Organization (WHO) to assist in the implementation of the WHO Framework Convention on Tobacco Control (FCTC). The acronym MPOWER stands for Monitor tobacco use and prevention policies, Protect people from tobacco smoke, Offer help to quit tobacco use, Warn about the dangers of tobacco, Enforce bans on tobacco advertising, promotion and sponsorship, and Raise taxes on tobacco. These measures are designed to help countries effectively curb the tobacco epidemic and promote public health.

Each component of the MPOWER framework addresses a specific aspect

of tobacco control. Monitoring tobacco use involves collecting data to guide and formulate effective policies. Protecting people from tobacco smoke ensures smoke-free environments to reduce second-hand smoke exposure. Offering help includes providing accessible and affordable interventions for tobacco cessation. Warning about the dangers involves implementing policies like mandatory graphic health warnings on tobacco packaging. Enforcing bans targets the reduction of tobacco product demand by restricting marketing and advertising. Finally, raising taxes aims to decrease tobacco consumption by making products less economically accessible, particularly to vulnerable populations like the youth. This comprehensive approach empowers governments to effectively tackle the global tobacco crisis, significantly reducing tobacco use and its health impacts.

In this section, we will show examples of the relationship between trends in tobacco product consumption and regulation in the US, then illustrate how that regulation aligned with MPOWER metrics (e.g., anti-smoking campaigns, advertising, cessation), and finally, some public policy implications and recommendations.

2.1.1 Trends in consumption and regulation

The most relevant regulatory change in recent years on traditional cigarettes is the 2009 Tobacco Control Law, which took place around the same time as the Mexican reform of 2008. In the papers of the Symposium “A Decade of the Tobacco Control Act”, according to (Blanke 2021), this Act has received criticism throughout its implementation: the prohibition of flavored tobacco, with the exception of menthol cigarettes, which have been targeted by the industry to black youth. The Act gave the U.S. Food and Drug Administration (FDA) legal authority over nearly the entire value chain, broad regulatory discretion, dedicated revenue for the tobacco agenda and staffing.

Schroth (2021) provides a 10-year impact analysis of the Act for the case of New York City. He focuses on the aspect of the new powers of the FDA and the relationship with local governments; they can implement more specialized tobacco control policies with more autonomy. The researcher argues that the Act weakened one of the tobacco industry’s most reliable litigation weapons: prevention, an issue that local governments can explore with more tools. Second, the Act authorized the FDA to combat illicit trade in tobacco products but with less action with respect to illicit trade in the context of tobacco tax evasion.

Regulations for electronic nicotine delivery systems (ENDS) in public places existed in fourteen states or local governments in 2018. These regulations applied in indoor areas such as workplaces, restaurants, or bars. Lee, Lin, and Seo (2019) investigate the relationship between state aerosol-free policies and ENDS use. Using a stratified analysis by age group, they find that adults living in states with an aerosol-free policy were less likely to use ENDS compared to those living in states without an aerosol-free policy, controlling for individual and state level covariates.

Cornelius et al. (2020), trace the trend of significant declines in cigarette smoking among U.S. adults over the past five decades and the rise of alternative

smoking products. The findings indicate that 21.3% of U.S. adults used a tobacco product every day or some days, and 25.2% used a tobacco product every day, some days, or rarely. Population-level interventions focused on the diversity of tobacco product use, including tobacco price increases, high-impact anti-tobacco mass media campaigns, comprehensive anti-tobacco laws, and improved access to aid smoking cessation, along with Food and Drug Administration (FDA) regulation of tobacco products, are critical to reducing tobacco-related disease and death in the United States.

Harlow, McConnell, and Barrington-Trimis (2023) study the dilemma of those under 21 years of age using e-cigarettes despite the age limit. With a sample of young adults aged 18 to 20 years in Los Angeles they evaluate underage e-cigarette purchase with vape frequency, intensity and dependence symptoms one year later. Overall, 32% had purchased e-cigarettes as minors. Regulations such as those implemented in Los Angeles that reduce retail access of e-cigarettes to minors may help prevent the progression of vaping.

According to Harrell et al. (2023) e-cigarettes are transitioning to being the most commonly used tobacco products by young adults. Using a Delphi method and Factor Analysis they find that the factors of: Liking, Negative Consequences, Reduced Negative Affect, Weight Control, and Addiction were significantly correlated with relevant measures of vaping, including susceptibility to vaping and lifetime vaping. Public health messages should target expectations to modify young adults' vaping behavior.

Yang et al. (2023) examine vaping among college students through attitudes toward campus tobacco regulations, normative perceptions of stealthy vaping behaviors, and control beliefs with stealthy vaping on campus among college students in the U.S. Participants with more positive attitudes toward campus tobacco regulation were less likely to engage in stealthy vaping on campus. Those with higher perceptions of stealthy vaping among other students were more likely to vape stealthily more often. The researchers conclude that it is on students' normative attitudes and beliefs about stealthy vaping where regulation may have the greatest effect.

Jenson, Lester, and Berman (2016) evaluate FDA performance during the first decade of federal regulation. Over the past decade smoking as a whole has declined, with a focus on vulnerable populations. However, the FDA has not prioritized combating health disparities and has little public engagement to counter tobacco industry influence. In fact, the agency's approach to premarket review of new products has led to the expansion of vaping among young people. In addition, graphic warning label rules are an arena that has been in the judiciary and out of the FDA's hands (Blanke 2021).

In the United States, several studies have analyzed the impact of tobacco use and control at the national, state and municipal levels. They identify three main themes: market responses to regulation, attitudes toward regulation, smoking intensity, and cessation strategies. Regulation, as shown below, aligned to MPOWER measures. Cotti, Nesson, and Tefft (2018) discuss how household-level consumer data provide the information needed to investigate the impact of policies on tobacco and tobacco-related product purchases, coupled with

the American Non-Smokers' Rights Foundation's collection of smoke-free air laws. With this information, they found changes in cigarette purchases when cigarette smoke-free air laws go into effect, but no change when those laws are for e-cigarettes and also that

[H]igher excise taxes on cigarettes reduce cigarette and e-cigarette purchases, suggesting that cigarettes and e-cigarettes are complements, and higher excise taxes on cigarettes reduce the total amount of nicotine purchased from cigarettes and e-cigarettes.(Cotti, Nesson, and Tefft 2018, 206).

2.1.2 Regulation aligned to MPOWER

Kresovich et al. (2022) study how antismoking campaigns at the federal, state, and local levels in the United States can be categorized by the themes and characteristics of prevention messages. In the U.S. market, the Vaping Prevention Resource database provides information to document diffusion campaigns, so the researchers analyzed 220 messages. The authors propose a methodology for the analysis of graphics, to classify them they established five categories: message themes, images, text characteristics, message perspective and other. Eighty-five percent of the messages included images: 27% showed a vape device, 22% showed smoke or vapor, and 21% showed a person's face.

Lee, Sanders-Jackson, and Tan (2022) observe that e-cigarette advertisements physically resemble traditional cigarette smoking cues and examine whether they cause the impression that traditional cigarettes are more widely used and accepted by society. Using a perception experiment, the investigators measured that those who saw e-cigarette advertisements with vaping signs had a lower perception that cigarette smoking was common compared to those who saw e-cigarette advertisements without vaping signs. Dave et al. (2019) conducted one of the first studies of e-cigarette advertising in television and magazines. Television advertising of e-cigarettes succeeded in reducing the number of smokers in the recent past by about 3%, but magazine advertising had no effect.

According to Hajek et al. (2019), evidence for the effectiveness of e-cigarettes as a smoking cessation strategy is limited compared with that of nicotine treatments. In a randomized trial, the authors

[A]ssigned adults attending UK National Health Service smoking cessation services to nicotine replacement products of their choice, including combinations of products, provided for up to 3 months, or a starter pack of e-cigarettes (a second-generation refillable e-cigarette with a bottle of nicotine e-liquid [18 mg per milliliter]), with a recommendation to purchase further e-liquids of the flavor and strength of their choice. (629)

The main outcome was sustained abstinence for 1 year but also respiratory symptoms reported by participants in the group that used e-cigarettes. Gravely et al. (2023), studying a sample of adults who smoked cigarettes and vaped

at least weekly, evaluate those who reported vaping to quit smoking by device type, overall and by country. Overall, 71.3% of respondents reported vaping as a smoking cessation measure, with no differences between countries.

In this order of ideas, studies point to an improvement in health when people switch to cigarette substitute products. An alternative product electronically heats small amounts of tobacco to generate aerosols. In evaluating these non-combustible products, Gale et al. (2021), find that temperatures below combustion contain less harmful chemicals and this is verifiable through biomarkers of exposure:

[D]ata between baseline and day 90 of an ambulatory switching study in which current smokers were randomly selected to either continue smoking cigarettes, switch to tobacco device use, or stop using any tobacco/nicotine product. However, in those subjects who switched to the heated tobacco device, and in a cohort of subjects whose abstention from cigarette smoking, significant and sustained reductions were observed for toxic substances with a known link to smoking-related diseases. (588)

In other studies, vaping patterns have been analyzed to understand the factors that can help smokers in their efforts to quit smoking. Notley et al. compared a sample of people who vape, against a representative sample of people who quit smoking. They then conducted semi-structured qualitative interviews that demonstrate that e-cigarettes can substitute for aspects of tobacco use and may be an innovation for risk reduction to prevent relapse or even aid in abstinence from smoking. In addition, the authors find that some of the participants

[v]iewed e-cigarettes as a short-term smoking cessation intervention and eventually attempted to quit vaping and tobacco smoking. Vaping appealed to some former smokers who had never intended to quit and offered a viable, long-term alternative to smoking that was experienced as supporting relapse prevention. (Notley et al. 2018, 11)

2.2 Adoption of MPOWER in Latin America

As in other regions of the world, Latin American countries have established health commitments by harmonizing and implementing tobacco control policies, such as MPOWER, but there are factors that distort its implementation. Ruckert et al. (2021) examine health in the foreign policy agenda in three dimensions: characteristics of the institutions and the interest that the various actors represent in health diplomacy, the environment of ideas in which this diplomacy operates and the characteristics of the specific health problem that enters into foreign policy. The authors examine the country cases of Mexico and Chile where corporate lobbying has a relevant influence on the implementation of international agreements. One example is the strong opposition of the corporate food and

beverage industries to labeling in these two countries. Bernabe-Ortiz and Carrillo-Larco (2023) examine the phenomenon of exposure to secondhand smoke, one of the MPOWER metrics, among adolescents. For Latin America, the age-standardized pooled prevalence of daily passive smoking was 15.1% and was higher in girls than in boys.

Sóñora et al. (2022) report that, in Latin America, around 80% of the population is protected by at least one of the MPOWER measures. Brazil was the first country to implement all the measures, generating a reduction of more than 75% in smoking prevalence. The region was also relatively quick to adopt policies on pictorial health warning labels (another MPOWER measure). Uruguay was one of the first countries in the world to require such plain packaging. Several countries in the region have expressed a goal of reducing smoking prevalence to below 12.9% by 2025. Youth are more sensitive to some tobacco control policies, particularly tobacco taxation, which is the most cost-effective of the MPOWER policies, but only Argentina, Chile and Brazil have tax levels that meet WHO standards. Blanco et al. (2017) conduct a 10-year count of the implementation of the Framework Convention in the Americas. 30 of the 35 countries in the Americas are Party to the Framework Convention; however, 40% of the members have not fully implemented the measures.

Although tobacco taxes in countries with more expanded tax systems are reaching their limit of effectiveness, in Latin America they still play an important role, especially if direct medical costs for each tobacco-related disease are compared. The burden of disease was estimated as the difference in disease events, deaths and associated costs among the outcomes predicted by the model. The results show that in these countries smoking is responsible for approximately 12% of adult deaths. In fiscal terms, this means \$26.9 billion in annual direct medical costs. Health costs attributable to smoking represent 6.9% of the health budgets of the sample of Latin American countries. In contrast, tobacco tax revenues cover only 36% of expenditures. The researchers propose a tax equivalent to 50% on the price of cigarettes that could save \$26.7 billion in healthcare costs over the next 10 years (Pichon-Riviere et al. 2020).

Chapter 3

The fight against the tobacco pandemic in Mexico

The U.S. experience allows us to contrast how laws passed almost at the same time, the General Law for Tobacco Control in 2008 in Mexico and the Tobacco Control Act in 2009 in the U.S., had such different effects. Although there are also points in common between both reforms, such as the creation of market observing institutions (COFEPRIS in Mexico and the FDA in the US) with greater powers and autonomy for the design of anti-tobacco policies for local governments.

As mentioned in the previous section, raising tobacco taxes in Latin America still plays an important role and Mexico is no exception. Tobacco products in Mexico are taxed with two lump-sum taxes: the Special Tax on Products and Services (IEPS) and the Value Added Tax (VAT). The former has an ad-valorem component of 16% and a specific component of \$0.35 per cigarette integrated into the producer's costs. Only the IEPS specifies the smoking reduction component. Using a database between 1994 and 2017, Ibarra Salazar et al. (2019) find a direct relationship of the tax with the price index of tobacco products, but the percentage of IEPS is not passed on to consumers. An increase in \$1 peso per pack increases the price index for tobacco products by 6.1 points. This value is proportionally lower for the IEPS than for the VAT. Tax increases have not been translated into increases of the same magnitude in the price index of tobacco products. This means that taxes are not effectively passed on to consumers through prices.

Fleischer et al. (2017) examine how policies adopted in Mexico affected smoking prevalence and smoking-attributable deaths using a SimSmoke simulation model. They evaluate the effects of seven types of policies: cigarette taxes, smoke-free air laws, mass media campaigns, advertising bans, warning labels, cessation treatment and youth tobacco access policies. In their results, they show that increases in cigarette prices are responsible for more than 60% of the reductions in smoking rates. In contrast, other studies on the Mexican case

conclude that price changes have no effect on consumption (Madrazo Lajous and Alonso Aranda, 2013).

Ibarra Salazar et al. (2019) also study pictograms on packs and their influence on Mexico's tobacco demand, which falls on another MPOWER measure: warning about the dangers of tobacco. The investigators estimate conventional, myopic and rational demand models between 1994 to 2013, using regression models. The second and third rounds of pictograms issued by the regulation caused a significant and consistent reduction in smoking, regardless of the demand model. This is an improvement over the first round, where no effect on tobacco consumption was revealed. Possibly, the effect of the pictograms on aggregate consumption manifested itself until the second round. Per capita consumption was reduced by 22 cigarettes with the second round, and 26 cigarettes with the third round. Likewise, the second round caused a reduction in demand of 20.3% in the long term, and 14.2% in the short term, while the third round reduced demand by 24.8% in the short term and 34.4% in the long term (Ibarra Salazar et al., 2019).

Another MPOWER measure is "Offer help to quit smoking (O)". In this regard there have been a number of pilot smoking cessation programs in Mexico, targeting patients in primary health clinics, adolescents enrolled in high school, and participants in community addiction treatment centers. One of the latter is the digital health app-based program for tablets called "Vive sin tabaco.... Decídete!" of 2015, designed to help smokers create a quit plan that includes smoking-related assessments, pharmacotherapy education, videos, counseling, and medications. Outcomes of this program are measured through interaction with audiovisual content and some cohorts included nicotine addiction tests that measured nicotine and exhaled carbon monoxide.

The results of a 2015 study in Mexico City show that "among those who did not quit smoking, 65% reduced the number of cigarettes per day from 9.5 to 6.01, representing a reduction of 3.12 cigarettes per day. The study also finds a reduction in the number of cigarettes smoked per day in those who were unable to quit at week 12 (Ponciano-Rodríguez et al. 2018, 551–553).

Cupertino et al. (2019) also evaluated the 2017 pilot of this interactive smoking cessation intervention that used both an e-health tool and medications; more specifically, "a digital app-based decision support software to drive a 12-week smoking cessation program through text messaging and pharmacotherapeutic support" (1) in the Mexican city of Cuernavaca, Morelos. At the end of the study, the investigators clinically verified abstinence through nicotine and exhaled carbon monoxide tests. The authors found that:

The program was well received by the participants, most of whom engaged in high levels of interactivity with the program and indicated high levels of participant satisfaction. Participants also expressed a high level of interest in using NRT in conjunction with the text messaging program. The vast majority of participants used the text messaging program to request additional NRT, suggesting that most participants completed at least a 4-week course of therapy. The smoking cessation rate was 40% at week 12 (10).

Chapter 4

The evolution of tobacco consumption in Mexico 2000-2022

For measuring smoking behavior in Mexico, there are several data sources:

- Global Adult Tobacco Survey (2009, 2015 and 2023). The 2023 has been released but not the microdata.
- Global Youth Tobacco Survey (2006, 2011)
- National Survey on the Consumption of Drugs, Alcohol and Tobacco (ENA 2008, 2011 and ENCODAT 2016). A new one for 2024 is being conducted.
- National Household Income and Expenditure Survey (every two years), which measures expenditure in several items, including tobacco¹.
- National Health and Nutrition Survey (ENSANUT 2000, 2006, 2012, 2018, 2019, 2021, 2022)

In the beginning of this project, very important information gaps were present and only ENSANUT was able to provide an overview of the most recent trends. However, in early 2024, the results of the Global Adult Tobacco Survey 2023 were released, although the data is not yet available for analysis. We will discuss the most recent trends on the following sections.

1. After seven years of hiatus, the Mexican government will conduct a new survey Encuesta Nacional de Salud Mental y Adicciones (Enasama) 2023-2024 as a continuation of the ENA and ENCODAT projects. This is a richer statistical project that provides better information on smoking behavior than the limited number of questions present in ENSANUT.

4.1 ENSANUT data

We used data from the National Health and Nutrition Survey (ENSANUT) as our primary source of smoking prevalence in Mexico due to its extensive coverage and availability. ENSANUT is a cross-sectional survey carried out approximately every 6 years. It employs a multistage stratified probabilistic sampling strategy, covering various health-related topics including tobacco and alcohol consumption in different demographic groups and geographical regions.

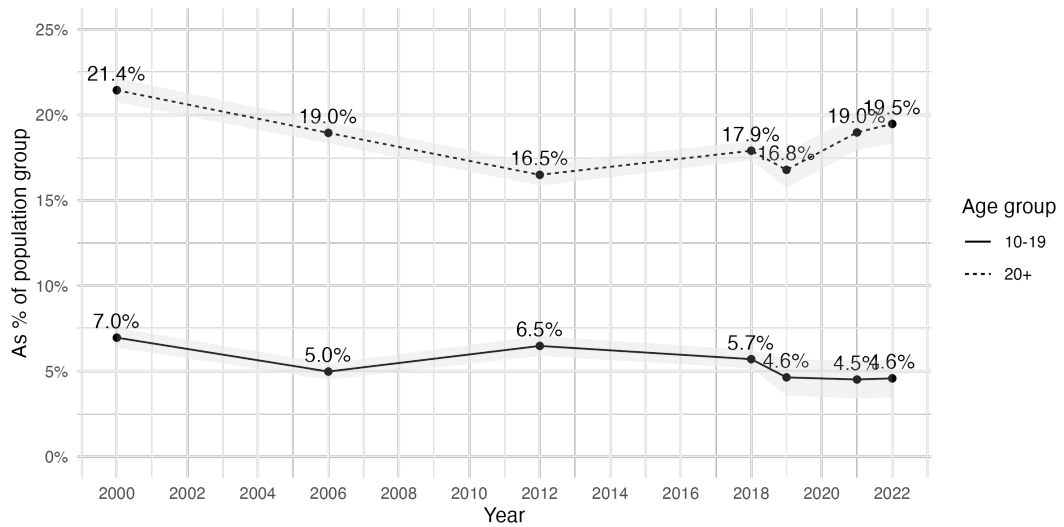
The survey provides statistically representative samples at the national and state levels for the years 2000, 2006, 2012, and 2018 and only at the national level for 2019, 2021, and 2022².

Being cross-sectional, it presents limitations for tracking long-term trends. Furthermore, variations in survey questions and definitions and statistical design over time limit the results that we can compare in this study. We stick to the variables whose definitions and measures are consistent over time.

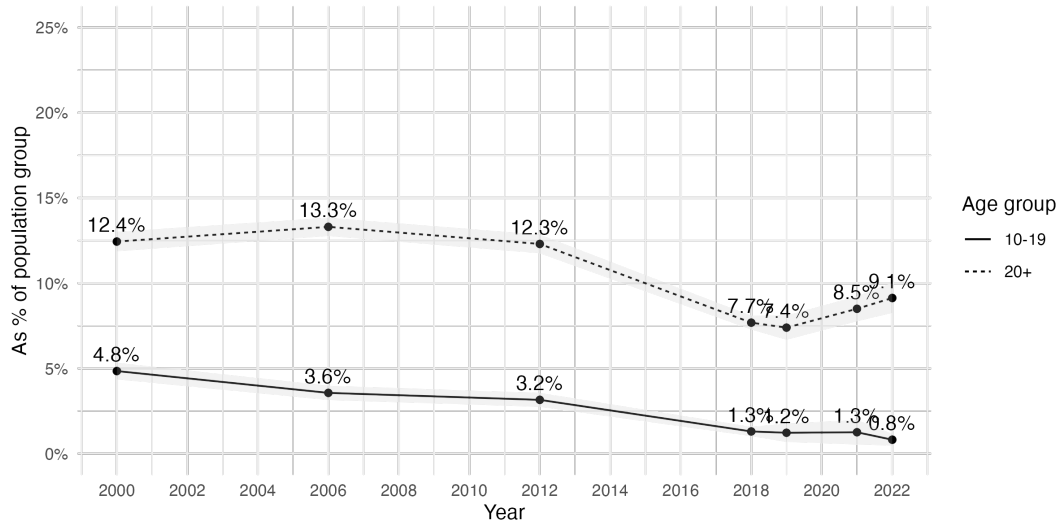
Measuring prevalence of consumption in a long-term basis faces the limitation of changing survey questions and definitions. Daily smoking is similar across surveys, but current smoking is a yes/no question for ENSANUT 2000 and 2006 and for ENSANUT 2018 up to 2022 it is defined as the ones that answer that smoke either occasionally or daily. ENSANUT 2012 captures current smoking as daily, weekly, monthly, or occasional. Defining current smokers as daily and weekly smokers yields the indicators most consistent with long-term trends. This is important because other statistical project use other definitions of smoking.

According to ENSANUT, the prevalence of tobacco consumption in Mexico in the adult population experienced a significant reduction in 2000-2018, going from 21.4% in 2000 to 16.8% in 2019 (Fig 4.1a), but it has suffered a rebound during the global COVID pandemic, reaching 19.5% in 2022. This is particularly evident when considering the prevalence of daily smoking in adults, which reached a minimum in 2019 of 7.4% of the population, but also experienced an increase in recent years (Fig. 4.1b). This trend should be compared with that presented by Luis Zavala-Arciniega et al. (2020) in which data from alternative data sources were used to establish a long-term trend in adult prevalence for the period 2002-2016.

2. A series of five smaller, yearly ENSANUT surveys (instead of each six years) were designed to provide opportune information related to the COVID-19 pandemic.



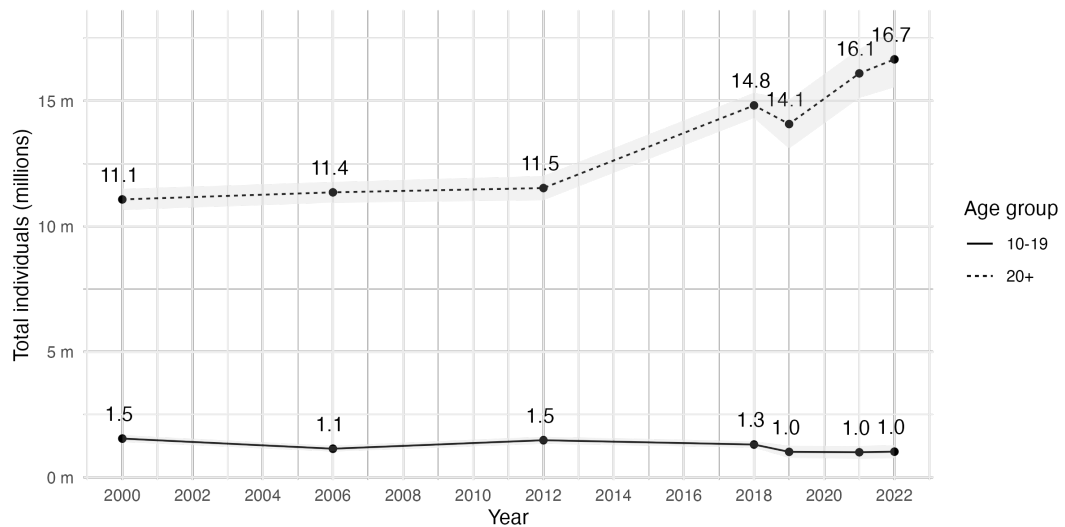
(a) Smoking prevalence (occasional plus daily) (as % of population)



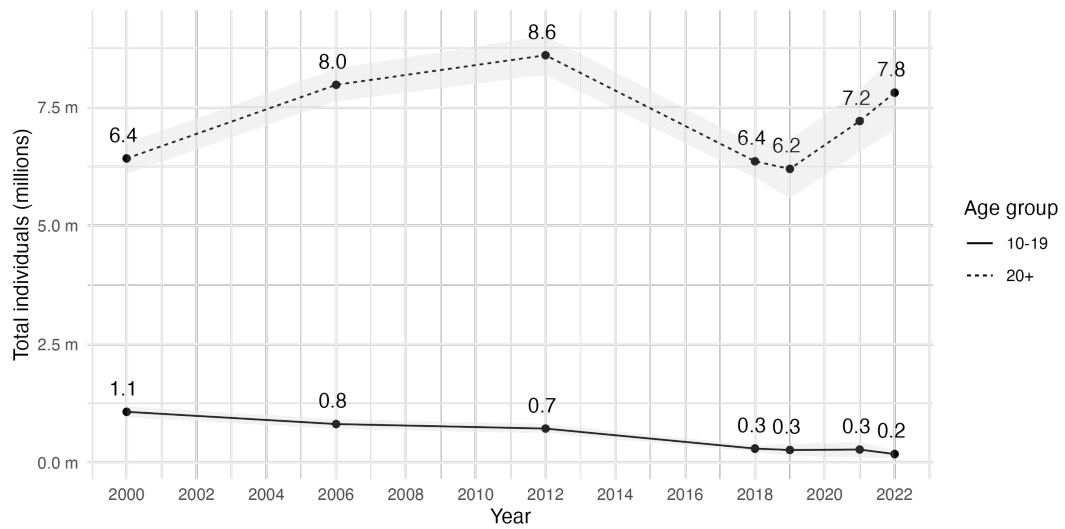
(b) Daily smoking prevalence (as % of population)

Figure 4.1: Prevalence of smoking in Mexico 2000-2022

However, when looking at the absolute number of smokers, daily and casual, a continuous growth in the number of smokers is evident 4.2a, implying 5.6 million more casual and daily smokers in 2022 than in 2000. Furthermore, the number of daily smokers has not changed significantly, almost bouncing back to the level recorded in 2006.



(a) Smokers (occasional plus daily) (millions of individuals)



(b) Daily smokers (millions of individuals)

Figure 4.2: Total smokers in Mexico 2000-2022

One should bear in mind that part of these developments, particularly the reduction of smoking in youth, should be studied in the context of the apparition of electronic cigarettes. The Table 4.1 shows that while the prevalence of smoking in the youth has decreased, the use of electronic cigarettes has increased constantly, and dual users are only part of what is driving this phenomenon. It appears that the youth is increasingly using electronic cigarettes instead of

Year	Population	Smokers	as %	E-cig users	as %	Both	as %
2000	22,153,230	1,541,208	7.0%	-	-	-	-
2006	22,874,970	1,137,435	5.0%	-	-	-	-
2012	22,804,083	1,476,311	6.5%	-	-	-	-
2018	22,885,451	1,304,060	5.7%	335,101	1.5%	146,850	0.6%
2019	21,859,047	1,012,328	4.6%	268,131	1.2%	34,055	0.2%
2021	22,109,109	996,102	4.5%	392,591	1.8%	183,550	0.8%
2022	22,289,636	1,019,487	4.6%	566,109	2.5%	189,693	0.9%

Table 4.1: Prevalence of smoking and dual use in youth 10-19. Source: Own calculations based on ENSANUT.

smoking tobacco. This is a trend that must be revised in the next installments of ENSANUT (2023 and 2024).

Finally, for new data coming from ENSANUT in 2023 and from the addictions survey in 2024, we are expecting a decrease in the prevalence due to a very steep increase in tobacco taxation. In September 2023, the median retail price of cigarettes was 75 pesos per 20 cigarette pack (USD\$4.3 with a 17.5 MXN/USD exchange rate) for the sample used in the calculation of inflation in Mexico. This price includes both a federal VAT of 16% and a Special Tax on Products and Services (IEPS) which is calculated by adding two components: 160% ad valorem tax and 0.5911 pesos in 2023 for each cigarette with standard net weight of 75 grams (0.6166 in 2024). 59% of the retail price of this median price 20 cigarette pack is the IEPS, while both taxes added are 73% of the retail price.

4.2 The Global Adult Tobacco Survey

Mexico recently presented the results of the Global Adult Tobacco Survey (GATS Instituto Nacional de Salud Pública 2023), in which a similar story is observed in Mexico.

First, it is crucial to mention that both surveys use a different definition of what a smoker is. While recent ENSANUT asks whether a person smokes daily, occasionally, or does not smoke, GATS first asks whether a person has smoked in the last 30 days. Afterwards, it observes the intensity of the smoking pattern in order to classify a person as a daily smoker or a occasional smoker. Therefore, ENSANUT tends to show higher prevalences due to the fact that occasional smoking could be beyond the 30 day limit imposed by GATS. This is the main reason why these estimates differ usually ENSANUT presenting 3-4% higher prevalence than GATS.

Nonetheless, while not showing an increase in the prevalence of overall smoking, GATS also shows us a relative stagnation in this indicator (see Table 4.2). The same as in ENSANUT, when we consider the total number of smokers, this survey also presents an increase of smokers in the 2009-2023 time period³,

3. Organización Panamericana de la Salud and Instituto Nacional de Salud Pública (MX)

resulting in 3.4 million more smokers, 1 million daily and 2.4 occasional. This contrasts with a falling prevalence rate in daily smoking and is probably explained by the changing demographics of the younger cohorts in Mexico, which is also found in ENSANUT data.

GATS has much richer data than ENSANUT, and we can appreciate from the aggregate data that there are positive changes in smoking:

- Non-smokers increased from 57.8 million to 79.3 million people. This is an increase of 21.5 million, of which 11.2 are never smokers. This means that more adults are deciding to never smoke than the ones that initiate.
- 1.4 million of the 8.9 million non smokers are former daily smokers, which is a considerable proportion of the total number of daily smokers (6.2 million).
- Also, 8.9 million of non smokers are former occasional smokers. This means that a great number of occasional smokers reach a point in which they are former smokers. (We should be careful, because part of this group is being considered as a smoker by ENSANUT).

Overall, GATS shows us the picture of a rapidly changing demographics in which all groups are growing in absolute terms, but at different rates. The total number of smokers has increased as well as the total number of non smokers, being the groups with highest growth the never smokers and the occasional smokers. Unfortunately, as of the elaboration of this report, the microdata has not been released publicly and is beyond the scope of this report.

4.3 Conclusion

In summary, by examining the ENSANUT data, we observe trends that may show no effectiveness of regulation. GATS data in the official reports also suggest a stagnation in the reduction of smokers in Mexico. This of course, is not without nuance: the main factor to consider is the rapidly changing demographic structure of Mexico. Therefore, it is important to isolate the effect of regulation from other factors, such as changing consumer behavior, delayed initiation, or the introduction of alternative products, among others, which may also have affected smoking behavior. For example, regulation may be very effective, but social changes may obscure this effect. Nonetheless, we expect a decrease to be evident due to a very sharp increase of tobacco taxes in 2023 and 2024.

	2009	2015	2023	2009-2015	2015-2023	2009-2023
	<i>Millions of persons</i>					
1. Current smoker	10.9	14.3	14.3	3.4	0.0	3.4
1.1 Daily smoker	5.2	6.6	6.2	1.4	-0.4	1.0
1.2 Occasional smoker	5.7	7.7	8.1	1.9	0.4	2.4
1.2.1 Occasional smoker, daily before	2.0	2.6	2.9	0.6	0.4	1.0
1.2.2 Occasional smoker, never daily	3.8	5.1	5.2	1.3	0.1	1.4
2. Non smoker	57.8	73.2	79.3	15.4	6.1	21.5
2.1. Ex daily smoker	3.4	5.1	4.8	1.7	-0.3	1.4
2.2 Never daily smoker	54.5	68.2	74.6	13.7	6.4	20.1
2.2.1 Former occasional smoker	6.7	10.2	15.6	3.5	5.4	8.9
2.2.2 Never smoker	47.8	58.0	59.0	10.2	1.0	11.2
	68.8	87.6	93.7			
	<i>Rate</i>					
1. Current smoker	15.9	16.4	15.3	0.5	-1.1	-0.6
1.1 Daily smoker	7.6	7.6	6.6	0.0	-1.0	-1.0
1.2 Occasional smoker	8.4	8.8	8.7	0.4	-0.1	0.3
1.2.1 Occasional smoker, daily before	2.9	2.9	3.1	0.0	0.2	0.2
1.2.2 Occasional smoker, never daily	5.5	5.8	5.5	0.3	-0.3	0.0
2. Non smoker	84.1	83.6	84.7	-0.5	1.1	0.6
2.1. Ex daily smoker	4.9	5.8	5.1	0.9	-0.7	0.2
2.2 Never daily smoker	79.2	77.9	79.6	-1.3	1.7	0.4
2.2.1 Former occasional smoker	9.8	11.7	16.7	1.9	5.0	6.9
2.2.2 Never smoker	69.4	66.2	63.0	-3.2	-3.2	-6.4

Table 4.2: Global Adult Tobacco Survey results for 2009, 2015, and 2023.

Chapter 5

Has tobacco regulation achieved its goals?

Tobacco regulation in Mexico has a decades-long history of development, starting with local legislation to establish smoking at work as inappropriate behavior for public servants. To study this regulatory evolution, it should be noted that Mexico is a federal republic composed of 32 states, and each state is composed of several, even hundreds of local entities. Regulation may apply in general (to all entities) or in the federal, state, or local sphere.

In the 2000s, federal legislation was enacted with public health goals in accordance with the development of the global FCTC. The General Law for the Control of Tobacco (GLCT)¹, established a regulatory framework based on the FCTC with concurrent attributions for all authorities, including state and local governments. This legislation required these subnational entities to enact their own regulations in parallel to the general law. Some states followed global progress and developed regulation even before the enactment of the GLCT. In the long run, each legislative entity at the state level has complied, making an effort to match local and state regulation with international and federal developments in tobacco control. However, this has occurred at an uneven pace, often resulting in several years of difference between early adopting entities and lagging ones.

Tobacco regulations, such as increased taxation and package labeling, are applied nationwide, making a formal analysis of isolated cause and effect a very difficult task. For example, in the same two decades, attitudes towards tobacco have changed and the population pyramid has changed (Lomelí Vanegas 2020). On the other hand, local regulations related to smoke-free environments and tobacco sales licenses have been enacted at different times on the Mexican territory.

Tobacco control within Mexico has been strongly influenced by the World Health Organization's MPOWER framework. Smoke-free environments, taxation

1. *Ley General para el Control del Tabaco*, published in May 8th, 2008

and pricing, as well as packaging and advertising, are crucial components of this comprehensive approach.

5.1 The impact of taxation on the prevalence of smoking in Mexico

Taxation serves as a deterrent to tobacco use, especially when combined with other control measures. The health and economic benefits of fully implemented tobacco taxes in Latin America underscore their significance (Pichon-Riviere et al. 2023). Furthermore, research has shown that increases in tobacco prices through taxation correlate with decreased consumption (Reynales-Shigematsu et al. 2022), and consistent monitoring of these policies is necessary to sustain their impact (Sandoval, Malik, et al. 2023).

The phenomenon of tobacco taxes has been widely studied from various economic and public health perspectives. In the case of Mexico, there is still room to increase these taxes, if compared to other countries. However, the effect of this increase occurs at a time when the market is transitioning to other products (Théodore et al. 2023). Regarding the horizons of taxation as a government instrument for tobacco control, it has been observed that taxes are already reaching their limit of effectiveness (Abouk et al. 2023). These are reaching the maximum possible value at which it is possible to add an additional price to the product (Hansen et al. 2023). Nonetheless, we performed a cigarette price elasticity analysis based on Jiménez-Ruiz, De Miera, et al. using data from the National Survey of Household Income and Expenditures (Encuesta Nacional de Ingresos y Gastos de los Hogares, ENIGH) conducted by the National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía, INEGI). Building on this we used data from the 2018, 2020 and 2022 ENIGH to replicate their methodology on cigarette price elasticity in Mexico. We employed the same variables as the authors suggest in their analysis but accounting for changes in the surveys. We observed that the price elasticity of cigarettes is -0.672 , which is interesting because it implies that a 10% increase in cigarette prices would decrease consumption only by 6.72%. This is in line with other estimations of price elasticity in Mexico (negative and relatively inelastic) and the region.

At the same time, new substitutes in emerging smoking technologies and the liberalization of recreational marijuana use are changing consumption dynamics, making cigarettes a more elastic commodity than they were thought to be in the past (Dave et al. 2023). For these reasons, in this document we present the argument that it is necessary to study smoking beyond taxation. A series of measures seek to complement this effect.

These taxes raise a significant amount of revenue when comparing local finances. But in the case of Mexico, taxes are not focused, and transfers are lost in a common fund that cannot be efficiently reused to address public health problems (Azagba, Ebling, and Korkmaz 2024). Tobacco taxes have been

regressive (Koch 2018), but this factor is changing with changes in technology. Likewise, in middle-income countries, the idea that cigarette use is focused on lower-income populations is questionable, as we will show in the data section.

Companies adopt pricing strategies to respond to the tobacco taxes, Sheikh, Branston, and Gilmore identify through a literature review major pricing strategies, these are shifting taxes between products; launching new brands as pathways for downtrading, product promotions and "discriminating monopoly" practices; price smoothing; and changing product attributes such as length and size of cigarettes or production processes (Sheikh, Branston, and Gilmore 2023).

To integrate taxes into a public policy model, researchers Ponce-Hernandez et al. elaborate a Tobacco Control Scale that assigns a score (0-100) based on the implementation of these components: price, prohibition in public spaces, public information campaigns, publicity prohibitions, health warnings, and treatments. There is a correlation between higher price and lower prevalence of daily smokers. As there is an income disparity in the north of the country, these regions showed lower scores at this scale and higher smokers' prevalence confirming the argument that tobacco consumption in Mexico is higher at higher incomes. The average score for tobacco price was 15 with a minimum of 8 and a maximum of 16, North states, with the exception of Guerrero have the highest price (Ponce-Hernández et al. 2024).

Concerning new technologies, the effect of tobacco taxes is making a slow but constant effect on the majority of users of new technologies, which are also dual smokers. Gallegos-Carrillo et al. study the effect of social networks and tobacco use, they find that exclusive smokers tend to transition to new technologies when friends that use new technologies are present. The effect of taxes is less important in the transition (Gallegos-Carrillo et al. 2022). However their study examined short term transitions.

5.2 The impact of other regulations

The role of packaging and advertising in influencing the appeal of tobacco products, particularly among young people, is critical. Plain packaging and comprehensive advertising bans have been recommended to reduce smoking initiation (Grilo et al. 2023). The attractiveness of flavored cigarettes and capsule cigarettes in Mexico has been linked to their marketing and packaging, which require stronger regulatory measures as shown by Tseng et al. (2023) and Brown et al. (2023). Furthermore, Reynales-Shigematsu et al. (2015) highlights the impact of health warnings and marketing restrictions on reducing smoking rates.

Smoke-free policies are instrumental in protecting the public from second-hand smoke and discouraging active smoking. The progression and challenges in implementing smoke-free environments in Mexico have been documented, highlighting the need for stronger enforcement to reduce the prevalence of smoking and protect public health (Ponce-Hernandez et al. 2022). Reynales-Shigematsu et al. (2020) considers that without the explicit inclusion of 100%

smoke-free environments, there is difficulty of enforcement by federal and state regulatory agencies. Furthermore, Sánchez-Romero et al. (2021) using the *SimSmoke* model attributed to smoke-free environments limited reductions in occasional (.4% males and .1% females) and daily smoking prevalence (.5% males and .1% females) in the 2002-2018 period.

The challenges of fully realizing the benefits of smoke-free environments are echoed in the findings of Luis Zavala-Arciniega et al. (2020), suggesting that, while there has been progress, the rates of occasional smoking increased in 2011-2016, indicating the need for a sustained and rigorous policy implementation.

Complementary to this white paper, an article directly assessing the effect of 100% smoke free places on the prevalence of smoking (both daily and occasional) was prepared within Movimiento Pro-Vecino's efforts. This paper found relatively modest effects, which coincide with the *SimSmoke* model used by Sánchez-Romero et al. 2021 for the period 2002-2018. Among the three groups of states analyzed in relation to the impact on smoking behavior (whether people smoke or not), only the state of Zacatecas exhibited a statistically significant effect from the implementation of full bans, with a 3% reduction in occasional smoking.

For the effect on daily smoking of the adoption of full bans, of the three state groups considered, only one showed a statistically significant effect after the adoption of full bans. In this context, the magnitudes were more substantial, indicating a reduction 5% in daily smoking according to the linear model.

This study had several limitations. First, the data used in this study are self-reported, which can be subject to bias. Second, the study is observational, and it is not possible to rule out the possibility that other factors occurring at the same time as the change in the smoke-free environment regulations, such as changes in tobacco prices or anti-smoking campaigns, may have also contributed to the observed changes in smoking behavior.

Furthermore, we only considered the effect of these regulations on smoking prevalence, despite the fact that the stated goals of smoke-free environments go beyond this one, particularly avoiding the exposure of non-smokers to second-hand smoke. Another stated goal is setting non-smoking as default, which can influence the initiation of smoking in youth groups. As shown in 4.1a and 4.1b, prevalence in youth groups decreased continuously during the study period.

In light of these results, it is recommended that complementary policies, focusing on alternative incentives, be considered to enhance the overall effectiveness of tobacco regulation efforts. In addition, the focus on the implementation and enforcement of these regulations represents a path for future research.

Chapter 6

A fragmented public health system

In Mexico, the General Health Law and its regulations define the bases and modalities for access to health services, the distribution of powers in health matters among the federal government and the 32 states as well as the distribution of powers among the Ministry of Health and other federal government agencies or autonomous organizations.

The health authorities are located in the executive branch, which are the Presidency of the Republic, the General Health Council, the Secretariat of Health and the governments of the states (“Ley General de Salud” 1984, Article 4). The General Health Council is a collegiate body for decision-making at the highest level in public health and is composed of the Secretary of Health, a secretary and thirteen members. The Council reports directly to the President, who appoints and may remove its members.

The objective of the National Health System is to comply with the right to health protection established in the Constitution and it is formed by the agencies and entities of the public administration, both federal and local, as well as by individuals and organizations of the social and private sectors that provide health services (Article 5). The coordination of the National Health System is the responsibility of the Ministry of Health (Article 7).

The challenges faced by the Mexican health system in implementing health policies are numerous, but the following stand out: Constant legal reforms, budget reduction, and an extensive network of institutions.

6.1 Legal reforms

Health reforms involve multiple policies that seek to achieve changes throughout the system. Campos and Reich (2019) define health policy as a government decision and an action plan to meet health system goals: improving the health status of the population, increasing financial risk protection, and increasing client

satisfaction; or operating outcomes: quality, access, and efficiency. Understanding the background and objectives of the 2008 General Health Law reform provides an important guideline for understanding the post-2020 paradigm shift and the current state of health policy.

In the late 1990s, catastrophic health expenditures were diagnosed as a public problem; besides, approximately half of the Mexican population lacked health insurance. The policies formulated in the 2008 reform attempted to solve the health dilemma as a means to reduce poverty and to reduce the financial stress of paying for personal health services. At the institutional level, the reform strengthened the steering role of the health system coordinated by the Ministry of Health. In the same way, it created surveillance bodies and instruments such as the Federal Commission for Protection against Health Risks (COFEPRIS), strengthened the generation of health information and the promotion of investigation. However, the problem of the weakening of the evaluation component persisted (Gómez-Dantés and Frenk 2019). On this topic, Martínez Valle, Williams, and Valle (2016), have monitored the reduction of inequalities and inequities in health.

Since 2003, a universal insurance policy was established in Mexico with Seguro Popular. This program allowed access to medical benefits to those not covered by any other social security institutions since in Mexico access to health services is linked to people's employment status. Those who have a formal job can be treated in institutes such as the Mexican Social Security Institute (IMSS) or the Institute of Security and Social Services for State Workers (ISSSTE). However, in Mexico more than 50% of the employed population works in the informal sector (INEGI, Instituto Nacional de Estadística y Geografía 2020a) and is not eligible to be cared for in the aforementioned institutes. Affiliation to Seguro Popular was voluntary and its coverage included a wide range of diseases and illnesses. This Insurance sought to reduce out-of-pocket medical expenses which in Mexico is one of the highest among OECD countries (Organisation for Economic Co-operation and Development (OECD) 2017), and was based on coordination with subnational governments, as it coordinated federal funding and decentralized provision by the health systems of the 32 states.

A health system reform was enacted in 2019 and came into operation a few months before the COVID-19 pandemic was declared in 2020. The reform restructured the provision of public health services and established as a central figure the newly created Health for Welfare Institute (INSABI). This new policy encountered opposition mainly among subnational governments as it implied ceding control over the provision of their health services to the federal government by signing an adhesion agreement. In fact, as of January 31, 2020, only 23 of 32 federative entities had signed the Coordination Agreement with the federal government (Camacho Lizárraga and Jacobo-Suárez 2022). In addition, sectors of the population expressed their discomfort with the change, since INSABI reduced the catalog of diseases and illnesses to be covered.

In 2023, the reform project for the extinction of INSABI was approved in order to "strengthen the steering role of the Federal Ministry of Health, optimize spending, avoid duplicities and better control the resources destined to the public

health system” (Soto 2023). With this reform, legal provisions were modified for the transfer to the federation of functions and human, budgetary, financial and material resources, as well as real estate, rights and obligations to Health Services of the Mexican Social Security Institute for Welfare (IMSS-BIENESTAR) (Diario Oficial de la Federación 2023).

The constant reforms to the health system have responded more to political principles than to detailed technical analysis which has caused a constant disintegration and restructuring affecting universality, service to beneficiaries and control of corruption (Reich 2020). In the particular case of the elimination of Seguro Popular and the creation of INSABI, Reich explains that the implementation of a new system was easier than a partial reform to modify the existing one due to political disputes about financing, payment, organization and regulation.

6.2 Budget reduction

The issue of financial resources has been a constant explanation to justify the aforementioned health sector reforms. In almost a decade, the health budget as a percentage of Gross Domestic Product (GDP) presented a constant reduction: from 2.88% in 2012 to 2.50% in 2020 (Méndez Méndez 2019). Mexico’s total spending (public and private) on health was 5.5% of GDP in 2017 (Secretaría de Salud 2019); or 5.8% according to the OECD (OECD, 2017). This expenditure is one of the lowest among the organization’s countries, whose average was 8.8% in 2017.

The country’s federal budget for the health sector in 2020 was \$128,826 million pesos (Secretaría de Hacienda y Crédito Público 2020); representing an increase of 3.6% over the previous year. The apparent increase barely covered the inflation of 3.15% registered in 2019 (INEGI, Instituto Nacional de Estadística y Geografía 2020b).

Another budgetary problem is the under-expenditure of resources. For example, during the COVID pandemic, the health sector spent 2.2% less than the authorized budget for the period January-May 2020 (\$49,843 million pesos). Another example is program U008-Prevention and Control of Overweight, Obesity and Diabetes, which for the same period had a budget of almost \$429 million pesos, of which only 51% was spent (Secretaría de Hacienda y Crédito Público 2020).

The problems of budget reduction and under-expenditure are aggravated by a larger population that requires access to health services, both due to the behavior of the population curve in Mexico as well as the population that lost health coverage with the elimination of Seguro Popular. Although the budget for the new INSABI-BIENESTAR (predecessor of the current IMSS-BIENESTAR) in 2021 is 4.5% higher than that exercised in 2019 by Seguro Popular, the potential population also increased: 14.4 million more people than in 2019 (Méndez Méndez and Llanos Guerrero 2021). Additional to this, the largest health insurance provider, IMSS (not to be confounded with IMSS-BIENESTAR), has continually faced budget restrictions which have resulted in medicine scarcity. If these trends

continue, there is a risk of lower rates of care and a greater contraction in per capita health spending.

6.3 Extensive network of institutions

The Mexican government’s legal powers in the area of health are broad: they range from issuing official standards, investigating, preventing, guiding, coordinating, providing care, controlling, monitoring and sanctioning, in relation to the right to health protection (*Constitución Política de los Estados Unidos Mexicanos* 2024, Article 4) and access to health services (“Ley General de Salud” 1984, Article 1). To comply with the above in a federalist political system implies the distribution of competencies between the federal government and the subnational governments for the decentralization of health services (Article 7). These competencies, in operational terms, are supported by cooperation agreements between the federation and the states (Article 9 and 13).

To illustrate the above, we will focus on four competencies of the federal government in the area of health: prevention, research, care (understood as the provision of health services), and control (regulation, surveillance and sanction); as well as the institutions involved, as shown in Table 6.1.

Competence	Federal agency or institution
Prevention	Ministry of Health; social security institutions such as IMSS-BIENESTAR, ISSSTE, Petróleos Mexicanos (PEMEX), Ministry of National Defense (SEDENA), Ministry of the Navy (SEMAR); Ministry of Public Education (SEP); Mexican Youth Institute (IMJUVE).
Research	National Cancer Institute; Ignacio Chavez National Institute of Cardiology; Salvador Zubirán National Institute of Medical Sciences and Nutrition; Ismael Cosío Villegas National Institute of Respiratory Diseases; National Institute of Geriatrics; Manuel Velasco Suárez National Institute of Neurology and Neurosurgery; National Institute of Genomic Medicine; National Institute of Pediatrics; Isidro Espinosa de los Reyes National Institute of Perinatology; Ramón de la Fuente Muñiz National Institute of Psychiatry; Luis Guillermo Ibarra Ibarra National Institute of Rehabilitation; National Institute of Public Health; Federico Gómez Children’s Hospital of Mexico; National Council for the Humanities, Sciences and Technologies (CONAHCYT).

Care (provision of health services)	Ministry of Health; social security institutions such as IMSS-BIENESTAR, ISSSTE, Petróleos Mexicanos (PEMEX), Ministry of National Defense (SEDENA), Ministry of the Navy (SEMAR); Ministry of Public Education (SEP); Mexican Youth Institute (IMJUVE); National Commission against Addictions (CONADIC).
Control (regulation, monitoring and control)	Ministry of Health; Federal Commission for the Protection against Sanitary Risks (COFREPRIS); Attorney General's Office (FGR); SEDENA, SEMAR; Ministry of Finance and Public Credit (SHCP), National Customs Agency of Mexico (ANAM); Ministry of Economy (SE), Federal Consumer Protection Agency (PROFECO).

Table 6.1: Competencies of the federal government in health matters and institutions involved.

Source: Prepared by the authors based on the General Health Law and the General Law for Tobacco Control.

This exercise allows us to observe, at the federal level alone, the large number and diversity of governmental agencies involved in the Mexican health system, which have different degrees of participation. Moreover, the functions of each agency are not mutually exclusive, as one institution may be involved in several tasks. This presents additional difficulties in the implementation of public policies by having to regulate the collaboration, agreement, coordination, contribution or concurrence of the various actors.

In Mexico there is a spectrum in tobacco control policies, ranging from health protection to risk reduction. The ranges of this spectrum go from prioritizing current smokers to prioritizing non-smokers and young people (Campus et al. 2021). Additionally, the policy considers the degree of harm caused by tobacco products and the alternatives available on the market. According to some authors, while e-cigarettes are a less harmful alternative to conventional cigarettes, there are a variety of other even less harmful products available to help quit smoking, including NRTs and prescription smoking cessation medications (Campus et al. 2021).

The tobacco control policy literature, including studies such as those presented in this article, offers recommendations for what anti-smoking policies for youth should look like. On the topic of economic incentives, Campus et al. (2021) propose a conditional cash transfer program as a risk reduction strategy to switch to electronic cigarettes. They claim that, based on the success of other school enrollment policies in Mexico, this could be a viable policy to reduce e-cigarette consumption.

On the topic of public policy approaches, Bird, Staines-Orozco, and Moraros (2016) propose that an effective anti-smoking strategy among adolescents requires

[A] comprehensive and multifaceted approach focused on: a) pre-

vention: helping to prevent adolescents from starting to consume tobacco, b) cessation: helping active adolescent smokers (and their parents) to quit smoking and c) protection: safeguarding adolescents from the harmful effects of exposure to secondhand smoke by strengthening policies and compliance with the rules. (Bird, Staines-Orozco, and Moraros 2016, 7)

Smoke-free policies, which is an MPOWER (Protecting People from Tobacco Smoke) measure, appear to have a particularly relevant effect on school-aged youngsters from a health point of view. In the meta-analysis carried out by Radó et al. (2021), the effect on health of this type of policy in outdoor areas and semi-private and private places for literature is examined; this analysis uses the cases of Canada, England, the United States and Hong Kong. The effects of smoke-free policies in outdoor areas or semi-private or private settings have been studied with methods such as randomized and non-randomized trials, interrupted time series, and controlled before-and-after studies. Studies show less smoke exposure in places covered by the policy, fewer unplanned hospital visits for asthma, and fewer unplanned visits for respiratory tract infections, in children under 17 years of age. The results were that, in locations covered by the policy, there are reductions in school grounds, following a smoke-free school policy, and in hospital visits for respiratory tract infection. Smoke-free car policies are associated with reductions in smoke exposure in children, which could translate into benefits for respiratory health (Radó et al. 2021). Some argue that regulations such as public smoking bans are not enforced in practice (Bird, Staines-Orozco, and Moraros 2016); that in the case of Mexico, when it comes to commercial establishments, compliance largely falls on individuals

What appears in the paper of the law and in the manuals of public policy against addictions is implemented with difficulty due to factors such as the weakness and institutional fragmentation of subnational governments, corruption, and inertia in implementation. The responses of the Mexican government and its subnational entities to the COVID-19 pandemic revealed the structural problems of the Mexican health system. Bautista-González et al. (2021) examine the response of the Mexican State through its fragmented health system in different federal institutions IMSS, ISSSTE, SSA and PEMEX. Regarding prevention, only SSA has the obligation to carry out campaigns aimed at the entire population, a relevant point in a country like Mexico where more than 50% of the workforce is informal and is not covered by other systems. From what was studied about the response to the pandemic, researchers found that there is an inherent need to improve health information systems in Mexico

In addition to prevention, another issue is the financing of health systems. In federal countries like Mexico, fiscal pressures are particularly pronounced. On a theoretical level, federal regimes possess characteristics to propose more specific local policies, which these countries are shaping the agenda for post-pandemic reforms. In the case of Mexico, several governors openly criticized the measures taken by the federal government to confront the pandemic. The implementation of local initiatives revealed failures in coordination between

Mexican governments. The fiscal arrangement is where state actors express their political force to pressure the executive. The Mexican health system is characterized by highly fragmented federal fiscal provisions and arrangements. The pandemic revealed the problems in boosting and maintaining health care financing. The inertia created by fiscal federalism makes change very difficult. States are dependent on federal transfers and reluctant to pay taxes (Béland et al. 2021). Health interventions, such as anti-smoking regulations, must consider not only the evidence but also the political dimension, that is, the power relations between the parties involved (Clavier and Leeuw 2013).

Beyond isolated approaches, what is required is to analyze the effectiveness of anti-smoking policies based on the inclusion of taxes, designated smoke-free spaces, warnings, advertising bans, surveillance and cessation programs; as did Guajardo Mendoza and Gil-García (2020), concluding that stricter policies aimed at controlling tobacco consumption are the result of external regulatory disturbances and the internal coordination and duration of minority coalitions, or the ability to the ruling coalition to change the policy itself.

Finally, as part of this research project, and as part of a soon to be published research paper, we used the experimental method of extraction of public information through requests to the National Transparency System, confirming that compliance with tobacco control in Mexico, according to the MPOWER dimensions of the WHO FCTC Framework, is limited. The few positive results are due to different structural factors; mostly:

- **Legal system.** At the national level, the existence of a variety of laws regulating tobacco control and involving a variety of implementers, with different levels of power depending on the level of government (i.e., “participation, collaboration, agreement, coordination, assistance or attendance”) and that, in general, must operate in a fragmented health system that affects the implementation of tobacco control policy.
- **System design.** From a legal perspective, federal and subnational governments comply with what is expected of them: Define powers and responsibilities of health authorities, ranging from prevention, guidance, provision of care (health services), surveillance, control, sanctions and conducting investigations that inform. However, federal legislation has been changing recurrently, which has generated some contradictions or gaps between the different levels of powers that impact its implementation, especially with regard to surveillance, sanctions and control.
- The effectiveness of the tobacco control policy will also depend on the level of knowledge about the dimensions of MPOWER by subnational governments and their operational capacity to implement them, in the end, both will affect their level of compliance with it.

Chapter 7

A dire future: the burden of smoking in the next decades

In chapter 3 we showed the current trends on smoking in Mexico: despite initial reductions in the prevalence rates in the last 20 years, the rebound during the COVID years deleted all the gains in the effort to end the pandemic. This dynamic is even more pressing when we examine the total number of smokers, which have continually increased due to changing demographics in Mexico.

7.1 Projecting mortality attributed to smoking

The Global Burden of Disease (GBD) project is a research initiative led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. It is designed to provide comprehensive and systematic assessments of global data on all major diseases, injuries, and risk factors. The GBD quantifies the impact of various health challenges by analyzing mortality and morbidity data across different countries, age groups, and genders. This allows for a comparative assessment of disease burden, measured in Disability-Adjusted Life Years (DALYs), which combine years of potential life lost due to premature mortality and years of productive life lost due to disability. Within this effort, the impact of several risks (behavioral and environmental) on final health outcomes was quantified. These risks included smoking.

One of the primary objectives of the GBD project is to inform policy-makers, health administrators, and researchers by providing detailed insights into the health challenges facing populations worldwide. The project utilizes a vast array of data sources, including epidemiological studies, disease registries, hospital data, and other health-related datasets, ensuring a comprehensive overview of global health trends. The GBD results are pivotal in shaping global health policy and investment decisions by highlighting priority areas for intervention and resource allocation. The findings are updated annually, reflecting the most recent data and providing ongoing insights into how health trends evolve over

	2000	2006	2012	2018	2019
	Total				
Total mortality	452,652	500,695	589,586	717,244	738,425
Attributable to all risk factors	270,966	301,821	354,515	433,405	448,472
<i>as % of total deaths</i>	59.9%	60.3%	60.1%	60.4%	60.7%
Attributable to smoking	38,026	40,551	43,600	47,393	48,393
<i>as % of total deaths</i>	8.4%	8.1%	7.4%	6.6%	6.6%
Attributable to smoking in selected causes	32,949	35,386	37,883	41,299	42,266
<i>as % of total deaths</i>	7.3%	7.1%	6.4%	5.8%	5.7%
<i>as % of smoking deaths</i>	86.6%	87.3%	86.9%	87.1%	87.3%

Table 7.1: Global Burden of Disease estimates for selected years

time.

7.1.1 Current mortality trends

For simplicity, this report focused on GBD's estimates of mortality, although a more nuanced approach should encompass Quality Adjusted Life Years and other indicators that fully represent the effect of smoking on health.

For Mexico, GBD estimated that of the total mortality in 2019, 48 thousand deaths could be directly attributed to smoking, which is 6.6% of all deaths. This can be appreciated in Table 7.1 in which we show this estimates for year 2019 and other selected years that are useful to compare with ENSANUT results. These mortality estimates while not exactly matching are very similar to official mortality figures provided by INEGI.

These mortality figures include (see Table 7.2) 12.7 thousand chronic obstructive pulmonary disease (COPD) deaths, 11.7 thousand ischemic heart disease deaths, 2.9 thousand stroke deaths, 4.7 thousand tracheal, bronchus and lung cancer deaths, 6.5 thousand deaths caused by other types of cancer, and 3.9 thousand diabetes deaths. These causes of death are the ones that are most associated with the increased risk created by smoking, but there are others, such as neurological disorders or respiratory infections that are also related to smoking.

Based on GBD estimates, we calculate that smoking can statistically explain 38.6% of all COPD deaths and 42.7% of all tracheal, bronchus and lung cancer in Mexico. In other cases, such as in diabetes, ischemic heart disease or stroke, there are other risks (such as sedentarism, nutrition and obesity) that are attributed to these causes of death. However, it should be considered that in the case of ischemic heart disease, despite smoking only explains 11% of all deaths, it represents 11.7 thousand deaths, approximately one fifth of all deaths attributable to smoking.

	2000	2006	2012	2018	2019
Chronic obstructive pulmonary disease					
Total mortality	17,523	20,915	25,422	31,174	32,781
Attributable to all risk factors	13,321	15,136	17,653	20,141	20,948
<i>as % of total deaths</i>	76.0%	72.4%	69.4%	64.6%	63.9%
Attributable to smoking	8,802	9,949	11,259	12,258	12,669
<i>as % of total deaths</i>	50.2%	47.6%	44.3%	39.3%	38.6%
Ischemic heart disease					
Total mortality	49,874	60,413	79,916	102,874	106,311
Attributable to all risk factors	46,681	56,496	74,712	96,219	99,420
<i>as % of total deaths</i>	93.6%	93.5%	93.5%	93.5%	93.5%
Attributable to smoking	8,978	9,689	10,734	11,658	11,683
<i>as % of total deaths</i>	18.0%	16.0%	13.4%	11.3%	11.0%
Stroke					
Total mortality	24,572	27,075	30,464	36,359	37,897
Attributable to all risk factors	20,440	22,491	25,327	30,261	31,525
<i>as % of total deaths</i>	83.2%	83.1%	83.1%	83.2%	83.2%
Attributable to smoking	2,980	2,907	2,801	2,833	2,861
<i>as % of total deaths</i>	12.1%	10.7%	9.2%	7.8%	7.5%
Tracheal, bronchus, and lung cancer					
Total mortality	7,371	7,913	8,414	10,372	11,002
Attributable to all risk factors	5,552	5,770	5,960	7,031	7,397
<i>as % of total deaths</i>	75.3%	72.9%	70.8%	67.8%	67.2%
Attributable to smoking	4,086	4,157	4,094	4,491	4,700
<i>as % of total deaths</i>	55.4%	52.5%	48.7%	43.3%	42.7%
Other cancers					
Total mortality	53,409	62,674	73,949	92,037	95,419
Attributable to all risk factors	16,715	18,780	21,592	27,087	28,095
<i>as % of total deaths</i>	31.3%	30.0%	29.2%	29.4%	29.4%
Attributable to smoking	5,239	5,527	5,765	6,313	6,497
<i>as % of total deaths</i>	9.8%	8.8%	7.8%	6.9%	6.8%
Diabetes mellitus					
Total mortality	34,530	42,426	52,328	70,454	73,838
Attributable to all risk factors	34,530	42,426	52,328	70,454	73,838
<i>as % of total deaths</i>	100.0%	100.0%	100.0%	100.0%	100.0%
Attributable to smoking	2,864	3,156	3,230	3,746	3,856
<i>as % of total deaths</i>	8.3%	7.4%	6.2%	5.3%	5.2%

Table 7.2: Global Burden of Disease estimates for selected years and causes

7.1.2 Estimating the future burden of the epidemic

Considering the annual mortality estimates attributable to smoking, we elaborated a simple model that projects this trends to 2024, 2034 and 2044. This model can be easily downloaded on the Open Science Framework repository created for this project.

This projection is based on the following assumptions:

- Rates for deaths attributable to smoking from 2019 are used for all future years. This is a conservative approach considering that mortality rates for smoking have been decreasing in the observed years. However, there is no factual basis to consider that these decreases will continue.
- We used Consejo Nacional de Población (2023) mid-year population projections to obtain an estimate of the age structure and population of Mexico in 2034 and 2044.
- We applied the age-specific mortality rates from GBD to the estimated population in 2034 and 2044 for the largest caused of death related to smoking.
- We did not consider the effect of COVID mortality on our estimates, although the 2021 and 2022 excess mortality could have important implications on the age groups considered for this projection. The magnitude of this excess mortality (200 thousand deaths each year) is not negligible, but the effect on the mortality rates attributable to smoking is yet to be measured and understood.

Our base projection for 2024 (see Table 7.3) considers that there are 48 thousand deaths attributable to smoking, which is similar to 2019 estimates. This figure continually increases to 78.9 thousand deaths in 2034 and 107 thousand in 2044.

These annual mortality estimates imply a total 682 thousand deaths attributable to tobacco in 2024-2034 and 944 thousand in 2034-2044, amounting to 1.6 million deaths in the next twenty years attributable to smoking.

This is a very basic model based on current trends, and the 2019 Global Burden of Disease rates calculated for each cause of mortality. This does not consider the increase of smoking prevalence previously discussed in this report. This increased prevalence of smoking would probably result in a higher estimate, due to the increased population exposed to this risk.

Table 7.4 shows an estimation of the prevalence of 2024 of smoking (casual and daily) and daily smoking for adult smokers (20 and older). The smoking prevalence rates for each age group from ENSANUT 2022 are used and result in a 19.7% general prevalence and 10.6% daily prevalence.

Without any modification to these rates, using only the demographic projections by Consejo Nacional de Población (2023), we can expect to reach 19.3 million smokers in 2034 and 20.2 million in 2044. This means 2.68 million more smokers in the next 20 years.

	2024	2034	2044
Annual mortality	828,093	1,126,267	1,475,849
Attr. to smoking	55,150	78,909	107,061
<i>as % of total</i>	6.7%	7.0%	7.3%
Attr. to smoking in selected causes	48,198	68,894	93,298
<i>as % of total</i>	5.8%	6.1%	6.3%
<i>as % of smoking deaths</i>	87.4%	87.3%	87.1%
Chronic obstructive pulmonary disease			
Total	37,352	55,768	79,199
Attr. to smoking	14,456	21,710	30,944
Ischemic heart disease			
Total	120,897	175,273	242,168
Attr. to smoking	13,277	18,267	23,800
Stroke			
Total	43,030	62,077	85,466
Attr. to smoking	3,251	4,490	5,876
Tracheal, bronchus, and lung cancer			
Total	12,562	17,806	23,819
Attr. to smoking	5,390	7,829	10,683
Other cancers			
Total	107,721	146,902	191,228
Attr. to smoking	7,422	10,529	14,100
Diabetes			
Total	84,096	118,145	157,372
Attr. to smoking	4,401	6,068	7,895

Table 7.3: Projected annual mortality attributable to smoking based on Global Burden of Disease rates

	2024	2034	2044
Inertial scenario (adult smokers >20 years)			
Smokers	17,558,969	19,345,213	20,243,191
Difference		1,786,243	897,978
Prevalence	19.7%	19.0%	18.3%
Daily smokers	9,394,441	9,853,600	9,905,548
Difference		459,159	51,947
Prevalence	10.6%	9.7%	9.0%
Reduction scenario (adult smokers >20 years)			
Smokers	17,558,969	16,406,143	11,731,016
Difference		- 1,152,826	- 4,675,127
Prevalence	19.7%	18.4%	11.6%
Daily smokers	9,394,441	7,469,361	5,274,927
Increment		- 1,925,080	- 2,194,434
Prevalence	10.6%	8.4%	5.2%

Table 7.4: Estimation of total smokers in 2034 and 2044 based on demographic projections by CONAPO

Only a very deliberate effort to first return to pre-COVID prevalence rates would result in a decrease in the total number of smokers in Mexico. In the Table 7.4 we present a reduction scenario in which in 2034 Mexico achieves a return to its pre-COVID (2019) smoking rates. An estimate for 2044 considers an across all age groups reduction of 25% further in the rates of consumption.

Chapter 8

Conclusion: New approaches to end the tobacco epidemic in Mexico

Risk reduction within the context of tobacco control refers to strategies designed to reduce the health risks associated with tobacco use without necessarily eliminating consumption entirely. In some cases because it is too costly to eliminate it, but in some cases, because it is not feasible. These strategies provide an alternative to more restrictive measures such as high taxation and comprehensive smoking bans. Defining risk reduction clearly within this framework is crucial as it shifts the focus from cessation to mitigation of harm, recognizing the diversity of consumer behavior and the potential for different outcomes by shifting to less risky behaviors. An example of this is the promotion and, in some cases, the mandatory use of safety devices for driving (ABS brakes, seatbelts) in order to reduce the risk of injury of driving, considering that people will not probably stop driving.

Current economic and policy research on risk reduction is extensive, yet reveals significant gaps in contrast to the results of restrictive tobacco control strategies. Although restrictive policies have been widely studied and implemented, there is a comparative lack of detailed analysis on the economic impact and public health outcomes of risk mitigation strategies. These gaps are particularly evident in understanding the long-term effects on public health, economic burden, and social acceptance. In chapter 2 we synthesized the state of the art research on tobacco control in Mexico. It is clear that efforts to perform research with this viewpoint have been limited.

Moreover, existing research often does not adequately address the full spectrum of consumer responses to risk reduction policies. This oversight can lead to a disconnect between policy intentions and actual outcomes, as traditional research methodologies might not capture the nuanced ways in which consumers adapt to changes in tobacco policy. Understanding these dynamics is essential

for designing interventions that are both effective and respectful of individual choices. A much better understanding on consumer behavior in Mexico and LMIC countries is needed: How do smokers initiate? How do they perceive themselves? How are they perceiving the health risks of tobacco and other products? How does cessation happen?

Therefore, we need to expand the research framework to include a broader range of risk reduction strategies. This should encompass not only the direct health impacts of reduced-risk products but also the social and economic implications of such policies. By broadening the scope of research, policymakers can be better equipped with the information necessary to formulate balanced tobacco control strategies that are capable of achieving public health goals while considering the complexities of consumer behavior.

Several countries around the world have implemented risk reduction policies with notable success, demonstrating substantial public health benefits and economic savings. For example, Sweden's tobacco control strategy, which includes the promotion of snus, a smokeless tobacco product, as a less harmful alternative to smoking, has contributed to the country having the lowest smoking rate in Europe. Studies attribute the widespread use of snus as a key factor in reducing smoking-related diseases and deaths, which aligns with Sweden's unique position of having one of the lowest rates of lung cancer in Europe.

In contrast, countries like Australia and Singapore, which have focused mainly on restrictive measures, including high taxes and comprehensive bans, show different outcomes. Although these countries have achieved reductions in smoking rates, the measures are also associated with significant challenges, such as the growth of illicit tobacco markets. In Australia, despite stringent policies, there has been a notable issue with the smuggling and illegal sale of tobacco products, which undermines the public health objectives of tobacco control laws.

In addition, the approach of the United Kingdom to risk reduction, particularly in promoting and regulating e-cigarettes as a less harmful alternative, provides a compelling case. Public Health England has consistently reported that e-cigarettes are 95% less harmful than smoking traditional cigarettes. This position has encouraged a significant number of smokers to switch to e-cigarettes, contributing to a decrease in smoking rates and associated health costs related to tobacco use. This should be contrasted with the Mexican approach to the matter in which the reduced-risk products have been banned by the Federal executive, and the communication on these alternatives has been focused on avoiding their use.

These examples highlight the potential benefits of risk reduction strategies over purely restrictive measures. By incorporating elements of consumer choice and less harmful alternatives, such strategies not only support public health goals but also mitigate the economic and social costs often escalated by stringent prohibitionist policies. The comparative analysis of these international examples provides valuable information on the efficacy of different tobacco control strategies and underscores the need for a balanced approach in tobacco policy.

8.1 The shortcomings of the current approach

Despite successes in avoiding consumption in young cohorts, and creating new generations free from smoking, the total number of smokers in the 20-40 age bracket has increased. This is confirmed both by ENSANUT and GATS.

This trend coincides with the adoption of stricter tobacco regulations, which suggests a very limited effect on smoking in the already smokers. Taxes constitute more than two thirds of the price of a pack of cigarettes and still the total number of smokers has not changed much with the introduction of regulations.

There is no option for current adults and as discussed in the previous chapter, the health burden of millions of smokers will become more evident as years pass by.

Current smokers, according to GATS 2023, are well aware that smoking causes serious illness (98%), including stroke (71.9%), myocardial infarction (85%), lung cancer (98%) and chronic pulmonary disease (95.5%).

In fact, according to the GATS, 53.6% of smokers tried quitting in the last 12 months, and of all smokers and quitters, 42.3% received advice from health caregivers to quit, although only 9.6% gave orientation on how to achieve this.

Most smokers tried quitting without help (90.2%), although some used pharmacotherapy (8.1%), counseling (4.9%), electronic cigarettes (11%), heated tobacco products (1.3), traditional medicine (1%), and digital means such as apps or social networks (6.4%).

Current smokers lack support and information in order to effectively quit despite the fact that they are well aware of the consequences of smoking. We think that science, and particularly economic research has much to provide in order to further our understanding and offer options to these individuals.

8.2 The case for a new research agenda in tobacco control in Mexico

Current research methodologies in tobacco control often fail to fully capture the complexities of risk reduction strategies. These methodologies generally favor the evaluation of restrictive policies, such as high taxes and bans, over approaches that could engage the consumer in making healthier choices. A comparative analysis between these and risk reduction methodologies is essential to identify gaps and improve research outcomes.

The WHO Framework Convention on Tobacco Control (FCTC) underscores the importance of risk reduction, as stated in Article 1(d): “tobacco control means a range of supply, demand, and risk reduction strategies that aim to improve the health of a population by eliminating or reducing their consumption of tobacco products and exposure to tobacco smoke.” This global endorsement provides a strong foundation for advocating a shift in research focus toward strategies that not only control but also reduce harm.

Moreover, there is significant potential for developing more balanced and humane policies that prioritize consumer choice over punitive measures like high

taxation and strict bans. Current evidence suggests that despite a strong institutional commitment to tobacco control, policies that overly rely on government coercion may not be as effective as those that consider the behavioral responses of consumers to different incentives.

Therefore, it is imperative to place the individual at the center of tobacco control research. Understanding how consumers respond to various incentives will enable the development of more effective, consumer-oriented tobacco control strategies. This approach not only aligns with international guidelines but also promotes a more sustainable and public health-friendly framework for tobacco control in Mexico.

8.2.1 The role of economic research to end smoking

This report is also a call for the involvement of economists in the global fight to end the tobacco pandemic. Economic modeling is a critical tool in assessing the public health implications and economic impacts of risk-reduced products like electronic cigarettes, particularly valuable in informing public health policies. By simulating long-term health outcomes and cost savings from reduced tobacco-related diseases, these models provide vital quantitative data. This information is especially crucial in low- and middle-income countries (LMICs), where healthcare resources are scarce and the tobacco disease burden is high.

Furthermore, economic models play a pivotal role in shaping regulatory and taxation strategies. They forecast how different policies might influence market behaviors, helping to craft tax regimes that discourage harmful smoking while recognizing the potential benefits of less risky alternatives such as e-cigarettes.

The significance of conducting benefit-cost analyses and studying consumer behavior toward risk in LMICs cannot be overstated. This research provides deep insight into how consumers perceive and react to the risks associated with electronic cigarettes versus traditional ones. Understanding local consumer behavior is key to developing effective health communications and policies that encourage the adoption of safer alternatives.

In addition, in environments where the healthcare infrastructure may be underdeveloped, benefit-cost analyses help identify which risk reduction strategies are most effective and economical. This is critical for proposing risk reduction policies that are not only scientifically sound but also economically viable.

Additionally, empirical research in LMICs can counteract overly restrictive regulations and high taxes on risk reduction products. Providing robust evidence of the benefits of these products supports a more balanced legislative approach. By aligning economic, behavioral, and public health insights, policymakers can better navigate the complexities of tobacco control, ultimately fostering a regulatory framework that effectively balances public health goals with market realities and consumer behaviors. This nuanced approach is essential for the successful integration of risk reduction strategies into tobacco policy.

New paths for research in Mexico should include:

- **Quantitative Harm Potential Estimation:**
 - Develop advanced economic models to estimate the relative harm and potential healthcare cost savings from adopting non-combustible nicotine products over traditional smoking.
 - Compare these savings to the economic impacts of more restrictive smoking measures.
 - This approach aims to provide a clearer cost-benefit perspective to policymakers.
- **Study of the Intensive Margin in Smoking:**
 - Investigate the linear effects of smoking intensity on health risks, as indicated by studies such as those by the Global Burden of Disease.
 - Evaluate how reductions in daily smoking frequency (e.g., from 20 to 10 cigarettes) can significantly decrease health risks and overall tobacco harm.
- **Regulatory Impact Analysis:**
 - Conduct thorough analyses to assess how various risk reduction policies have affected public health costs and economic burdens related to tobacco, in contrast to more restrictive policies.
 - This analysis will help in understanding the broader impacts of policy interventions on public health.
- **Cost-Benefit Analysis of Regulatory Approaches:**
 - Reevaluate and compare the effectiveness of pharmaceutical and non-pharmaceutical risk reduction strategies against the costs imposed by stringent tobacco control measures.
 - Extend the scope of analysis to various regulatory frameworks, such as smoke-free zones, and explore formal economic evaluations for each.
- **Influence of Social and Cultural Factors:**
 - Assess how social norms and cultural perceptions influence the economic effectiveness and public acceptance of different risk reduction strategies.
 - Explore specific cultural dynamics, such as the misconceptions about nicotine risks and the factors driving youth towards electronic cigarettes.
- **Cessation Studies:**
 - Address the gap in information on effective cessation by conducting interviews with individuals who have successfully quit smoking.
 - Perform a sociodemographic analysis to identify key factors that encourage people to stop smoking.

- **Assessing Internalities in Consumer Choice:**

- Investigate to what extent smokers consider the harms of smoking in their decision-making process, distinguishing between addictive behaviors and rational cost-benefit calculations.
- Explore potential incentives that could effectively promote smoking cessation, considering the complex interplay of awareness, addiction, and personal choice.

- **Policy Development Implications:**

- Examine the implications of economic evaluations for policy development, particularly focusing on the challenges of implementation at the local level in Mexico.
- Address broader administrative challenges that intersect with effective tobacco control, such as law enforcement and natural resource management.

Additionally, the pursuit of effective risk reduction strategies necessitates significant methodological innovations in data collection and economic modeling. A key challenge identified in this project is the disparity in policy comprehension and application, which stems from inconsistent language and understanding among policymakers. Addressing this requires the development of clear, communicable categories that can bridge the gap between complex economic models and policy implementation. Enhancing data collection processes and employing sophisticated economic modeling techniques are crucial for accurately analyzing and comparing the effectiveness of risk reduction strategies against more restrictive measures.

Moreover, it is essential to integrate economic analysis with insights from sociology, policy studies, and public administration to enrich research outcomes. This approach offers a more holistic perspective, as was emphasized in this report, which amalgamates viewpoints from economics, law, and public administration. Each discipline brings unique insights, collectively contributing to a more comprehensive understanding of the issues at hand and addressing the key questions that motivated this report.

The importance of longitudinal economic studies cannot be overstated, especially in a country like Mexico where there is a conspicuous absence of long-term data on smoking behaviors and the impacts of tobacco control policies over time. Longitudinal studies are vital to tracking the sustainability and long-term effectiveness of risk reduction policies compared to restrictive approaches.

Furthermore, the combination of different data sources presents a methodological challenge that needs to be addressed. Sources such as the Global Adult Tobacco Survey (GATS), the National Addiction Survey (ENCODAT), and the National Health and Nutrition Survey (ENSANUT) examine tobacco use phenomena, but differ significantly in methodology. A comprehensive methodological approach that includes quantitative adjustments for data interoperability

and comparability is essential to draw meaningful conclusions from these diverse datasets.

8.2.2 Embracing open science

In a highly contested domain like tobacco risk reduction, embracing the open science paradigm is crucial. Open science practices, such as making research data, methodologies, and analyses publicly available, foster transparency and credibility. By adopting these practices, the broader scientific community can scrutinize and validate studies on risk-reduced products and consumer behavior, reinforcing their reliability. This transparency is especially important in LMICs, where regulatory scrutiny and scientific resources may be limited, and the impact of misinformation can be disproportionately high.

In addition, open science practices can facilitate collaboration between a diverse range of disciplines and geographies, improving the robustness and relevance of research findings. By openly sharing data and methodologies, researchers can engage in cross-validation exercises, replicate studies, and collectively refine approaches and conclusions. This collaborative approach not only strengthens the scientific foundation of the findings, but also broadens the consensus around the interpretations and policy implications derived from the research.

In an environment where there is skepticism about the motives of risk reduction research, leveraging open science can serve as a counterbalance. It ensures that research contributions are evaluated on the basis of their scientific merit rather than their financial origins. Objective scrutiny enabled by open science practices helps to build a trustworthy evidence base that policy makers and the public can rely on when evaluating the potential benefits and risks of electronic cigarettes and other risk-reduced products.

Therefore, for economic research on risk-reduced tobacco products to effectively influence policy and public opinion, it must not only adhere to the highest standards of scientific rigor, but also commit to the principles of open science.

8.3 Potential impact

Refined public health policies enhanced by economic research could dramatically shape tobacco control. By providing robust evidence on the efficacy of risk reduction strategies versus restrictive measures, this research can guide effective public health interventions. This evidence-based approach is essential to craft policies that not only reduce smoking rates but also address health disparities.

Economic and social outcomes are influenced by informed risk reduction policies. Moving away from restrictive measures, which often carry significant social and economic costs, risk reduction strategies can foster sustainable economic benefits. These include reduced healthcare costs from lower rates of smoking-related diseases and improved workforce productivity, along with positive social outcomes such as improved public health equity.

Chapter 8. Conclusion: New approaches to end the tobacco epidemic in Mexico

There is a critical need for targeted economic research funding and a strategic policy focus that considers risk reduction as a potentially superior strategy to restrictive tobacco control measures. This calls for a reevaluation of funding priorities and policy frameworks to support research that yields actionable insights into risk reduction's effectiveness.

Looking ahead, integrating economic research into tobacco risk reduction strategies offers a vision in which balanced policies effectively reduce tobacco use in Mexico. Such strategies should respect individual choice while prioritizing public health, leading to a sustainable decrease in tobacco consumption and its associated health burdens.

Appendix A

Open science at Movimiento Pro-Vecino

In line with the principles of open science, our project is committed to improving transparency, accessibility, and reproducibility in scientific research. We believe that sharing knowledge and tools freely contributes significantly to the advancement of science and informed policy-making. This commitment is reflected in our approach to studying tobacco regulations in Mexico, where we aim to provide comprehensive insights and accessible resources for the community.

Our database on tobacco regulation was initiated with the publication of the General Law for Tobacco Control (LGPCT) in 2008 and has been systematically expanded to encompass relevant legislation up to September 2023. It includes a detailed collection from various governmental levels: 13 federal laws and regulations, 205 state laws, and 79 regulations from the largest municipalities in urban areas across Mexico. This extensive compilation was sourced from the System of Consultation of Ordinances of the Supreme Court of Justice of the Nation, focusing on tobacco products and emerging novel smoking technologies.

The scope of our database is both broad and detailed, categorizing regulations within the WHO MPOWER framework. This classification allows for nuanced analysis and comparisons across different jurisdictions and time periods. The database not only covers traditional tobacco products but also addresses the legislative responses to novel smoking technologies, reflecting the evolving landscape of tobacco control.

The methodology employed in analyzing these regulations utilizes open-source tools and statistical methods to ensure that our findings are reproducible and verifiable. By leveraging these technologies, we aim to provide a robust analytical framework that other researchers can replicate or build upon.

To support the global research community, we have made our database and the corresponding analytical code publicly available. This openness is intended to facilitate further research on tobacco control policies and their impacts. Researchers interested in accessing these resources can find them hosted using

the Open Science Framework, where they are freely available for download and use.

This dataset is particularly valuable for ongoing research into tobacco regulation and policy-making. It serves as a crucial resource for public health advocates, policymakers, and researchers who require comprehensive and reliable data to inform their work. Furthermore, it offers a unique opportunity for comparative studies and for monitoring legislative trends over time, providing insights into the effectiveness of different regulatory approaches.

As the legal landscape continues to evolve, particularly with the ongoing judicial debates and rapid adaptations to new smoking technologies, we consider an important task to ensure that this database is kept updated. We invite collaboration and feedback from the international community to enhance the utility and accuracy of this dataset. Our goal is to continue contributing to the evidence base that supports effective tobacco control measures and public health strategies worldwide.

This can be found in the OSF link: <https://osf.io/2tdc8>

A fundamental part of this project was to elaborate the code repository that was needed to perform analyses that relied on ENSANUT microdata. Movimiento Pro-Vecino's commitment is to make all this code public, so it can be examined and be used for further research on the topic.

This code base is also part of our Open Science Framework and can be freely explored in the next link <https://osf.io/n4pav/>

Finally, our estimates on mortality based on the Global Burden of Disease project is available in the OSF link <https://osf.io/mdjs6/>

Bibliography

- About, Rahi, Charles Courtemanche, Dhaval Dave, Bo Feng, Abigail S. Friedman, Johanna Catherine Maclean, Michael F. Pesko, Joseph J. Sabia, and Samuel Safford. 2023. “Intended and unintended effects of e-cigarette taxes on youth tobacco use.” *Journal of Health Economics* 87 (January): 102720. ISSN: 0167-6296. <https://doi.org/10.1016/J.JHEALECO.2022.102720>.
- Aguilar, A., E. Gutierrez, and E. Seira. 2021. “The effectiveness of sin food taxes: Evidence from Mexico.” *Journal of Health Economics* 77:102455. <https://doi.org/10.1016/j.jhealeco.2021.102455>.
- Alvarez, P. A., C. Valdez, and B. Dutta. 2022. “Analysis of the innovation capacity of Mexican regions with the multiple criteria hierarchy process.” *Socio-Economic Planning Sciences* 84:101418. <https://doi.org/10.1016/J.SEPS.2022.101418>.
- Anger, Silke, Michael Kvasnicka, and Thomas Siedler. 2011. “One last puff? Public smoking bans and smoking behavior.” *Journal of health economics* 30 (3): 591–601.
- Armenta-Paulino, N., F. C. Wehrmeister, L. Arroyave, A. J. D. Barros, and C. G. Victora. 2022. “Ethnic inequalities in health intervention coverage among Mexican women at the individual and municipality levels.” *EClinicalMedicine* 43:101228. <https://doi.org/10.1016/J.ECLINM.2021.101228>.
- Arora, M., A. Chugh, N. Jain, M. Mishu, M. Boeckmann, S. Dahanayake, J. Eckhardt, et al. 2020. “Global impact of tobacco control policies on smokeless tobacco use: A systematic review protocol.” *BMJ Open* 10 (12): e042860. <https://doi.org/10.1136/BMJOPEN-2020-042860>.
- Arredondo, Armando, Ana Lucia Recaman, Carlos Pinzon, and Alejandra Azar. 2018. “Financial consequences from smoking-related diseases in middle-income countries: Evidence and lessons from Mexico.” *The International Journal of Health Planning and Management* 33 (2): e454–e463.
- Azagba, Sunday, Todd Ebling, and Alperen Korkmaz. 2024. “Beyond the smoke: Historical analysis of the revenue implications of state cigarette tax policies, 1989 to 2019.” *International Journal of Drug Policy* 127 (May): 104408. ISSN: 0955-3959. <https://doi.org/10.1016/J.DRUGPO.2024.104408>.

- Barrett, S. 2004. "Implementation Studies. Time for a Revival? Personal Reflections on 20 Years of Implementation Studies." *Public Administration* 82:249–262. <https://doi.org/10.1111/j.0033-3298.2004.00393.x>.
- Bautista-González, E., J. Werner-Sunderland, P. Pérez-Duarte Mendiola, C. J. Esquinca-Enríquez-de-la-Fuente, D. Bautista-Reyes, M. F. Maciel-Gutiérrez, I. Murguía-Arechiga, C. Vindrola-Padros, and M. Urbina-Fuentes. 2021. "Health-care guidelines and policies during the COVID-19 pandemic in Mexico: A case of health-inequalities." *Health Policy OPEN* 2:100025. <https://doi.org/10.1016/J.HPOPEN.2020.100025>.
- Beaglehole, R., C. Bates, B. Youdan, and R. Bonita. 2019. "Nicotine without smoke: fighting the tobacco epidemic with harm reduction." *The Lancet* 394 (10200): 718–720. [https://doi.org/10.1016/S0140-6736\(19\)31884-7](https://doi.org/10.1016/S0140-6736(19)31884-7).
- Béland, Daniel, Gregory P. Marchildon, Andrés Medrano, and Philip Rocco. 2021. "COVID-19, Federalism, and Health Care Financing in Canada, the United States, and Mexico." *Journal of Comparative Policy Analysis: Research and Practice* 23 (2): 143–156. <https://doi.org/10.1080/13876988.2020.1848353>.
- Belen, Saenz-de-Miera, Wu Daphne, Essue Beverly M, Maldonado Norman, Jha Prabhat, and Reynales-Shigematsu Luz Myriam. 2022. "The distributional effects of tobacco tax increases across regions in Mexico: an extended cost-effectiveness analysis." *International Journal for Equity in Health* 21 (1): 8.
- Bernabe-Ortiz, Antonio, and Rodrigo M. Carrillo-Larco. 2023. "Second-hand smoke exposure in adolescents in Latin America and the Caribbean: a pooled analysis." *The Lancet Regional Health - Americas* 20:100478. <https://doi.org/10.1016/J.LANA.2023.100478>.
- Bird, Yelena, Hugo Staines-Orozco, and John Moraros. 2016. "Adolescents' smoking experiences, family structure, parental smoking and socio-economic status in Ciudad Juárez, Mexico." *International Journal for Equity in Health* 15 (1). <https://doi.org/10.1186/s12939-016-0323-y>.
- Blanco, Ana, Rocío C. Sandoval, Laura Martínez-López, and Ricardo de B. Caixeta. 2017. "Diez años del Convenio Marco de la OMS para el Control del Tabaco: avances en las Américas." *Salud Pública de México* 59 (1): S117–S125. <https://doi.org/10.21149/8682>.
- Blanke, David D. 2021. "Symposium Introduction: A Decade of the Tobacco Control Act: Progress, Setbacks, and the Future of Tobacco Control." *Journal of Legal Medicine* 40 (3–4): 285–291. <https://doi.org/10.1080/01947648.2020.1867474>.
- Boes, Stefan, Joachim Marti, and Johanna Catherine Maclean. 2015. "The impact of smoking bans on smoking and consumer behavior: Quasi-experimental evidence from Switzerland." *Health economics* 24 (11): 1502–1516.

- Brown, Jennifer L, Grazielle Grilo, Joanna E Cohen, Katherine Clegg Smith, Luz Myriam Reynales-Shigematsu, Maria Guadalupe Flores Escartin, and Meghan Bridgid Moran. 2023. "Colours, capsules and concept flavour names on cigarette packs appeal to youth in Mexico." *Tobacco control* 32 (e1): e16–e22.
- Buonanno, Paolo, and Marco Ranzani. 2013. "Thank you for not smoking: evidence from the Italian smoking ban." *Health policy* 109 (2): 192–199.
- Camacho Lizárraga, María Isabel, and Martha Jacobo-Suárez. 2022. "From "People need to hug each other, Do it - And Nothing Will Happen" to "Keep a Healthy Distance": The Mexican Government Response to the COVID-19 Pandemic." In *Global Risk Management: The Role of Collective Cognition in Response to COVID-19*, edited by M. L. Rhodes and L. Comfort. Routledge.
- Campos, Paulo A., and Michael R. Reich. 2019. "Political Analysis for Health Policy Implementation." *Health Systems & Reform* 5 (3): 224–235. <https://doi.org/10.1080/23288604.2019.1625251>. <https://doi.org/10.1080/23288604.2019.1625251>.
- Campus, Bradley, Patrick Fafard, Jonathan St. Pierre, and Steven J. Hoffman. 2021. "Comparing the regulation and incentivization of e-cigarettes across 97 countries." *Social Science & Medicine* 291. <https://doi.org/10.1016/j.socscimed.2021.114187>. <https://doi.org/10.1016/j.socscimed.2021.114187>.
- Cáñez-Cota, A., and C. Rentería. 2023. "Why are municipal wastewater treatment plants abandoned in Mexico? When a more money policy approach is not enough." *Water Resources and Economics* 43:100226. <https://doi.org/10.1016/J.WRE.2023.100226>. <https://doi.org/10.1016/J.WRE.2023.100226>.
- Catalano, Michael A, and Donna B Gilleskie. 2021. "Impacts of local public smoking bans on smoking behaviors and tobacco smoke exposure." *Health economics* 30 (8): 1719–1744.
- Clavier, Carole, and Evelyne de de Leeuw. 2013. *Health Promotion and the Policy Process*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199658039.001.0001>. <https://doi.org/10.1093/acprof:oso/9780199658039.001.0001>.
- Consejo Nacional de Población. 2023. *Población a mitad de año, 1950-2070*. Datos Abiertos de México. Última modificación de datos: 2023-09-29. Periodo cubierto: de 1950-07-01 a 2070-07-01. Disponible a nivel nacional (1950-2070) y entidad federativa (1970-2070). Desagregado por edad y sexo. Formato CSV. Licencia Libre Uso MX. <https://datos.gob.mx/busca/dataset/proyecciones-de-la-poblacion-de-mexico-y-de-las-entidades-federativas-2020-2070/resource/1d3a38bd-3282-4c96-bc67-45cf14e14acb>.
- Constitución Política de los Estados Unidos Mexicanos*. 2024. Diario Oficial de la Federación. Última reforma publicada DOF 24-01-2024.

- Cornelius, Monica E, Teresa W Wang, Ahmed Jamal, Catherine G Loretan, and Linda J Neff. 2020. “Tobacco Product Use Among Adults—United States, 2019.” *Morbidity and Mortality Weekly Report* 69 (46): 1736. <https://doi.org/10.15585/MMWR.MM6946A4>.
- Corvalán B., María Paz. 2017. “El tabaquismo: una adicción.” *Revista Chilena de Enfermedades Respiratorias* 33, no. 3 (September): 186. <https://doi.org/10.4067/s0717-73482017000300186>. <http://dx.doi.org/10.4067/s0717-73482017000300186>.
- Cotti, Chad, Erik Nesson, and Nathan Tefft. 2016. “The effects of tobacco control policies on tobacco products, tar, and nicotine purchases among adults: Evidence from household panel data.” *American Economic Journal: Economic Policy* 8 (4): 103–123.
- . 2018. “The relationship between cigarettes and electronic cigarettes: Evidence from household panel data.” *Journal of Health Economics* 61:205–219. <https://doi.org/10.1016/j.jhealeco.2018.08.001>. <https://doi.org/10.1016/j.jhealeco.2018.08.001>.
- Cupertino, Ana Paula, Francisco Cartujano-Barrera, Magaly Ramírez, Rosibel Rodríguez-Bolaños, James F Thrasher, Gabriel Pérez-Rubio, Ramcés Falfán-Valencia, Edward F Ellerbeck, and Luz Myriam Reynales-Shigematsu. 2019. “A mobile smoking cessation intervention for Mexico (Vive sin tabaco... ¡decídetel!): Single-arm pilot study.” *JMIR mHealth and uHealth* 7 (4). <https://doi.org/10.2196/12482>. <https://doi.org/10.2196/12482>.
- Dave, Dhaval, Daniel Dench, Michael Grossman, Donald S Kenkel, and Henry Saffer. 2019. “Does e-cigarette advertising encourage adult smokers to quit?” *Journal of Health Economics* 68:102227. <https://doi.org/10.1016/J.JHEALECO.2019.102227>. <https://doi.org/10.1016/J.JHEALECO.2019.102227>.
- Dave, Dhaval, Yang Liang, Michael F. Pesko, Serena Phillips, and Joseph J. Sabia. 2023. “Have recreational marijuana laws undermined public health progress on adult tobacco use?” *Journal of Health Economics* 90 (July): 102756. ISSN: 0167-6296. <https://doi.org/10.1016/J.JHEALECO.2023.102756>.
- DeCicca, P, D Kenkel, and M. F. Lovenheim. 2022. “The economics of tobacco regulation: a comprehensive review.” *Journal of economic literature* 60 (3): 883–970.
- “Ley General de Salud.” 1984. Última reforma publicada el 03 de enero de 2024, *Diario Oficial de la Federación*.
- “Ley General para el Control del Tabaco.” 2008. Última reforma publicada el 17 de febrero de 2022, *Diario Oficial de la Federación*.
- “Ley General de Transparencia y Acceso a la Información Pública.” 2015. Última reforma publicada el 13 de agosto de 2020, *Diario Oficial de la Federación*.

- Diario Oficial de la Federación. 2020. “Decreto por el que se modifica la Tarifa de la Ley de los Impuestos Generales de Importación y de Exportación” (February). https://www.dof.gob.mx/nota_detalle.php?codigo=5586899&fecha=19/02/2020#gsc.tab=0.
- . 2021. “Decreto por el que se prohíbe la circulación y comercialización en el interior de la República, cualquiera que sea su procedencia, de los Sistemas Electrónicos de Administración de Nicotina, Sistemas Similares sin Nicotina, Sistemas Alternativos de Consumo de Nicotina, cigarrillos electrónicos y dispositivos vaporizadores con usos similares, así como las soluciones y mezclas utilizadas en dichos sistemas” (May). https://www.dof.gob.mx/nota_detalle.php?codigo=5653845&fecha=31/05/2022#gsc.tab=0.
- . 2023. “Acuerdo por el que se emiten las bases para la transferencia de recursos y desincorporación por extinción del organismo público descentralizado denominado Instituto de Salud para el Bienestar” (June). https://dof.gob.mx/nota_detalle.php?codigo=5690905&fecha=01/06/2023#gsc.tab=0.
- Elmore, Richard F. 1980. “Backward Mapping. Implementation Research and Policy Decisions.” *Political Science Quarterly* 94:601–616. <https://doi.org/10.2307/2149628>.
- Esposito, Lucio, Shatakshee Dhongde, and Christopher Millett. 2021. “Smoking habits in Mexico: Upward and downward comparisons of economic status.” *Review of Development Economics* 25 (3): 1558–1575.
- Fleischer, Nancy L., James F. Thrasher, Luz Myriam Reynales-Shigematsu, K. Michael Cummings, Rafael Meza, Yian Zhang, and David T. Levy. 2017. “Mexico SimSmoke: how changes in tobacco control policies would impact smoking prevalence and smoking attributable deaths in Mexico.” *Global Public Health* 12 (7): 830–845. <https://doi.org/10.1080/17441692.2015.1123749>.
- Gale, N., M. McEwan, O. M. Camacho, G. Hardie, J. Murphy, and C. J. Proctor. 2021. “Changes in biomarkers of exposure on switching from a conventional cigarette to the glo tobacco heating product: A randomized, controlled ambulatory study.” *Nicotine and Tobacco Research* 23 (3): 584–591. <https://doi.org/10.1093/ntr/ntaa135>.
- Gallegos-Carrillo, Katia, Inti Barrientos-Gutiérrez, Edna Arillo-Santillán, Rosibel Rodríguez-Bolaños, Lizeth Cruz-Jiménez, Vidaña Pérez Desirée, Yoo Jin Cho, and James F. Thrasher. 2022. “Transitions between tobacco products: Correlates of changes in cigarette smoking and e-cigarette use among exclusive adult smokers and dual users in Mexico.” *Preventive Medicine Reports* 29 (October): 101869. ISSN: 2211-3355. <https://doi.org/10.1016/J.PMEDR.2022.101869>.

- Global Burden of Disease Collaborative Network. 2020. *Global Burden of Disease Study 2019 (GBD 2019) Relative Risks*. Funded by the Bill and Melinda Gates Foundation (BMGF). Seattle, United States of America. <https://doi.org/10.6069/GYVX-YR58>.
- Gómez-Dantés, Octavio, and Julio Frenk. 2019. “Financing Common Goods: The Mexican System for Social Protection in Health Agenda.” *Health Systems & Reform* 5 (4): 382–386. <https://doi.org/10.1080/23288604.2019.1648736>.
- Gravely, Shannon, Hua-Hie Yong, Jessica L. Reid, Kevin A. East, Alex C. Liber, K. Michael Cummings, Anne C. K. Quah, Geoffrey T. Fong, and David Hammond. 2023. “An examination of quitting smoking as a reason for vaping by the type of nicotine vaping device used most often among adults who smoke and vape: Findings from the Canada, England and the United States 2020 ITC Smoking and Vaping Survey.” *Preventive Medicine Reports* 33:102201. <https://doi.org/10.1016/J.PMEDR.2023.102201>.
- Grilo, Grazielle, Jennifer L Brown, Joanna E Cohen, and Katherine Clegg Smith. 2023. “Shared perceptions of flavored cigarette pack design among young adults who smoke in Mexico and the Philippines.” *Tobacco Induced Diseases* 21.
- Grilo, Grazielle, Lisa P Lagasse, Joanna E Cohen, Meghan B Moran, Luz Myriam Reynales-Shigematsu, and Katherine C Smith. 2021. ““It’s all about the colors:” how do Mexico City youth perceive cigarette pack design.” *International Journal of Public Health* 66:585434.
- Guajardo Mendoza, María Alejandra, and José Ramón Gil-García. 2020. “Advocacy coalitions, external perturbations and policy changes: Understanding the intensity of tobacco control policy in Spain, Mexico and Uruguay.” *Gestión y Política Pública* 29 (2): 477–501. <https://doi.org/10.29265/gypp.v29i2.781>.
- Hajek, Peter, Anna Phillips-Waller, Dunja Przulj, Francesca Pesola, Katherine Myers Smith, Natalie Bisal, Jinshuo Li, et al. 2019. “A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy.” *New England Journal of Medicine* 380 (7): 629–637. <https://doi.org/10.1056/nejmoa1808779>.
- Hansen, Benjamin, Joseph J. Sabia, Drew McNichols, and Calvin Bryan. 2023. “Do tobacco 21 laws work?” *Journal of Health Economics* 92 (December): 102818. ISSN: 0167-6296. <https://doi.org/10.1016/J.JHEALECO.2023.102818>.
- Harlow, Alyssa F., Rob S. McConnell, and Jessica L. Barrington-Trimis. 2023. “Underage E-Cigarette Purchasing and Vaping Progression Among Young Adults.” *Journal of Adolescent Health* 72 (2): 260–266. <https://doi.org/10.1016/J.JADOHEALTH.2022.09.018>.

- Harrell, Paul T., Thomas H. Brandon, Stephanie E. Stark, Vani N. Simmons, Tracey E. Barnett, Gwendolyn P. Quinn, and Seungtaek Chun. 2023. "Measuring vaping-related expectancies in young adults: Psychometric evaluation of the Electronic Nicotine Vaping Outcomes (ENVO) scale." *Drug and Alcohol Dependence* 246:109861. <https://doi.org/10.1016/J.DRUGALCDEP.2023.109861>.
- Hawk, Mary, Robert W. S. Coulter, James E. Egan, Susan Fisk, M. Reuel Friedman, Monique Tula, and Suzanne Kinsky. 2017. "Harm reduction principles for healthcare settings." *Harm Reduction Journal* 14 (1): 70. <https://doi.org/10.1186/S12954-017-0196-4>.
- Hjern, Benny. 1982. "Implementation Research. The Link Gone Missing." *Journal of Public Policy* 2:301–308. <https://doi.org/10.1017/S0143814X00001975>.
- Ibarra Salazar, J., C. González Caloca, S. Núñez Gómez, M. Ramírez García, M. Rodríguez Nuncio, and C. Santos González. 2019. "La regulación de etiquetado en la industria del tabaco de México: efecto de los pictogramas en la demanda de tabaco." *Economía Teoría y Práctica* 51. <https://doi.org/10.24275/ETYP/AM/NE/512019/IBARRA>.
- INEGI, Instituto Nacional de Estadística y Geografía. 2020a. *Encuesta Nacional de Ocupación y Empleo. ENOE. Cuarto trimestre de 2019. Principales indicadores laborales de las ciudades. [National Survey of Occupation and Employment. ENOE. Fourth quarter of 2019. Main labor indicators of the cities.]* https://www.inegi.org.mx/contenidos/programas/enoe/15ymas/doc/resultados_ciudades_enoe_2019_trim4.pdf. [National Survey of Occupation and Employment. ENOE. Fourth quarter of 2019. Main labor indicators of the cities.]
- . 2020b. "Índice Nacional de Precios al Consumidor. Calculadora de inflación [National consumer price index. Inflation calculator]." [National consumer price index. Inflation calculator]. <https://www.inegi.org.mx/app/indicesdeprecios/CalculadoraInflacion.aspx>.
- Instituto Nacional de Salud Pública. 2023. *Encuesta Global de Tabaquismo en Adultos*. Cuernavaca, México.
- Jacobsen, Mark R., Christopher R. Knittel, James M. Sallee, Arthur A. van Benthem, Inês Azevedo, Richard Blundell, Meghan Busse, et al. 2020. "The Use of Regression Statistics to Analyze Imperfect Pricing Policies." *Journal of Political Economy* 128 (5): 1826–1876. <https://doi.org/10.1086/705553>.
- Jenson, D., J. Lester, and M. L. Berman. 2016. "FDA's Misplaced Priorities: Premarket Review under the Family Smoking Prevention and Tobacco Control Act." *Tobacco Control* 25 (3): 246. <https://tobaccocontrol.bmj.com/content/25/3/246.full.pdf>.

- Jiménez-Ruiz, JA, B Sáenz De Miera, Luz Myriam Reynales-Shigematsu, Hugh R Waters, and Mauricio Hernández-Ávila. 2008. “The impact of taxation on tobacco consumption in Mexico.” *Tobacco control* 17 (2): 105–110.
- Jiménez-Ruiz, JA, B Sáenz de Miera, LM Reynales-Shigematsu, HR Waters, and M Hernández-Avila. 2008. “The impact of taxation on tobacco consumption in Mexico.” *Tobacco control* 17, no. 2 (April): 105–110. <https://doi.org/10.1136/tc.2007.021030>. <https://tobaccocontrol.bmj.com/content/17/2/105>.
- Kiviniemi, Marc T., and Lynn T. Kozlowski. 2015. “Deficiencies in public understanding about tobacco harm reduction: results from a United States national survey.” *Harm Reduction Journal* 12 (1): 1–7. <https://doi.org/10.1186/S12954-015-0055-0>.
- Knaul, Felicia M., Michael Touchton, Héctor Arreola-Ornelas, Rifat Atun, Raul J. C. Anyosa, Julio Frenk, Adolfo Martínez-Valle, et al. 2021. “Punt Politics as Failure of Health System Stewardship: Evidence from the COVID-19 Pandemic Response in Brazil and Mexico.” *The Lancet Regional Health - Americas* 4:100086. <https://doi.org/10.1016/J.LANA.2021.100086>. <https://doi.org/10.1016/J.LANA.2021.100086>.
- Koch, Steven F. 2018. “Quasi-experimental evidence on tobacco tax regressivity.” *Social Science Medicine* 196 (January): 19–28. ISSN: 0277-9536. <https://doi.org/10.1016/J.SOCSCIMED.2017.11.004>.
- Kresovich, Alex, Nicole Sanzo, Brandon Brothers, Holly Prentice-Dunn, Marcella H. Boynton, Erin L. Sutfin, Paschal Sheeran, and Seth M. Noar. 2022. “What’s in the message? An analysis of themes and features used in vaping prevention messages.” *Addictive Behaviors Reports* 15:100404. <https://doi.org/10.1016/J.ABREP.2021.100404>. <https://doi.org/10.1016/J.ABREP.2021.100404>.
- Lee, Bridget, Hsien-Chang Lin, and Dong-Chul Seo. 2019. “Inclusion of electronic nicotine delivery systems in indoor smoke-free air policies and associated vaping behavior.” *Addictive Behaviors* 98:106061. <https://doi.org/10.1016/J.ADDBEH.2019.106061>. <https://doi.org/10.1016/J.ADDBEH.2019.106061>.
- Lee, Seungji, Amber Sanders-Jackson, and Andy S. L. Tan. 2022. “The effect of vaping cues in e-cigarette advertisements on normative perceptions about cigarettes among young adults who use cigarettes and e-cigarettes in Boston.” *Drug and Alcohol Dependence* 241:109698. <https://doi.org/10.1016/J.DRUGALCDEP.2022.109698>. <https://doi.org/10.1016/J.DRUGALCDEP.2022.109698>.
- Lipsky, Michael. 1971. “Street Level Bureaucracy and the Analysis of Urban Reform.” *Urban Affairs Quarterly* 6:391–409. <https://doi.org/10.1177/107808747100600401>. <https://doi.org/10.1177/107808747100600401>.
- . 1980. *Street-Level Bureaucracy: The Dilemmas of Individuals in the Public Service*. Russell Sage Foundation.

- Lomelí Vanegas, Eduardo. 2020. “The health economy in Mexico.” *CEPAL Review-Special issue*.
- Madrazo Lajous, Alejandro, and Francisco Alonso Aranda. 2013. *El derecho a la salud en el sistema constitucional mexicano*. Technical report Número publicación 62. Centro de Investigación y Docencia Económicas, A.C. <http://repositorio-digital.cide.edu/bitstream/handle/11651/1327/122761.pdf?sequence=1>.
- Martín-Álvarez, J. M., A. Almeida, A. A. Golpe, and E. Asensio. 2023. “Electronic device or regulated tobacco product? Learning from the diffusion of heated tobacco products in Spain.” *Public Health* 219:61–66. <https://doi.org/10.1016/j.puhe.2023.03.017>. <https://doi.org/10.1016/j.puhe.2023.03.017>.
- Martinez Valle, Adolfo, Jessica S. Williams, and Angelica M. Valle. 2016. “The Mexican experience in monitoring and evaluation of public policies addressing social determinants of health.” *Global Health Action* 9 (1). <https://doi.org/10.3402/GHA.V9.29030>. <https://doi.org/10.3402/GHA.V9.29030>.
- Méndez Méndez, José Salvador. 2019. “La contracción del gasto per cápita en salud: 2010 – 2020.” Centro de Investigación Económica y Presupuestaria (CIEP), October. <https://ciep.mx/GvUt>.
- Méndez Méndez, José Salvador, and Ana Llanos Guerrero. 2021. “De Seguro Popular a INSABI: Mayor población con menor atención.” Centro de Investigación Económica y Presupuestaria (CIEP), June. <https://ciep.mx/2iCf>.
- Notley, Caitlin, Emma Ward, Lynne Dawkins, and Richard Holland. 2018. “The unique contribution of e-cigarettes for tobacco harm reduction in supporting smoking relapse prevention.” *Harm Reduction Journal* 15 (1). <https://doi.org/10.1186/s12954-018-0237-7>. <https://doi.org/10.1186/s12954-018-0237-7>.
- OECD. 2023. *Non-Medical Determinants of Health: Tobacco consumption*. <https://stats.oecd.org/index.aspx?queryid=30127>.
- Organisation for Economic Co-operation and Development (OECD). 2017. *Health at a Glance: OECD Indicators. Health expenditure in relation to GDP*. OECD Publishing. http://dx.doi.org/10.1787/health_glance-2017-en.
- Organización Mundial de la Salud (OMS). 2021. *Informe OMS sobre la epidemia mundial de tabaquismo, 2021: abordar los productos nuevos y emergentes*. Technical report. OMS. <https://apps.who.int/iris/rest/bitstreams/1469644/retrieve>.
- Organización Panamericana de la Salud and Instituto Nacional de Salud Pública (MX). 2010. *Encuesta Global de Tabaquismo en Adultos. México 2009*. Coedited with the Organización Panamericana de la Salud. Cuernavaca (México): Instituto Nacional de Salud Pública.

- Pan American Health Organization and Instituto Nacional de Salud Pública. 2017. *Global Adult Tobacco Survey. Mexico 2015*. Cuernavaca, Mexico.
- Pichon-Riviere, Andrés, Andrea Alcaraz, Alejandro Palacios, Bibiana Rodríguez, Luz Myriam Reynales-Shigematsu, Marcela Pinto, Marianela Castillo-Riquelme, et al. 2020. “The health and economic burden of smoking in 12 Latin American countries and the potential effect of increasing tobacco taxes: an economic modelling study.” *The Lancet Global Health* 8 (10): e1282–e1294. [https://doi.org/10.1016/S2214-109X\(20\)30311-9](https://doi.org/10.1016/S2214-109X(20)30311-9). [https://doi.org/10.1016/S2214-109X\(20\)30311-9](https://doi.org/10.1016/S2214-109X(20)30311-9).
- Pichon-Riviere, Andrés, Ariel Bardach, Federico Rodríguez Cairoli, Agustín Casarini, Natalia Espinola, Lucas Perelli, Luz Myriam Reynales-Shigematsu, et al. 2023. “Health, economic and social burden of tobacco in Latin America and the expected gains of fully implementing taxes, plain packaging, advertising bans and smoke-free environments control measures: a modelling study.” *Tobacco Control*, ISSN: 0964-4563. <https://doi.org/10.1136/tc-2022-057618>. eprint: <https://tobaccocontrol.bmj.com/content/early/2023/05/24/tc-2022-057618.full.pdf>. <https://tobaccocontrol.bmj.com/content/early/2023/05/24/tc-2022-057618>.
- Pieroni, Luca, Manuela Chiavarini, Liliana Minelli, and Luca Salmasi. 2013. “The role of anti-smoking legislation on cigarette and alcohol consumption habits in Italy.” *Health policy* 111 (2): 116–126.
- Ponce-Hernandez, Delta Jeazul, Luis Sordo, Luz Myriam Reynales-Shigematsu, Enrique Regidor-Poyatos, Jesús Henares-Montiel, and Alhelí Calderón-Villarreal. 2022. “Progress and challenges in tobacco control policies in Mexico, 2003–2017: an approach using the Tobacco Control Scale.” *Journal of Public Health Policy* 43 (3): 431–444.
- Ponce-Hernández, Delta Jeazul, Joel Antonio Martínez-Regalado, Luz Myriam Reynales-Shigematsu, Alhelí Calderón-Villarreal, Enrique Regidor, Lidia Herrero, and Luis Sordo. 2024. “Correlation between tobacco control policies and tobacco prevention in Mexico: a sub-national analysis.” *Journal of Public Health Policy* (April): 1–15. ISSN: 1745655X. <https://doi.org/10.1057/S41271-024-00473-6/TABLES/1>. <https://link.springer.com/article/10.1057/s41271-024-00473-6>.
- Ponciano-Rodríguez, Guadalupe, Luz Myriam Reynales-Shigematsu, Rosibel Rodríguez-Bolaños, Javier Pruñonosa-Santana, Fernando Cartujano-Barrera, and Ana Paula Cupertino. 2018. “Enhancing smoking cessation in Mexico using an e-Health tool in primary healthcare.” *Salud Pública de México* 60 (5): 549–558. <https://doi.org/10.21149/9348>. <https://doi.org/10.21149/9348>.

- Radó, Maria K., Florentine J. M. Mölenberg, Lucas E. H. Westenberg, Aziz Sheikh, Christopher Millett, Alex Burdorf, Frank J. van Lenthe, and Jasper V. Been. 2021. "Effect of smoke-free policies in outdoor areas and private places on children's tobacco smoke exposure and respiratory health: a systematic review and meta-analysis." *The Lancet Public Health* 6 (8): e566–e578. [https://doi.org/10.1016/S2468-2667\(21\)00097-9](https://doi.org/10.1016/S2468-2667(21)00097-9). [https://doi.org/10.1016/S2468-2667\(21\)00097-9](https://doi.org/10.1016/S2468-2667(21)00097-9).
- Reich, Michael R. 2020. "Restructuring Health Reform, Mexican Style." *Health Systems & Reforms* 6 (1): 1–11. <https://doi.org/10.1080/23288604.2020.1763114>. <https://doi.org/10.1080/23288604.2020.1763114>.
- Reynales-Shigematsu, Luz Myriam, Nancy L Fleischer, James F Thrasher, Yian Zhang, Rafael Meza, K Michael Cummings, and David T Levy. 2015. "Effects of tobacco control policies on smoking prevalence and tobacco-attributable deaths in Mexico: the SimSmoke model." *Revista Panamericana de Salud Pública* 38:316–325.
- Reynales-Shigematsu, Luz Myriam, Belén Sáenz-de-Miera, Blanca Llorente, Norman Maldonado, Geordan Shanon, and Prabhat Jha. 2022. "Beneficios del impuesto a los cigarros en México: análisis por sexo y quintil de ingreso." *Revista Panamericana de Salud Pública* 46:e80.
- Reynales-Shigematsu, Luz Myriam, Heather Wipfli, Jonathan Samet, Justino Regalado-Pineda, and Mauricio Hernández-Ávila. 2020. "Tobacco control in Mexico: a decade of progress and challenges." *salud pública de méxico* 61:292–302.
- Rodríguez-Bolaños, Rosibel, Guadalupe Ponciano-Rodríguez, Alejandro Rojas-Carmona, Fernando Cartujano-Barrera, Edgar Arana-Chicas, Ana Paula Cupertino, and Luz Myriam Reynales-Shigematsu. 2022. "Prácticas, barreras y facilitadores de proveedores de salud en clínicas para dejar de fumar en México." *Enfermería Clínica* 32 (3): 184–194. <https://doi.org/10.1016/J.ENFCLI.2021.04.007>. <https://doi.org/10.1016/J.ENFCLI.2021.04.007>.
- Ruckert, Arne, Carla Almeida, Jorge Ramírez, Gustavo Guerra, Víctor N. Salgado de Snyder, Emanuel Orozco, Augusto A. Alvarenga, et al. 2021. "Global Health Diplomacy (GHD) and the integration of health into foreign policy: Towards a conceptual approach." *Global Public Health* 17 (6): 1041–1054. <https://doi.org/10.1080/17441692.2021.1900318>. <https://doi.org/10.1080/17441692.2021.1900318>.
- Sabia, Joseph J., and Daniel I. Rees. 2014. "Youth smoking and addiction: evaluating the wisdom and efficacy of government intervention." *Expert Review of Pharmacoeconomics & Outcomes Research* 8 (3): 213–217. <https://doi.org/10.1586/14737167.8.3.213>. <https://doi.org/10.1586/14737167.8.3.213>.

- Sánchez-Romero, Luz María, Luis Zavala-Arciniega, Luz Myriam Reynales-Shigematsu, Belén Sáenz de Miera-Juárez, Zhe Yuan, Yameng Li, Yan Kwan Lau, Nancy L Fleischer, Rafael Meza, James F Thrasher, et al. 2021. “The Mexico SimSmoke tobacco control policy model: Development of a simulation model of daily and nondaily cigarette smoking.” *Plos one* 16 (6): e0248215.
- Sandoval, Rosa Carolina, Adriana Bacelar Gomes, Maxime Roche, Natalia Parra, and Francisco Armada. 2023. “Advances in tobacco control in the Region of the Americas, 2020.” *Revista Panamericana de Salud Pública* 46:e202.
- Sandoval, Rosa Carolina, Sehr Malik, Maxime Roche, Itziar Belausteguigoitia, and Gilberto Morales-Zamora. 2023. “Lessons learned from fostering tobacco taxes in the Americas and implications for other health taxes.” *Revista Panamericana de Salud Pública* 46:e188.
- Schroth, Kenneth R. J. 2021. “Ten Years of the Tobacco Control Act in New York City.” *Journal of Legal Medicine* 40 (3–4): 321–333. <https://doi.org/10.1080/01947648.2020.1868939>. <https://doi.org/10.1080/01947648.2020.1868939>.
- Secretaría de Hacienda y Crédito Público. 2020. *Avance Físico y Financiero de los Programas Presupuestarios Enero - Mayo 2020*. Online. Physical and Financial Progress of the Budget Programs January - May 2020. https://www.ppef.hacienda.gob.mx/work/models/PPEF/2021/estructura_programatica/2_AvanceFisicoyFinanciero_delosProg-Presupuestarios2020.pdf.
- Secretaría de Salud. 2019. *Gasto en Salud en el Sistema Nacional de Salud*. Online. Health Expenditure in the National Health System. http://www.dgis.salud.gob.mx/contenidos/sinais/gastoensalud_gobmx.html.
- Sheikh, Zaineb Danish, J. R. Robert Branston, and Anna B. Gilmore. 2023. “Tobacco industry pricing strategies in response to excise tax policies: a systematic review.” *Tobacco Control* 32 (2): 239–250. ISSN: 0964-4563. <https://doi.org/10.1136/TOBACCOCONTROL-2021-056630>. <https://tobaccocontrol.bmj.com/content/32/2/239%20https://tobaccocontrol.bmj.com/content/32/2/239.abstract>.
- Sóñora, Guillermo, Luz Myriam Reynales-Shigematsu, Joaquin Barnoya, Bianca Llorente, André de Souza Szklo, and James F. Thrasher. 2022. “Achievements, challenges, priorities and needs to address the current tobacco epidemic in Latin America.” *Tobacco Control* 31 (2): 138–141. <https://doi.org/10.1136/TOBACCOCONTROL-2021-057007>.
- Soto, D. 2023. “Adiós al INSABI: traspasan recursos y personal a IMSS-Bienestar,” April. Accessed April 10, 2024. <https://politica.expansion.mx/mexico/2023/04/26/que-pasara-con-el-insabi-tras-su-desaparicion>.

- Théodore, Florence L, Livia Roxana González-Ángeles, Luz Myriam Reynales-Shigematsu, Belen Saenz-de-Miera, Erick Antonio-Ochoa, and Blanca Llorente. 2023. “The Challenges of Tobacco Fiscal Policy Implementation in Mexico From the Perspective of Key Actors.” *Nicotine & Tobacco Research* 26, no. 4 (October): 444–451. ISSN: 1469-994X. <https://doi.org/10.1093/ntr/ntad188>. eprint: <https://academic.oup.com/ntr/article-pdf/26/4/444/56771538/ntad188.pdf>. <https://doi.org/10.1093/ntr/ntad188>.
- Tseng, Tuo-Yen, Kevin Welding, Belen Saenz-de-Miera, Grazielle Grilo, and Joanna E Cohen. 2023. “The Use of Packaging Descriptors in a Rapidly Growing Market for Capsule Cigarettes: Evidence From Mexico.” *Nicotine & Tobacco Research* (November): ntad208. ISSN: 1469-994X. <https://doi.org/10.1093/ntr/ntad208>.
- WHO. 2023. *WHO report on the global tobacco epidemic, 2023: protect people from tobacco smoke*. World Health Organization. Geneva.
- World Health Organization. 2003. *WHO Framework Convention on Tobacco Control*. World Health Organization.
- Yang, Mengying, Adrienne M. Russell, Adam E. Barry, Ashley L. Merianos, and Hsien-Chang Lin. 2023. “Stealth vaping and associated attitudes, perceptions, and control beliefs among US college students across four tobacco-free campuses.” *Addictive Behaviors* 136:107490. <https://doi.org/10.1016/J.ADDBEH.2022.107490>. <https://doi.org/10.1016/J.ADDBEH.2022.107490>.
- Yanow, Dvora. 2000. *Conducting Interpretive Policy Analysis*. Newbury Park: Sage.
- Zavala-Arciniega, Laura, Inti Barrientos-Gutiérrez, Edna Arillo-Santillán, Katia Gallegos-Carrillo, Rosibel Rodríguez-Bolaños, and James F. Thrasher. 2021. “Profile and patterns of dual use of e-cigarettes and combustible cigarettes among Mexican adults.” *Salud Pública de México* 63 (5): 641–652. <https://doi.org/10.21149/12365>. <https://doi.org/10.21149/12365>.
- Zavala-Arciniega, Luis, Luz Myriam Reynales-Shigematsu, David T Levy, Yan Kwan Lau, Rafael Meza, Daniela Sarahí Gutiérrez-Torres, Edna Arillo-Santillán, Nancy L Fleischer, and James Thrasher. 2020. “Smoking trends in Mexico, 2002–2016: before and after the ratification of the WHO’s Framework Convention on Tobacco Control.” *Tobacco control* 29 (6): 687–691.