

Tobacco harm reduction and better treatment could **save nearly two million lives in selected countries in the Middle East.**

**REPORT SUPPORTED BY INTERNATIONAL AND LOCAL TOBACCO HARM REDUCTION EXPERTS
JUNE 2024**

REPORT BY: DEREK YACH, CHERYL OLSON,
DELON HUMAN, AND KARL FAGERSTROM

Contents

1. Executive Summary	4
2. Rationale	6
3. Benefits of THR	8
The Quality of Evidence About the Benefits of THR for Cessation and Harm Reduction has Strengthened	
4. Analysis of Seven Countries in the Middle East	10
5. The Approach	16
6. Lives Saved Across Seven Middle East Countries	19
7. Actions Needed to Save Lives	23
Tobacco Harm Reduction (THR) products in the Middle East	25
8. Acknowledgments	30
9. References	31

1. Executive Summary

GLOBAL PROGRESS TO END SMOKING HAS STALLED. CURRENT APPROACHES TO TOBACCO CONTROL HAVE NOT BEEN SUFFICIENT. THE WORLD HEALTH ORGANIZATION (WHO) PROJECTS THAT 1.27 BILLION PEOPLE GLOBALLY WILL SMOKE BY 2025. OVER EIGHT MILLION ANNUALLY WILL DIE FROM TOBACCO USE. THIS IS UNACCEPTABLE FROM A PUBLIC HEALTH PERSPECTIVE.

This report focuses on seven countries in the Middle East - Pakistan, Egypt, Lebanon, Jordan, Kuwait, Saudi Arabia, and the UAE. A total of 390 million people live in these countries. Of these, 61 million adults use tobacco products, and 384,000 die prematurely every year because they use tobacco products.

WHO projects that smoking prevalence in the Middle East will only decrease slightly, from 33.3% in 2020 to 31% in 2025. This is the smallest decline among all WHO regions. This calls for urgent action, not a continuation of the status quo.

Data presented shows that tobacco use contributes to several major causes of death in these countries that are set to increase over the next few decades. These include lung and oral cancer, COPD, heart disease, and stroke. They will impose significant human and economic costs.

The report considers how tobacco harm reduction (THR) products could reduce this burden. THR products use nicotine without the deadly exposures that cause harm. THR products (e-cigarettes/vapes, heated tobacco products, snus, nicotine pouches, and charcoal free shisha) are rapidly gaining traction among consumers in the Middle East. But these innovations have not yet been embraced by physicians and governments as key to cutting premature deaths.

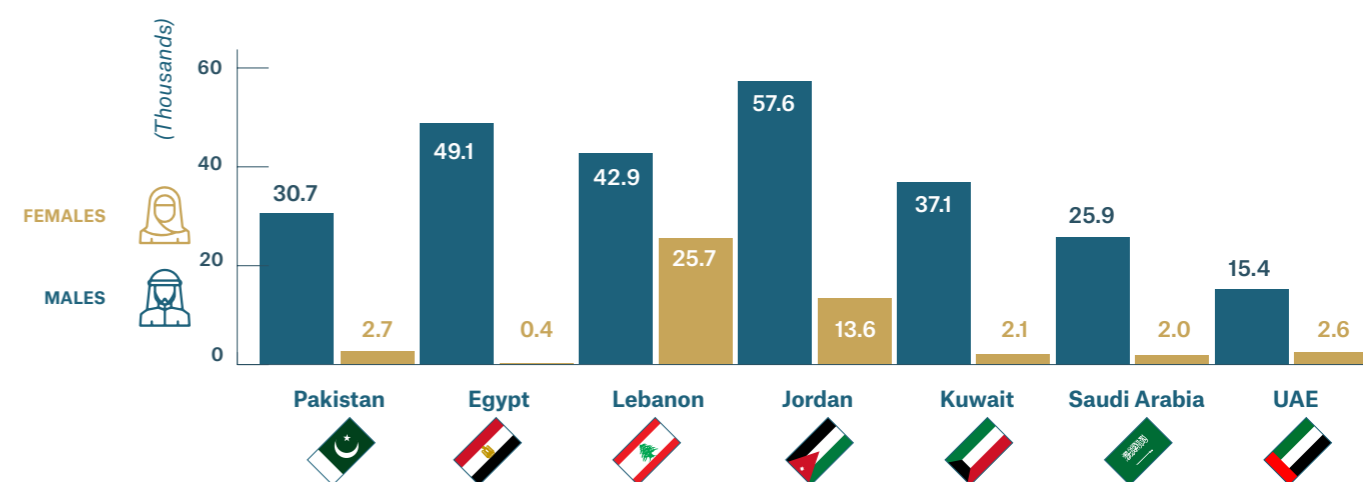
The report comes as the quality of evidence on the benefits of smoking cessation and THR has strengthened. Cessation at every age is associated with longer survival, and switching to THR products is almost twice as effective for cessation as nicotine replacement therapies. While long-term studies on the health benefits effects of switching to THR are still needed, results of studies using biomarkers of future diseases are promising.

This report also comes at a time when many countries have recently reversed bans on many THR products and liberalized their approach to THR. New and innovative THR products are being developed in and for the Middle East. A further sign of growing acceptance of the value of THR and the demand for them by consumers.

We calculated the combined impact of embracing THR, better cessation services, and improved lung cancer treatment in the seven Middle East countries on long term trends in health.

The analysis shows that over 1.8 million lives could be saved by 2060 through these interventions, compared to continuing with current WHO-directed tobacco control efforts alone.

Figure 1. Adult smoking rates by sex, 2022



To achieve these gains, key actions are needed, including:

- **Activating physicians to communicate the benefits of THR to patients in all clinical encounters, to counter disinformation about nicotine and the value of THR, and to develop a regional equivalent of the Royal College of Physicians report on THR and vapes.**
- **Governments continue to revise regulations to improve access to THR products and invest in national science and research to advance THR.**
- **Creating independent science-based consumer groups able to advocate for their needs.**
- **Supporting religious leaders to guide their communities to quit smoking and support tobacco harm reduction.**

Embracing THR, cessation, and improved lung cancer treatment represents a major opportunity for the Middle East to dramatically improve the health of its populations.

2. Rationale

GLOBAL PROGRESS TO END SMOKING HAS STALLED

Current approaches to tobacco control have stalled. The World Health Organization (WHO) projects that 1.27 billion people globally will smoke by 2025¹, and that tobacco use will kill 8.7 million annually.² Deaths are projected by WHO to increase to 10 million in five years before declining to about 6.5 million by 2060.³ *This is not what public health success looks like.*

We focus on seven countries from across the Middle East. They include **Pakistan, Egypt, Lebanon, Jordan, Kuwait, Saudi Arabia, and the United Arab Emirates (UAE).**



Pakistan



Lebanon



Egypt



Jordan



Kuwait



Saudi Arabia



UAE

These are Muslim societies with cultural similarities and comparable lifestyle behaviours, but with widespread variations in resources, and many involved in conflicts and wars during the past three decades. These factors have an impact on the use, trends, and types of tobacco products used in the region.

As Fouad et al. (2020) note, citing WHO global reports, *“For males, which make up the vast majority of all tobacco smokers in the [Eastern Mediterranean] Region, the prevalence of current tobacco smoking is projected to decrease by less than 2 percentage points, from 33.1% in 2010 to 31.2% in 2025.”*⁴

This preventable disaster should engender outrage and immediate action. This report aims to provide an alternative vision of what is possible.

We consider the benefits of interventions based on tobacco harm reduction (THR) products, which include nicotine without the deadly exposures that cause the harms. As stated in a recent article by 15 past presidents of the Society for Research on Nicotine and Tobacco, *“Nicotine is the chemical in tobacco that fosters addiction. However, toxic constituents other than nicotine, predominantly in smoked tobacco, produce the disease resulting from chronic tobacco use.”*⁵

These products include vapes, nicotine pouches, heated tobacco products, and uniquely in the Middle East, charcoal free shisha. They are gaining traction by consumers but are not yet embraced by physicians and governments as key to cutting premature deaths.

We also consider the benefits of better treatment for lung cancer, knowing it accounts worldwide for 2.5 million cases and 1.8 million deaths a year.⁶



WHO NEGLECTS THE LIFE-SAVING POTENTIAL OF TECHNOLOGICAL INNOVATION

The WHO Framework Convention on Tobacco Control (FCTC) is the first international treaty negotiated under the auspices of WHO. FCTC has led international control efforts for over two decades. Decisions taken at its governing body's 2024 gathering (known as COP10) focused on a variety of worthy issues, including environmental effects of tobacco cultivation and cigarette filters, and guidelines for tobacco advertising and media promotion.⁷ Egypt spoke on behalf of the Eastern Mediterranean Region (EMRO) group, and noted the necessity to protect younger generations⁸. However, COP10 did not discuss tobacco harm reduction (THR). Nor did it address the role of innovation and technology improvements that could reduce tobacco harms, and the need to adapt policies as these become available.⁹

This omission from WHO's first treaty has had two unfortunate implications. First, it perpetuates a view among public health experts that innovation and new technology is irrelevant to ending smoking. Second, it implies that equity in access to effective, life-saving technologies does not matter with regard to tobacco control. That partly explains why access to nicotine replacement therapies (NRT) remains paltry across LMICs.¹⁰

We have seen remarkable progress across the fields of biotechnology, pharmaceutical innovation and diagnostics led by private companies and supported in part by leading health research funders like the U.S. National Institutes of Health (NIH). The result is that a range of THR products have met the United States Food and Drug Administration (USFDA) criteria of being *“appropriate for the protection of public health.”*¹¹ They include four major categories: heated tobacco products, e-cigarettes, snus, and oral nicotine pouches. All of them use nicotine. None involve combustion.

All substantially reduce exposure to the toxic substances in combustible cigarettes.^{12, 13} One new addition, a charcoal-free shisha, represents a unique potential contribution to tobacco harm reduction led by Middle East innovation.^{14, 15}

3. Benefits of THR

THE QUALITY OF EVIDENCE ABOUT THE BENEFITS OF THR FOR CESSATION AND HARM REDUCTION HAS STRENGTHENED

In recent months, leading medical journals have published views that support the value of smoking cessation and tobacco harm reduction.

Cho and colleagues, writing in *NEJM Evidence*¹⁶, draw on four national cohorts involving 1.48 million people followed for 15 years to produce updated data on the benefits of adult cessation by age. They state that *“Cessation at every age was associated with longer survival, particularly cessation before 40 years of age.”*

Cho et al. shows no differences in survival between men and women who never and formerly smoked before age 40, compared to a decade difference among those who quit between 50-59. Note that in the older age group, former smokers still show a decade advantage in survival compared to current smokers. No other public health interventions can achieve this for people at age 50.

Pair this with a Korean study from *JAMA Network Open*, focused on cancer risk following cessation. Almost three million people were followed for over 15 years. Regardless of quitting age, a significant reduction in cancer risk was observed.¹⁷

*The Lancet*¹⁸ and the *New England Journal of Medicine*¹⁹ each recently carried articles calling for a greater focus on the value of THR for cessation. Beaglehole and Bonita (both previous directors of chronic diseases at WHO), writing in *The Lancet*, make the case for WHO to adopt THR to save lives. As they note, *“The FCTC does not prohibit harm reduction approaches but leaves it up to countries to decide how to regulate e-cigarettes and other novel nicotine products.”*

Further, *“WHO’s lack of endorsement of tobacco harm reduction limits healthier choices for the 1.3 billion people globally who smoke and who are at an increased risk of early death.”*

Nancy Rigotti of Harvard Medical School, writing in the *NEJM*, suggests that we have reached a *“tipping point”* in the quality of trial evidence, that requires physicians to *“acknowledge this progress and add e-cigarettes to the smoking cessation toolkit.”*



WHY DOES THIS MATTER FOR THR?

Multiple studies, and Cochrane systematic reviews²⁰, conclude that e-cigarettes (vapes) are almost twice as effective as achieving cessation than NRTs. In short, current evidence suggests that e-cigarettes are the most widely available effective means for smokers to quit. Cho et al.’s comments in the *NEJM* about the benefits of smoking cessation at every age do not differentiate between cessation methods; they apply to quitting with THR products or with NRTs.

More studies are needed to thoroughly assess the effectiveness of snus, nicotine pouches, and heated tobacco products as cessation interventions. However, the United States’ FDA has granted *“modified risk tobacco product”* status to some oral and heated tobacco products based on submitted scientific evidence.²¹ Real-world evidence also exists, including meaningful reductions in cigarette smoking in countries such as Sweden and Japan due to switching to THR products.²²

Because these are newer technologies, we do not have studies on long-term effects of switching to THR products. In the meantime, we can look to the plethora of impressive studies using biomarkers of outcomes that have high predictive value for cancers, respiratory and heart disease.^{23, 24, 25}

These studies are used by companies in their USFDA applications and deserve to be cited and used more extensively by the public health community when motivating policy makers.










COUNTRY-SPECIFIC STUDIES OF LIVES SAVED ARE NEEDED TO DRIVE FOR NATIONAL CHANGE

Across diverse disciplines, there is a long history of using rigorous methods to provide data on alternative futures.²⁶ Such *“foresight studies”* provide policy makers and the public a compelling vision of a future that is better than the status quo and is possible through the application of knowledge and interventions available today. We apply such an approach to show that it is possible to influence the course of the tobacco epidemic.

4. Analysis of Seven Countries in the Middle East

We focus on seven countries in the Middle East: Pakistan, Egypt, Lebanon, Jordan, Kuwait, Saudi Arabia, and the UAE, where a total of 390 million people live. Here, 61 million adults smoke, and 384,200 people die prematurely every year from combustible tobacco and toxic smokeless tobacco products.

Table 1: Demographic and development data for seven Middle East countries








	 Pakistan	 Lebanon	 Egypt	 Jordan	 Kuwait	 Saudi Arabia	 UAE
GDP/capita							
In thousands \$	1.7	4.2	4.3	4.3	52	68	88
Education (years)	5.3	11.1	9.7	11.4	10.9	8.8	11.3
Population in millions	224	5.2	99.1	11.6	4.4	35.7	9.2
2017 Life Expectancy							
 MALES	66.3	73	68	77.8	81	75	73
 FEMALES	67.4	80	74.3	81.1	87	79	77

Data source: IMHE country profiles.
<https://www.healthdata.org/research-analysis/health-by-location/profiles>

GDP per capita across these countries ranges from a low of \$1700 in Pakistan, to \$88,000 in the United Arab Emirates (UAE). Life expectancy exceeds 80 in the UAE yet remains in the high 60s in Pakistan.














Table 2: Top five risks underpinning death, disease, and disability in seven Middle Eastern countries.

	 Pakistan	 Lebanon	 Egypt	 Jordan	 Kuwait	 Saudi Arabia	 UAE
Rank							
1	Malnutrition	TOBACCO	High BP	High BMI	High BMI	High BMI	High BMI
2	Air pollution	High BP	High BMI	High BP	High BG	High BP	High BP
3	High BP	High BMI	TOBACCO	Malnutr	High BP	High BG	TOBACCO
4	Diet	High BG	Air pollution	TOBACCO	TOBACCO	Diet	High BG
5	TOBACCO	Diet	High BG	High BG	Diet	Air pollution	High LDL

Data source: IMHE country profiles.
<https://www.healthdata.org/research-analysis/health-by-location/profiles>

Table 2 shows that tobacco use features as one of the top five risks across all countries. Diet-related and clinical factors related to chronic disease feature strongly as major risks driving the burden of disease.

Table 3: Smoking rates and numbers of smokers in seven Middle East countries.

	 Pakistan	 Egypt	 Lebanon	 Jordan	 Kuwait	 Saudi Arabia	 UAE
Smoking Prevalence (%) 2018							
 MALES	30.7	49.1	42.9	57.6	37.1	25.9	15.4
 FEMALES	2.7	0.4	25.7	13.6	2.1	2.0	2.6
Number of Smokers (million)							
 MALES	15.8	18.1	0.8	2.3	0.7	4.1	0.9
 FEMALES	2.0	0.1	0.5	0.5	0.03	0.2	0.1
TOTALS	17.8	18.2	1.3	2.8	0.73	4.3	1.0
WHO estimated 2025 prevalence	11.3	25.8	34.1	37.1	27.3	16.7	23.4
WHO Survey Year	2017 15-49 yrs.	2016/17 15-69 yrs.	2016/17 18-69 yrs.	2019 18-69 yrs.	2014 18-69 yrs.	2019 18-69 yrs.	2017/18 18-69 yrs.



Data source: WHO global report on trends in prevalence in tobacco use 2000-2030. <https://iris.who.int/bitstream/handle/10665/375711/9789240088283-eng.pdf>

Table 3 shows that smoking rates exceed 35% in Lebanon, Egypt, Jordan, and Kuwait. These are among the highest rates in the world. Further, the smoking rate among women in Lebanon (25.7%) is among the highest recorded among women worldwide.

Note that Table 3 shows data from several surveys that are between eight and ten years old. None have been carried out in the last three to four years. This is problematic. Reduced-risk products are not included in surveys at exactly the time that their use is expanding. Policy needs to be made on current data; this cannot be done at present.

The Middle East region is characterised by a diversity of tobacco use. Cigarettes historically dominated, but recent studies suggest increasing use of shisha/water pipe²⁷ and midwakh/dokha,²⁸ especially among younger people and women.

Table 4: Diversity of tobacco use and harm reduction products in the Middle East

Traditional Tobacco	Reduced Risk Option	Middle East Brand
Cigarettes, Cigar	Vapes, Heated Tobacco Products	 NDS <small>ALTERNATIVE NICOTINE DELIVERY SOLUTIONS</small>
Water Pipe, Shisha	Charcoal Free Shisha	 OOKA <small>SHISHA</small>
Oral Tobacco Product (Shamma, Gutkha)	Snus, Nicotine Pouches	VELO VOLTBAR LYFT
Midwakh/Dokha	None at this stage	None at this stage

It has been estimated that over 100 million people smoke tobacco in a water pipe (also called Shisha or Hookah).²⁹ This method has social and cultural value and meaning in the region, and is perceived as safer than cigarette smoking (or even seen as healthy) by many users.³⁰ Use is more common among men, but the gender gap is smaller than that observed with cigarette smoking.³¹

Midwakh/Dokha use is common in the region and increasing in some areas. (Dokha is the tobacco mix smoked in the Midwakh pipe.) For example, Midwakh was the most frequently reported tobacco product used in a 2021 study of UAE university students.³² Dokha includes a blend of tobacco and other toxic substances.³³ Further research is needed on brands/types and their various health risks.

Shammah is a traditional oral tobacco product specific to the region, reportedly commonly used in Saudi Arabia and Yemen.³⁴ The product is locally made by mixing ground tobacco leaf with various materials such as lime, ash, black pepper, oils and flavourings. A variety of potential carcinogens, including nitrosamines, have been identified in shammah.³⁵

Table 4 shows that for three *“traditional”* forms of tobacco, there are newer alternative reduced-harm nicotine-containing products.

The smoking rates and behavioral risks in Table 3 are reflected in the leading causes of death (Table 5).

Table 5. Top ten causes of death in 2021 in selected Middle East countries (IHME). Those strongly related to tobacco are highlighted.

	 Pakistan	 Lebanon	 Egypt	 Jordan	 Kuwait	 Saudi Arabia	 UAE
Rank							
1	Neonatal	IHD	IHD	IHD	IHD	IHD	IHD
2	IHD	Stroke	Cirrhosis	Stroke	Stroke	Road Injuries	Road Injuries
3	Stroke	Lung Cancer	Stroke	Diabetes	Lower RI	Stroke	Stroke
4	Diarrhea	HyperHD	Road Injuries	HyperHD	Road injuries	CKD	CKD
5	Lower RI	Alzheimer's	CKD	CKD	Alzheimer's	Lower RI	Diabetes
6	TB	CKD	HyperHD	Neonatal	Hyper HD	Falls	COPD
7	COPD	Breast Cancer	Lower RI	Congenital	Diabetes	Cirrhosis	Hyper HD
8	Diabetes	Colorectal Cancer	Diabetes	Road Injuries	CKD	Diabetes	Drug Overdose
9	CKD	LowerRI	COPD	Lower RI	Congenital	Other Injury	Pancreatic Cancer
10	Cirrhosis	Diabetes	Cirrhosis	Lung Cancer	Lung Cancer	COPD	Self-harm

Data source: IMHE country profiles.
<https://www.healthdata.org/research-analysis/health-by-location/profiles>

Smoking is a major cause of COPD, IHD, stroke, tuberculosis, and lung cancer deaths. The table shows the importance of other important risks: diet and obesity-related, as well as road injuries. This triple burden of diseases strains the ability of health systems.

Pakistan must address the still incomplete agenda related to under-development while at the same time having to address the consequences of tobacco and unhealthy diets.

By contrast, Egypt, Lebanon, Jordan, and Kuwait have three major groups of diseases requiring attention. They are driven by tobacco, unhealthy diets, and weak traffic controls.

UAE's major causes of death are like those of Kuwait and Saudi Arabia; diet, tobacco and traffic-related causes dominate. This profile resembles many other high-income countries, where behavioural risks are joined by mental health issues.

Cardiovascular disease (CVD), reflected by ischemic heart disease in the table, is the number one cause of death in all countries except Pakistan.³⁶ IHD is caused by several factors. These include high blood pressure, diabetes and unhealthy diets, a lack of physical activity, and genetics. However, smoking is singled out "as major contributor of CVD burden in the MENA region," and higher youth smoking rates in the region (in contrast to the declining smoking trends internationally) raise concern about future increases in CVD. Smoking is both a risk factor for chronic CVD and an inducer of acute events such as myocardial infarction.³⁷

Most studies assessing attributable risks have been based on USA and European countries. This underestimates the effects seen in ME countries. One example is the INTERHEART Middle East study,³⁸ which listed smoking first among modifiable population risk factors for acute myocardial infarction in the region, and estimated that 45% of that risk is attributable to smoking—above that seen in US studies. Given the importance of CVD as a lead cause of death in many countries in the region, this increases the urgency to promote smoking cessation.

COPD AND LUNG CANCER MADE THE TOP TEN CAUSES OF DEATH IN ALL SEVEN COUNTRIES

About 50-70 percent of COPD cases and deaths are attributable to smoking.³⁹ While COPD is mainly caused by tobacco, for some countries reported here fine particle air pollution and the energy sector may be an additional contributor.^{40,41}

About 70-90 percent of lung cancer cases and deaths are attributable to tobacco use. About 60 to 70 percent of cases of oral cancer, laryngeal cancer, and oesophageal cancer are also caused by tobacco use. Against this background, a recent major report on future cancer trends in the Middle East is critical.⁴² It shows that the Middle East is at the start of a rapid demographic transition. The population over the age of 65 is set to increase by 290% between 2018 and 2050. As a result of aging and the combined high level of smoking, cancer diagnoses and deaths are expected to greatly increase by 2040, strongly affecting the healthcare system in the region.⁴³ This is a further motivation to address adult smoking rates with greater urgency and new interventions.

As Table 5 on the previous page shows, stroke is a top ten killer in all seven countries. While the main cause of stroke is hypertension, smoking accounts for a quarter of all stroke deaths.⁴⁴ A recent systematic analysis of the global burden of neurological disease led by Middle East collaborators showed that between 1990-2019 the burden of disease due to ischaemic stroke more than doubled across the Middle East.⁴⁵

Calculating the "size of the price": the aim

This study aims to provide national policymakers and public health experts with estimates of the value of THR, better cessation programmes, and improved access to lung cancer diagnostics and treatment in terms of measured as "lives saved" over the next three to four decades.

5. The Approach

We compare WHO projections of future tobacco deaths by 2060. These are based on continued and more effective implementation the key components of the WHO Framework Convention on Tobacco Control (FCTC), simplified into six policy measures labelled collectively as MPOWER. Disappointingly, tobacco harm reduction (THR) was omitted from the MPOWER⁴⁶ approach. The WHO projections also leave out potential improvements in the effectiveness of cessation services, as well as access to rapidly improving diagnostics and treatments for lung cancer. We focus on lung cancer for two reasons. It accounts for 2.5 million of the 8.5 million tobacco deaths, and better diagnostics and treatment suggest that within a decade, lung cancer will no longer have a five-year survival of about 10-20% but approach the survival rate of breast cancer which has reached 90%.

Tobacco-related diseases are chronic conditions that take a few decades before the full benefits of cessation or harm reduction are visible in national data. This is a critical point to appreciate. Recent updates on the value of cessation (as described above) show that policy makers have overestimated how long it takes to achieve benefits from adult cessation: in terms of reduced overall mortality and in deaths from major tobacco related cancers.

All the expected premature tobacco deaths by 2060 will occur in current adult smokers.

If no person under 18 years of age started smoking today, lives saved among youth would take until the 2060s to become visible in national mortality data. This reinforces the need to focus on the behaviours of middle-aged smokers and users of toxic smokeless tobacco products, if we seek population health gains within the next several decades. Many of these smokers will be in touch with health services for early-stage COPD, heart disease and possible cancer. This creates opportunities for secondary prevention (see below).

RECENT APPROACHES TO ESTIMATING “LIVES TO BE SAVED”

There have been several recent efforts to model responses to the question: “*What would happen to the burden of disease if countries did embrace THR?*” These have been published by academics and industry. We refer readers to our earlier report to obtain details Lives Saved: Integrating Harm Reduction for Tobacco Control in Brazil (tobaccoharmreduction.net) and Lives Saved: Tobacco Control & Harm Reduction in LMICs (tobaccoharmreduction.net)

WHY THIS STUDY IS IMPORTANT NOW

This study comes at a time when over a billion people smoke and THR products are used by 120-140 million people globally. Most people who use THR products live in high income countries. In these countries we now have powerful evidence of the impact of THR use on the declining use of combustibles. This has well described for countries such as Sweden, UK, Japan, and USA.⁴⁷ We believe that when faced with a clear choice of policies, responsible governments will act to save lives, and be supported by civil society.

METHODS

The approaches used by seasoned “*modellers*” were reviewed and simplified to their essential elements. Details are contained in earlier reports. The key assumptions are repeated below.

ASSUMPTIONS

The following **assumptions** are made in calculating lives saved.

- **At present, NRTs are 10% effective in terms of cessation at one year. Vapes are twice as effective.**
- **The spectrum of THR products reduce toxic exposures by 80% and reduce tobacco-related causes of premature death by 70%. While use these conservative values for comparability knowing the emerging evidence from exposure assessments and the use of biomarkers of outcome show far greater levels of reduced harm are likely.**
- **Lung cancer survival at five years will increase to 50% for most countries by 2050 driven by improvements in diagnosis and treatment.**
- **WHO estimates that cessation services (a mix of medications and behavioural support) will be 50% effective in achieving one-year quit rates by 2035 and be available to 50% of smokers by 2045. This effectiveness projection is not aligned with research findings, but for the purpose of this study it has been accepted as a “best case assumption”.⁴⁸**
- **The rate of decline in smoking will accelerate from 2035 onwards, which will lead to health impacts increasing sharply from 2045 onwards (see Figure 1).**
- **WHO trends suggest that from 2000 to 2025 smoking rates will fall by a third in men. We believe this could accelerate to 50% from 2030 in all countries.**

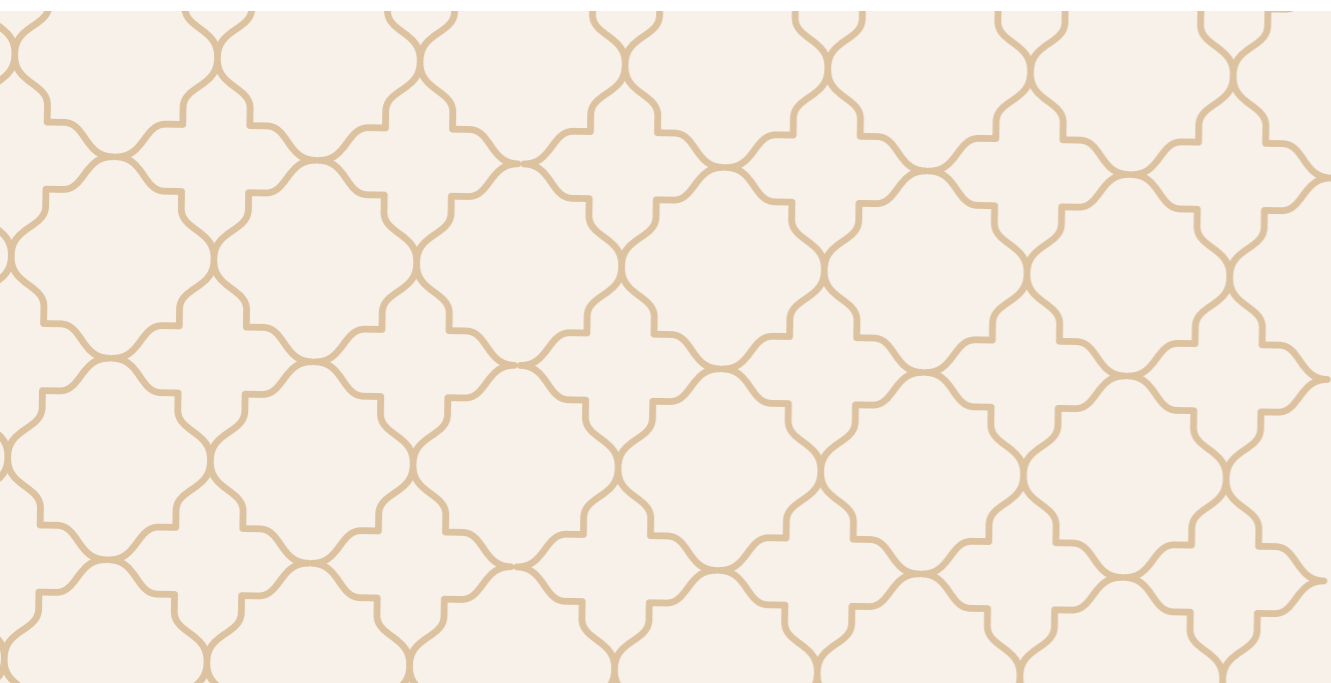
ESTIMATES FROM ABOVE ARE USED TO MODEL THREE SCENARIOS

SCENARIO 1: Status quo (traditional tobacco control). Current trends using WHO estimates. The WHO estimate of a 35% decline in global tobacco deaths from the peak of 10 million⁽³⁾ is used as the basis for calculating country-specific estimates.

SCENARIO 2: Tobacco control + Implementation of THR policies and availability of THR products. Trends that include THR uptake assuming that, as a group, they will lead to a 56% decline in tobacco deaths and will become available increasingly from 2035.

SCENARIO 3: Tobacco control + THR uptake + Improved access to diagnostics and treatment of tobacco-related diseases. Trends that include THR and better access and use of diagnostics and treatments (focused mainly on lung cancer, which killed an estimated 1.8 million people in 2020).⁴⁹

The differences between the WHO projections and those where THR alone, and THR with other measures were calculated assuming a linear relationship between lives saved over the decades. Figure 1, however, shows that this is more likely to follow an inverse S shape with deaths accelerating beyond 2040. The cumulative number of deaths is not significantly affected by using linear extrapolation.



NOTE ABOUT THE QUALITY AND AVAILABILITY OF DATA

The quality of evidence used to develop THR policy needs to be methodologically sound. Polarization within the field of tobacco and nicotine science threatens the integrity of research.⁵⁰ Recent reviews of epidemiological and toxicological research related to THR have highlighted a range of basic concerns about methods used.^{51, 52, 53, 54}

Common issues include unclear hypotheses or methods not appropriate to test stated hypotheses; unsupported claims of causality; not controlling for potential confounding variables; amounts of product exposure not standardized or specified; non-representative study participants; and not considering effects of participants' previous combustible tobacco use.

Laboratory studies testing new technologies (such as vaping and heated tobacco devices) often use poorly reported or non-reproducible methods, under conditions incompatible with real-world use. Some papers have been formally retracted. Unfortunately, critiques and retractions cannot stop sloppy or slanted science from being repeatedly cited and potentially misleading policy makers, physicians and consumers.

6. Lives Saved Across Seven Middle East Countries

Table 6 contains the output of the expert analysis to calculate the number of lives to be saved between 2020 and 2060 if THR and related measures are implemented. These numbers represent the additional gains, beyond those WHO estimates, that will occur because of the roll-out of MPOWER. They represent a significant number of premature deaths. Two scenarios are listed: the first includes accelerated access to THR products, while the second also includes better access to more effective NRTs and better access and treatment of lung cancer.

These numbers are indicative of what could happen if governments, health professionals, industry and consumers aligned on policies and actions. Failure to do so will leave the WHO projection in place. It was beyond this report to calculate the impact on disease and disability or the economic benefits of THR. That requires a separate, more detailed set of analyses ideally led by countries.

Note that there is growing body of evidence that shows that nicotine itself could well be beneficial for a range of neurological conditions^{55, 56}, of which Parkinson's Disease is a notable one. It is projected to have a major devastating impact across the Middle East over the next decades.⁵⁷ Better treatments are therefore a high priority. Of the lives saved using a background of no action, 50% will occur due to MPOWER strategies and an additional 50% due to THR, better cessation, and management of lung cancer.

Table 6: Smoking related deaths and lives saved 2020-2060 through tobacco harm reduction, better cessation, and lung cancer treatment.

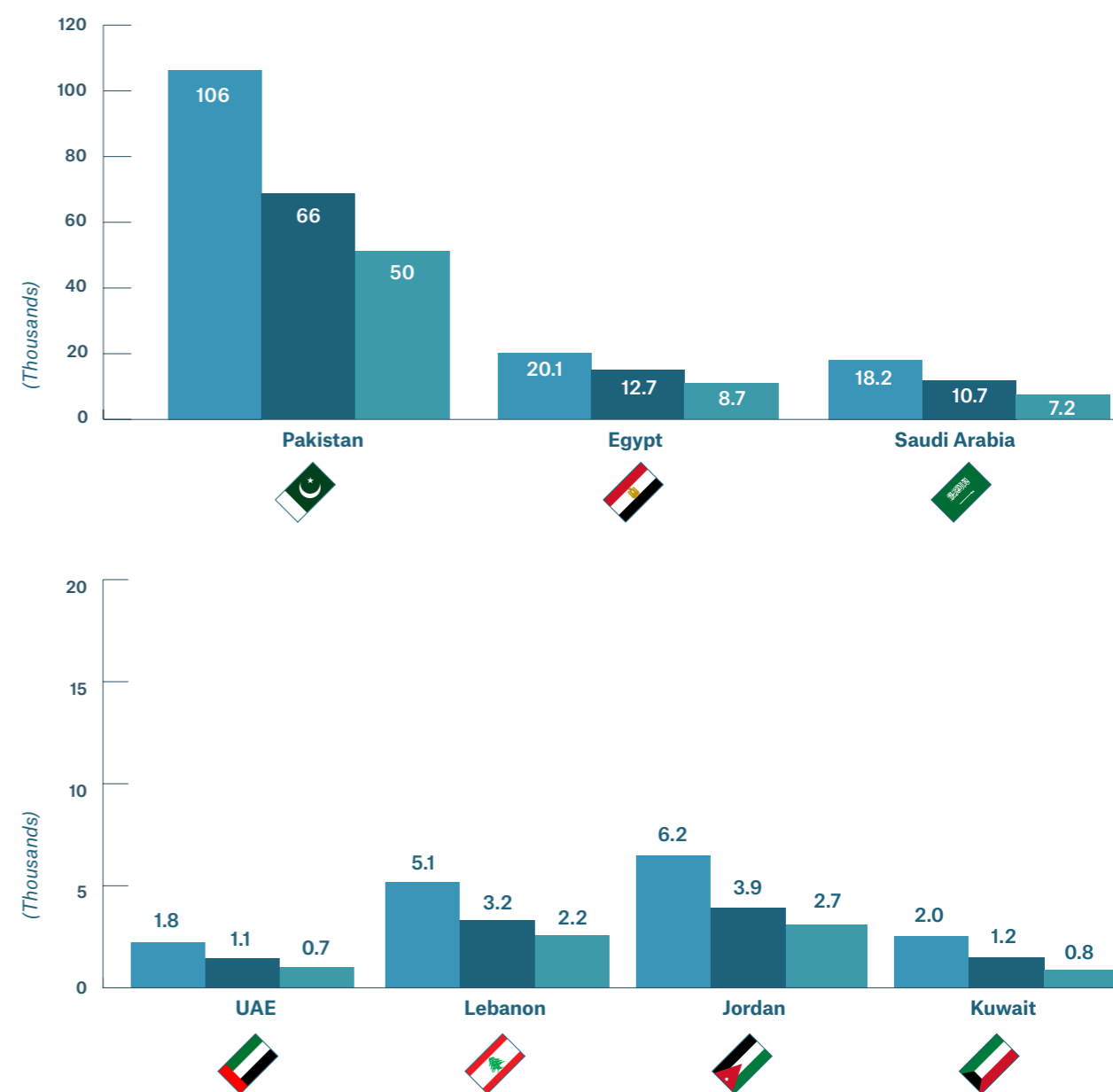
	 Pakistan	 Lebanon	 Egypt	 Jordan	 Kuwait	 Saudi Arabia	 UAE
Annual Deaths from Tobacco (Thousands)							
2019	163	7.8	32	9.5	3.0	28	2.9
2045 THR	114	5.5	22.4	6.6	2.0	18.7	1.9
2045 THR + Quit	76	3.9	15.7	4.6	1.4	13.1	1.3
2060 WHO projected deaths per year	106	5.1	20.1	6.2	2.0	18.2	1.8
2060 projected deaths adding THR	66	3.2	12.7	3.9	1.2	10.7	1.1
THR+better cessation and lung cancer treatment = Max	50	2.2	8.7	2.7	0.8	7.2	0.7
Lives Saved							
2020-2060 total deaths -THR	800,000	37,700	148,000	45,500	15,600	158,600	14,300
2020-2060 total deaths -THR plus cessation	1,200,000	58,000	228,000	70,000	24,000	220,000	22,000

Figure 2. Projected deaths from tobacco in 2060

This figure shows the number of tobacco deaths expected to occur in 2060 using three scenarios: WHO projections using FCTC and MPOWER measures; WHO projections adding THR products; and WHO projection adding THR, smoking cessation and, lung cancer innovations.

Scenarios

- 2060 WHO projected deaths per year
- 2060 WHO projected deaths adding THR
- THR+better cessation and lung cancer treatment = Max



7. What Actions are Needed if we are to Save Lives?

This study compliments and extends related studies of South Africa, Brazil, Kazakhstan, Bangladesh, and Pakistan (with Pakistan included here as well). Those five countries include a population of 674 million people, with 74.5 million adults who smoke. If they were to embrace THR, better cessation, and more effective treatment for lung cancer, we estimate that three million lives would be saved over the next decades. Note these are over and above lives to be saved by continuing with WHO's current programs alone.

KEY ACTIONS NEEDED INCLUDE:

- Activating physicians to communicate the benefits of THR to patients, to counter disinformation about nicotine, and to lead policy development.
- Governments continue to revise legislation to improve access to THR products and invest in national science and research to advance THR.
- Creating independent science-based nicotine consumer groups able to advocate for their needs.
- Supporting religious leaders to guide their communities to quit smoking and support tobacco harm reduction.

Activating physicians to counter disinformation about nicotine and the value of THR, to communicate the benefits of THR to patients in all clinical encounters, and to lead policy development by publishing a major report on the state of smoking and the role of THR in ending premature deaths and disease that draws on the approaches used 60 years ago by the Royal College of Physicians.

PHYSICIANS COMMUNICATE THE BENEFITS OF THR TO PATIENTS AND COUNTER DISINFORMATION

Physicians led in the early years of tobacco control in the UK and the USA. They were the subjects of the earliest cohorts that showed that smoking kills.⁵⁸ They galvanised reports⁵⁹ that led to the first government actions. Doctors quit in large numbers once they understood the evidence, though this varied by region.⁶⁰ They started cessation services for their patients, and they led the development of public health policies to end smoking.

It is time for an equivalent focus on THR in the Middle East. A new 16-country survey on trust and health,⁶¹ which included the UAE, found that physicians remain the most trusted source of information. Physicians can be at the forefront of accelerating the demise of smoking and reducing tobacco-related disease, disability, and death – if encouraged to communicate harm reduction strategies to their patients. This needs to start with correcting the massive extent of disinformation. In a 2022 survey of 15,335 physicians in 11 countries, 77% incorrectly believed that nicotine causes lung cancer.⁶² However, on average over 80% of physicians were at least moderately interested in receiving training in cessation and THR.⁶³

1.8
MILLION

1.8 million lives could be saved in seven Middle East countries

A total of 1.8 million lives could be saved in seven Middle East countries if tobacco harm reduction products were made widely available, if better cessation services were developed, and if better treatment for lung cancer was introduced over the next four decades.

This represents a major opportunity for these countries to improve the health of their populations.

Little information is available specific to physicians in Middle Eastern nations. A 2019 survey conducted in Egypt found physicians had high awareness of electronic cigarettes but viewed them less positively than did their patients.⁶⁴ Studies to identify the distinctive perceptions and educational interests of doctors in the region are needed.

The respected polling firm Ipsos recently surveyed nearly 27,000 cigarette smokers in 28 countries regarding their views of vaping.⁶⁵ Misinformation has spread to such an extent that only a quarter (on average) correctly perceived e-cigarettes as less harmful than smoking. In Saudi Arabia and the UAE, 79% and 77% respectively perceived vaping as equivalent or more harmful than combusted tobacco.

PHYSICIANS TACKLE MISSED OPPORTUNITIES FOR SECONDARY PREVENTION AMONG PATIENTS WHO SMOKE

Millions of people are diagnosed with conditions such as COPD, IHD, early stage cancer, stroke, other tobacco-related diseases, and schizophrenia every year across the Middle East. Over 70 percent of people with several of these conditions smoke at the point of diagnosis. A year or two after diagnosis, international research suggests that most still smoke. Tobacco cessation is either not attempted or fails. This accelerates clinical decline and substantially adds to the burden of disease and suffering experiences by patients. Physicians should review national data on this and implement programs that give high priority to cessation and access to harm reduction at every clinical encounter.

MEDICAL AND HEALTH EXPERTS DEVELOP A REGIONAL EQUIVALENT OF THE ROYAL COLLEGE OF PHYSICIANS REPORT ON E-CIGARETTES AND HARM REDUCTION

Over 60 years ago⁶⁶ the Royal College of Physicians published the first major report on the harm of smoking. Their voice over the decades has led policy development in the UK and around the world. Earlier this year they released their latest evidence review on e-cigarettes and harm reduction.⁶⁷ It is led by physicians and is meant to aid physicians in *“how e-cigarettes can be used to support more people to make quit attempts while discouraging young people and never-smokers from taking up e-cigarette use.”* An equivalent report for the Middle East that we led by prestigious medical societies and academies could galvanise needed action.

GOVERNMENTS CONTINUE TO REVISE LEGISLATION TO IMPROVE ACCESS TO THR PRODUCTS AND INVEST IN NATIONAL SCIENCE AND RESEARCH TO ADVANCE THR

A recent review⁶⁸ gives updated information on tobacco control legislation across the Middle East. It shows that the region has made progress on price and tax measures but ranks last among WHO regions in protecting people from exposure to tobacco smoke and in terms of regulating the content of tobacco products. The latter hampers scientific evaluation of the range of new tobacco harm reduction products available, and leaves governments dependent on US science and policy perspectives. The article also comments on the weakness of regional research on new products, on studies to assess health benefits and risks, and to address misinformation. The report does not provide information about tax and regulatory policies related to THR. We draw upon work prepared for this report by Tamarind Intelligence to address this.

An update on regulations related to Tobacco Harm Reduction (THR) products in the Middle East

by Barnaby Page ([Tamarind Intelligence](#)), June 2024.

One of the more remarkable stories related to THR in recent years has been the Middle East region’s adoption of e-cigarettes. Some places have adopted heated tobacco and nicotine pouches as well. Although there are exceptions – Iran, Oman and Qatar still ban e-cigarettes, for example – the region has generally gone against the global trend of tighter regulation. Instead, the Middle East has liberalised its approach, with many countries that once prohibited these products now allowing them. Nicotine pouches have generally remained unregulated, although snus is frequently banned.

Legislation differs by nation. For example, some countries require positive approval before products can be sold; others only require notification of products being placed on the market.

Heated tobacco tends to be regulated similarly to combustible tobacco, but regulation of vapour in the region is often influenced by the EU Tobacco Products Directive (TPD). GCC health ministers once leaned toward e-cigarette prohibition, but this has changed. A long-anticipated standard for e-cigarettes from the Gulf Cooperation Council (GCC), in development by the UAE since 2019, could form the foundation of future regulatory structures for the GCC and other Middle East countries.

The main markets for THR products in the Middle East are Egypt, Saudi Arabia, and the United Arab Emirates (UAE). Vapes are the dominant form, and disposables are making their presence felt. The emergence of regional e-liquid brands is noteworthy – and symbolic of the increasing maturity of a sector.

Tobacco Harm Reduction (THR) products in the Middle East



EGYPT

The dissonance in Egypt between health establishment scepticism and enthusiastic adoption by consumers — not to mention tax authorities — is typical of many Middle Eastern countries. This year, the ministry of health and the president's health adviser warned (online and in a TV interview) about health problems caused by e-cigarettes, and a senior official from the Egyptian Fatwa House said that from an Islamic point of view they should be used solely for smoking cessation.

Since its e-cigarette ban ended in 2021-2022, the Egyptian market has seen strong growth: up 43% between 2020 and 2023. There are now around 700,000 vapers, vape store chains are emerging, and local e-liquid brands have wide market presence. The heated tobacco market in Egypt also shows promising growth.

Further rules on e-cigarettes and heated tobacco seem likely, with the Egyptian Organization for Standards and Quality (EOS) drafting two regulations which we believe have a high chance of passing into law. We also anticipate that the Egyptian government will encourage local production of heated tobacco products. *(Note that Philip Morris International has acquired a 14.7% stake in Eastern Co., Egypt's largest cigarette manufacturer, with the stated goal of providing adult smokers in Egypt with alternatives to smoking).*⁶⁹



JORDAN

Jordan, which the World Health Organization (WHO) lauded last year as having achieved close to best practice in tobacco control despite having a male smoking rate of 56%, abandoned its total prohibition on novel nicotine products in 2019. The country imposes heavy taxes on both heated tobacco (150% on devices and consumables) and e-cigarettes (200%).



KUWAIT

Kuwait legalised the import and sale of both e-cigarettes and heated tobacco in 2016 and has no specific regulations on pouches. It also specifically included e-shisha when lifting the ban. However, Kuwait is stricter than many of its neighbours in at least one respect: a minimum purchase age of 21 for both vapour and heated tobacco.



LEBANON

In 2015, Lebanon repealed its e-cigarette ban and legalised heated tobacco. Nicotine pouches are not specifically regulated. Lebanon's regulations are less complex compared to rules of some Gulf states, and taxation is low by regional standards. Oral tobacco products are not banned as they are in many parts of the Middle East but are regulated similarly to combustibles.



PAKISTAN

Pakistan's tobacco laws focus on cigarettes, and do not cover novel nicotine products comprehensively. E-cigarettes are not subject to any specific regulation (general laws on consumer goods apply); nor are oral products, although some general provisions for tobacco products do apply to them. Nicotine pouches are unregulated.

Pakistan's laissez-faire attitude would seem to differ sharply from its neighbour, India, where official opposition to novel nicotine products is outspoken and laws are often draconian.



SAUDI ARABIA

In 2019, Saudi Arabia was one of several countries to lift its e-cigarette ban. At the same time, it enacted a comprehensive regulatory structure, largely based on the EU TPD. It also ended restrictions on heated tobacco, before further regulating both categories in 2021.

The country is considering imposing new ingredient restrictions and increasing taxation on heated tobacco. Saudi Arabia is also pursuing a Tobacco Endgame 2030 strategy that could see even higher taxes on all products. Saudi Arabia could also be affected if GCC standards emerge.

Oral products such as snus are banned. The legality of nicotine pouches is unclear. They do not fall under the scope of tobacco legislation, but Saudi customs has confirmed to us that it regards Lyft pouches as banned. A domestic product — DZRT, produced by the state-owned Badael — is advertised as being for smoking cessation.



UNITED ARAB EMIRATES

Both e-cigarettes and heated tobacco were legalised and regulated in the UAE in 2019. With high awareness and a large, affluent expatriate population, it has unsurprisingly been a fast-growing market for novel nicotine — it is one of the biggest Asian export destinations for Chinese e-cigarette manufacturers. We do not expect significant changes barring the potential arrival of GCC standards. As elsewhere in the region, oral tobacco products are illegal to sell (although snus can be imported for personal use), and pouches are essentially unregulated.

Barnaby Page, editorial director, Tamarind Intelligence

Based on research by the ECigIntelligence/TobaccoIntelligence analyst team

Governments in the Middle East have made important progress and should now consider regulating nicotine products proportionate to the risk they pose to health and in ways that maximise benefits and make healthier choices as easy as possible. Taxes should be substantially higher on deadly combustibles than on THR products.

Marketing bans and warnings should discourage use of combustibles by adults and children but provide information about benefits of THR to adult tobacco users. Access to combustibles and toxic smokeless products should be severely restricted, but THR products should be made widely accessible to adults. One under-appreciated benefit of THR is that the considerable costs of innovation, marketing and distribution are carried by the private sector.

GOVERNMENTS INVEST IN NATIONAL SCIENCE AND RESEARCH

Most publicly funded research on THR is carried out in the US and Europe and exported worldwide. Local investment in science and scientists has three effects: it ensures that locally relevant research is developed, it leads to the creation of local expertise, and building local expertise in science leads to better informed local policies and policy makers. This has been true in all successful areas of health and science. The good news is that there are academics deeply engaged in addressing tobacco control across the Middle East to build upon

CREATING INDEPENDENT SCIENCE-BASED CONSUMER GROUPS ABLE TO ADVOCATE FOR THEIR NEEDS

HIV/AIDS patients and advocates rallied for better policies under the banner of *“nothing about us, without us.”* This led to changes in government policies that included a commitment to harm reduction and led to better access to antiretrovirals. As a result, millions of people are living longer and healthier lives across LMICs. Similar progress could follow if we had effective new nicotine user groups around the world.

While there are many active nicotine user groups around the world, they have yet to galvanise into a movement with impact. Their advocacy to highlight that tobacco-related deaths can be prevented, according to this study, is a much-needed element.

A report from the Global State of Tobacco Harm Reduction identified 54 consumer advocacy groups⁷⁰ operating around the world. None of the groups were identified in the Middle East.

However, an effective tobacco harm reduction groups has been developed in Tunisia: STTACA or the Tunisian Society of Tabacology and Addictive Behaviours. It is part of SCOHRE, the International Association on Smoking Control and Harm Reduction.⁷¹ They are science based, include leading local physicians, and highlight the value of working closely across many fields of harm reduction. Countries covered here would do well to learn from their progress as they build their programs.

SUPPORTING RELIGIOUS LEADERS TO GUIDE THEIR COMMUNITIES TO QUIT SMOKING AND SUPPORT TOBACCO HARM REDUCTION

It is time to revisit and update the way Islamic scholars and leaders could support an acceleration of the need to end deaths from tobacco. This is especially important across the Middle East where religious leaders play a vital role in promoting health.



The first and only WHO meeting on religion and tobacco was held in 1999.⁷² The meeting was chaired by Dr M.H. Khayat, then Deputy Regional Director for the Eastern Mediterranean. The meeting acknowledged the powerful role religious leaders play in providing health advice to their communities. Of course, a quarter-century ago, there were no tobacco harm reduction options. Given that tobacco use had not spread across the world when Islam was founded, religious scholars have had to interpret texts regarding how smoking (and more recently, vaping) fits or clashes with doctrines.

Until the early 20th century, according to an article in the BMJ,⁷³ most Muslim jurists did not believe that smoking had any negative health effects. Some thought it might even aid digestion or reduce stress. As evidence of health risks increased, smoking became discouraged (mukrooh). Some scholars and institutions went further and declared smoking to be prohibited (haram).

Some published studies have considered how smoking cessation might be enhanced during Ramadan. Many Muslims perceived quitting smoking to be easier during Ramadan, when both religion and culture discourage smoking during the daytime fast, both in public and at home.⁷⁴

Two recent studies looked favourably at e-cigarette use for this purpose during Ramadan. One looked at vaping preferences and reasons for using e-cigarettes in the United Arab Emirates.⁷⁵ A majority reported starting vaping to quit smoking. Over half reported no withdrawal symptoms during the Ramadan fasting time.

The second study had a similar focus and findings but took place in Jordan.⁷⁶ It noted that *“Ramadan offers a good opportunity for smokers to quit, as the reported physical and psychological e-cigarette withdrawal symptoms were found to be relatively weak.”* In both studies, e-cigarettes were accurately perceived as less risky than smoking.

Acknowledgments

AUTHORS OF THIS REPORT:

Derek Yach, Cheryl Olson, Delon Human, and Karl Fagerstrom.

THE INTERNATIONAL EXPERT GROUP WHO DEVELOPED THE ASSUMPTIONS AND METHODS USED IN THE "SAVE LIVES" REPORTS ARE THANKS:

Abbas Raza, Kgosi Letlape, Mihaela Raescu, Anders Milton, Diego Verrastro, Heino Stover, Anoop Misra, Hiroya Kumamaru.

PREVIOUS REPORTS:

Lives Saved: Integrating Harm Reduction for Tobacco Control in Brazil

Lives Saved: Tobacco Control & Harm Reduction in LMICs

Available at tobaccoharmreduction.net

References

- ¹ WHO global report on trends in prevalence of tobacco use 2000-2025, fourth edition <https://www.who.int/publications/i/item/9789240039322>
- ² WHO report on the global tobacco epidemic, 2023: Protect people from tobacco smoke. <https://www.who.int/teams/health-promotion/tobacco-control/global-tobacco-report-2023>
- ³ The International Commission to Reignite the Fight Against Smoking. Commission report: Reignite the fight against smoking. Available from: https://www.fightagainstmoking.org/wp-content/uploads/2021/10/Updated-Commission-Report_9.29.21.pdf
- ⁴ Fouad H, Commar A, Hamadeh RR et al. Smoking prevalence in the Eastern Mediterranean Region. *Eastern Mediterranean Health Journal*. 2020;26:1. <https://www.emro.who.int/emhj-volume-26-2020/volume-26-issue-1/smoking-prevalence-in-the-eastern-mediterranean-region.html>
- ⁵ Balfour DJK, Benowitz NL, Colby SM et al. Balancing consideration of the risks and benefits of e-cigarettes. *American Journal of Public Health*. 2021;111:1661-1672. <https://doi.org/10.2105/AJPH.2021.306416>
- ⁶ World Health Organization. Lung cancer: Key facts. 2023; Jun 26. <https://www.who.int/news-room/fact-sheets/detail/lung-cancer>
- ⁷ World Health Organization FCTC. COP10 adopted historic decisions to protect the environment from the harms of tobacco and to address cross-border tobacco advertising, promotion and sponsorship and the depiction of tobacco in entertainment media [News release]. 2024 Feb. 10. <https://fctc.who.int/newsroom/news/item/10-02-2024-cop10-adopted-historic-decisions-to-protect-the-environment-from-the-harms-of-tobacco-and-to-address-cross-border-tobacco-advertising-promotion-and-sponsorship-and-the-depiction-of-tobacco-in-entertainment-media>
- ⁸ Transcript of COP10 opening session. At: <https://copwatch.info/storage/2024/02/COP10-opening-session-transcription.pdf>
- ⁹ Yach D, Glover M, Human D et al. COP10 scorecard: Measuring progress in achieving the objectives of the FCTC. 2024 Jan. Report available at Tobacco Harm Reduction.net. <https://media.thr.net/strapi/12592c1201d0aa86e70733eb62024ca0.pdf>
- ¹⁰ Patwardhan S, Rose JE. Overcoming barriers to disseminate effective smoking cessation treatments globally. *Drugs and Alcohol Today*. 2020;20(3):235-247. <https://doi.org/10.1108/DAT-01-2020-0001>
- ¹¹ US Food and Drug Administration. The relative risks of tobacco products. (Current as of 4/16/2024.) <https://www.fda.gov/tobacco-products/health-effects-tobacco-use/relative-risks-tobacco-products>
- ¹² Hatsukami D, Carroll DM. Tobacco harm reduction: Past history, current controversies and a proposed approach for the future. *Preventive Medicine*. 2020;140:106099. <https://doi.org/10.1016/j.ypmed.2020.106099>
- ¹³ O'Leary R, Polosa R. Tobacco harm reduction in the 21st century. *Drugs and Alcohol Today*. 2020;20(3):219-234. <https://doi.org/10.1108/DAT-02-2020-0007>
- ¹⁴ Duncan G. Charcoal-free shisha to launch globally as demand for clean smoking products rises. *The National*. 2023 July 21. <https://www.thenationalnews.com/world/uk-news/2023/07/21/charcoal-free-shisha-to-launch-globally-as-demand-for-clean-smoking-products-rises/>
- ¹⁵ Elsayed Y, Dalibalta S, Abu-Farha N. Chemical analysis and potential risks of hookah charcoal. *Science of the Total Environment*. 2016;262:262-268. <https://doi.org/10.1016/j.scitotenv.2016.06.108>
- ¹⁶ Cho ER, Brill IK, Gram IT, Brown PE, Jha P. Smoking cessation and short- and longer-term mortality. *NEJM Evidence*. 2024;3(3). DOI: 10.1056/EVIDoa2300272
- ¹⁷ Park E, Kang HY, Lim MK et al. Cancer risk following smoking cessation in Korea. *JAMA Network Open*. 2024;7(2):e2354958. doi:10.1001/jamanetworkopen.2023.54958
- ¹⁸ Beaglehole R, Bonita R. Harnessing tobacco harm reduction. *The Lancet*. 2024; Feb. 1. [https://doi.org/10.1016/S0140-6736\(24\)00140-5](https://doi.org/10.1016/S0140-6736(24)00140-5)
- ¹⁹ Rigotti NA. Electronic cigarettes for smoking cessation: Have we reached a tipping point? *NEJM*. 2024;390(7):664-665. DOI: 10.1056/NEJMe2314977
- ²⁰ Lindson N, Butler AR, McRobbie H, et al. Electronic cigarettes for smoking cessation. *Cochrane Database of Systematic Reviews*. 2024 January 08. <https://doi.org/10.1002/14651858.CD010216.pub8>
- ²¹ US Food and Drug Administration. Modified risk granted orders. (Current as of 3/16/2023.) <https://www.fda.gov/tobacco-products/advertising-and-promotion/modified-risk-granted-orders>
- ²² Fagerstrom K. Can alternative nicotine products put the final nail in the smoking coffin? *Harm Reduction Journal* 2022;19:131. <https://doi.org/10.1016/j.ypmed.2020.106099>
- ²³ Azzopardi D, Haswell LE, Frosina J et al. Assessment of biomarkers of exposure and potential harm, and physiological and subjective health measures in exclusive users of nicotine pouches and current, former and never smokers. *Biomarkers*. 28(1):118-129. <https://doi.org/10.1080/1354750X.2022.2148747>

References continued

- ²⁴ Yach D, Scherer G. Applications of biomarkers of exposure and biological effects in users of new generation tobacco and nicotine products: Tentative proposals. *Drug Testing and Analysis*. 2023;15(10):1127-1132. <https://doi.org/10.1002/dta.3567>
- ²⁵ Lüdicke F, Ansari SM, Lama N et al. Effects of switching to a heat-not-burn tobacco product on biologically relevant biomarkers to assess a candidate modified risk tobacco product: A randomized trial. *Cancer Epidemiology, Biomarkers and Prevention*. 2019;28(11): 1934-1943. <https://doi.org/10.1158/1055-9965.EPI-18-0915>
- ²⁶ Miles I, Saritas O, Sokolov A. *Foresight For Science, Technology and Innovation*. Switzerland: Springer Cham, 2016. <https://link.springer.com/book/10.1007/978-3-319-32574-3>
- ²⁷ Nasser AMA, Geng Y, Al-Wesabi SA. The prevalence of smoking (cigarette and waterpipe) among university students in some Arab countries: A systematic review. *Asian Pacific Journal of Cancer Prevention*. 2020;21(3):583-591. doi: 10.31557/APJCP.2020.21.3.583
- ²⁸ Vupputuri S, Hajat C, Al-Houqani M et al. Midwakh/dokha tobacco use in the Middle East: much to learn. *Tobacco Control*. 2013;25(2). <https://doi.org/10.1136/tobaccocontrol-2013-051530>
- ²⁹ Ward KD, Hammal F, VanderWeg MW et al. Are waterpipe users interested in quitting? *Nicotine & Tobacco Research*. 2005;7(1):149-156. <https://doi.org/10.1080/14622200412331328402>
- ³⁰ Hawash M, Mosleh R, Jarrar Y, Hanani A, Hajyousef Y. The prevalence of water pipe smoking and perceptions on its addiction among university students in Palestine, Jordan, and Turkey. *Asian Pacific Journal of Cancer Prevention*. 2022;23(4):1247-1256. doi: 10.31557/APJCP.2022.23.4.1247
- ³¹ Hamadeh RR, Lee J, Abu-Rmeileh NME, et al. Gender differences in waterpipe tobacco smoking among university students in four Eastern Mediterranean countries. *Tobacco Induced Diseases*. 2020;18:100. doi: 10.18332/tid/129266
- ³² Ahmed LA, Verlinden M, Alobeidli MA et al. Patterns of tobacco smoking and nicotine vaping among university students in the United Arab Emirates: A cross-sectional study. *International Journal of Environmental Research and Public Health*. 2021;18(14):7652. <https://doi.org/10.3390/ijerph18147652>
- ³³ Samara F, Alam IA, ElSayed Y. Midwakh: Assessment of levels of carcinogenic polycyclic aromatic hydrocarbons and nicotine in dokha tobacco smoke. *Journal of Analytical Toxicology*. 2022;46(3):295-302. DOI: 10.1093/jat/bkab012
- ³⁴ Raj AT, Patil S, Sarode SC, Sarode GS. Systematic reviews and meta-analyses of smokeless tobacco products should include shammah. *Nicotine and Tobacco Research*. 2019. 21(8):1147. <https://doi.org/10.1093/ntr/nty144>
- ³⁵ Khalid A, Alhazmi HA, Abdalla AN et al. GC-MS analysis and cytotoxicity evaluation of shammah (smokeless tobacco) samples of Jazan region of Saudi Arabia as promoter of cancer cell proliferation. *Journal of Chemistry*. 2019:3254836. <https://doi.org/10.1155/2019/3254836>
- ³⁶ Alhuneafat L, Al Ta'ani O, Jabri A et al. Cardiovascular disease burden in the Middle East and North Africa region. *Current Problems in Cardiology*. 2024;49(3):102341. doi: 10.1016/j.cpcardiol.2023.102341
- ³⁷ Gallucci G, Tartarone A, Lerose R et al. Cardiovascular risk of smoking and benefits of smoking cessation. *Journal of Thoracic Disease*. 2020;12(7):3866-3876. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7399440/>
- ³⁸ Gehani AA, Al-Hinai AT, Zubaid M et al. Association of risk factors with acute myocardial infarction in Middle Eastern countries: the INTERHEART Middle East study. *European Journal of Preventive Cardiology*. 2014;21(4):400-410. doi: 10.1177/2047487312465525
- ³⁹ Feizi H, Alizadeh M, Nejadghaderi SA et al. The burden of chronic obstructive pulmonary disease and its attributable risk factors in the Middle East and North Africa region, 1990–2019. *Respiratory Research*. 2022;23:319. <https://doi.org/10.1186/s12931-022-02242-z>
- ⁴⁰ Economic and Social Commission for Western Asia/League of Arab States. Air quality and atmospheric pollution in the Arab region [draft report]. Accessed 10 May 2024. https://www.un.org/esa/sustdev/csd/csd14/escwaRIM_bp1.pdf?t
- ⁴¹ State of Global Air initiative: PM2.5 exposure. <https://www.stateofglobalair.org/air/pm#hot-spots>
- ⁴² Roche C. The future of cancer care: health system sustainability in the Middle East and North Africa (MENA). *Economist Impact whitepaper*. 2023;Aug.14. <https://impact.economist.com/perspectives/health/future-cancer-care-MENA>
- ⁴³ Cheema S, Maisonneuve P, Mamtani R et al. Influence of age on 2040 cancer burden in the older population of the Gulf Cooperation Council (GCC) countries: Public health implications. *Cancer Control*. 2021. <https://doi.org/10.1177/10732748211027158>
- ⁴⁴ Feigin VL, Norrving B, George MG et al. Prevention of stroke: A strategic global imperative. *Nature Reviews Neurology*. 2016;12(9):501-512. doi: 10.1038/nrneurol.2016.107
- ⁴⁵ GBD 2019 North Africa and the Middle East Neurology Collaborators. The burden of neurological conditions in north Africa and the Middle East, 1990–2019: a systematic analysis of the Global Burden of Disease Study 2019. *The Lancet Global Health*. 2024 April 8. [https://doi.org/10.1016/S2214-109X\(24\)00093-7](https://doi.org/10.1016/S2214-109X(24)00093-7)
- ⁴⁶ World Health Organization. The MPOWER measures. [Accessed 10 May 2024] <https://www.who.int/initiatives/mpower>
- ⁴⁷ Fagerstrom K. Can alternative nicotine products put the final nail in the smoking coffin? *Harm Reduction Journal* 2022;19:131. <https://doi.org/10.1016/j.yjmed.2020.106099>
- ⁴⁸ Rosen LJ, Galili T, Kott J, Rees V. Beyond “safe and effective”: The urgent need for high-impact smoking cessation medications. *Preventive Medicine*. 2021;150:106567. <https://doi.org/10.1016/j.yjmed.2021.106567>
- ⁴⁹ Sung H, Ferlay F, Siegel RL et al. Global Cancer Statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians*. 2021;71(3):209-249. <https://doi.org/10.3322/caac.21660>
- ⁵⁰ Carroll DM, Denlinger-Apte RL, Dermody SS et al. Polarization within the field of tobacco and nicotine science and its potential impact on trainees. *Nicotine and Tobacco Research*. 2021;36-39. <https://doi.org/10.1093/ntr/ntaa148>
- ⁵¹ Hajat C, Stein E, Selya A et al. Analysis of common methodological flaws in the highest cited e-cigarette epidemiology research. *Internal and Emergency Medicine*. 2022;17(3):887-909. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9018638/>
- ⁵² Hajat C, Stein E, Ramstrom L. et al. The health impact of smokeless tobacco products: a systematic review. *Harm Reduction Journal*. 2021;18:123. <https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/34863207/>
- ⁵³ Polosa R, Farsalinos K. A tale of flawed e-cigarette research undetected by defective peer review process. *Internal and Emergency Medicine*. 2023;18:973-975. <https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/38133348/>
- ⁵⁴ Sussman RA, Sipala R, Emma R, Ronsisvalle S. Aerosol emissions from heated tobacco products: A review focusing on carbonyls, analytical methods, and experimental quality. *Toxics*. 2023;11(12):947. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10747376/>
- ⁵⁵ Gjedde A. Nicotine and its derivatives in disorders of cognition: a challenging new topic of study. *Frontiers in Neuroscience*. 2023;17:1252705. doi: 10.3389/fnins.2023.1252705
- ⁵⁶ Alhowail A. Molecular insights into the benefits of nicotine on memory and cognition (review). *Molecular Medicine Reports*. 2021;23(6):398. doi: 10.3892/mmr.2021.12037
- ⁵⁷ Safiri S, Noori M, Nejadghaderi SA et al. The burden of Parkinson’s disease in the Middle East and North Africa region, 1990–2019: results from the global burden of disease study 2019. *BMC Public Health*. 2023;23:107. <https://doi.org/10.1186/s12889-023-15018-x>
- ⁵⁸ Doll R, Peto R, Boreham J, et al. Mortality in relation to smoking: 50 years’ observations on male British doctors. *BMJ*. 2004;328:1519. <https://doi.org/10.1136/bmj.38142.554479.AE>
- ⁵⁹ National Library of Medicine Profiles in Science. Reports of the Surgeon General: The 1964 Report on Smoking and Health. [Accessed 10 May 2024]. <https://profiles.nlm.nih.gov/spotlight/nn/feature/smoking>
- ⁶⁰ Smith DR, Leggat PA. An international review of tobacco smoking in the medical profession: 1974–2004. *BMC Public Health*. 2007;7:115. <http://www.biomedcentral.com/1471-2458/7/115>
- ⁶¹ Edelman Trust Institute. 2024 Edelman Trust Barometer special report: Trust and health. <https://www.edelman.com/trust/2024/trust-barometer/special-report-health>
- ⁶² Foundation for a Smoke-Free World. Doctors’ Survey findings [edited 2023 Sept. 5]. <https://globalactiontoendsmoking.org/research/global-polls-and-surveys/doctors-survey/>
- ⁶³ Australian Associated Press. Nearly 80% of doctors worldwide mistakenly believe nicotine causes lung cancer, thwarting efforts to help one billion smokers quit. 2023;July 20. <https://www.aap.com.au/aapreleases/cision20230719ae61922/>
- ⁶⁴ Dwedat I, Ruby D, Mostafa A. A survey exploring knowledge and beliefs about electronic cigarettes between health care providers and the general population in Egypt. *International Journal of Chronic Obstructive Pulmonary Disease*. 2019;14:1943-1950. <https://doi.org/10.2147/COPD.S214389>
- ⁶⁵ We Are Innovation. Innovation under fire: A global alert on the misperception epidemic in vaping views (Ipsos survey report). [Accessed 10 May 2024.] <https://weareinnovation.global/documents/wai-ipsos-innovation-misperception-epidemic.pdf>
- ⁶⁶ Royal College of Physicians. Smoking and health. 1962. <https://www.rcp.ac.uk/improving-care/resources/smoking-and-health-1962/>

References continued

⁶⁷ Royal College of Physicians. **E-cigarettes and harm reduction: An evidence review. 2024;April 18.** <https://www.rcp.ac.uk/policy-and-campaigns/policy-documents/e-cigarettes-and-harm-reduction-an-evidence-review/>

⁶⁸ Abu-Rmeileh NME, Khader YS, Rahim HA et al. **Tobacco control in the Eastern Mediterranean region: implementation progress and persisting challenges. Tobacco Control. 2022;31(2):150-152.** <https://doi.org/10.1136/tobaccocontrol-2021-056539>

⁶⁹ Tobacco Reporter website. **PMI acquires minority stake in Eastern Co. 22 May 2024.** <https://tobaccoreporter.com/2024/05/22/pmi-acquires-minority-stake-in-eastern-co/>

⁷⁰ GSTHR. **Tobacco harm reduction consumer advocacy organisations (briefing paper). 2023;Nov.** <https://gsth.org/resources/briefing-papers/consumer-advocacy-organisations/consumer-advocacy-organisations/>

⁷¹ SCOHRE website. <https://www.scohre.org/ambassadors/tunisia/>

⁷² WHO meeting on religion and tobacco. **May 3, 1999. WHO, Geneva WHO/NCD/TFI/99.2**

⁷³ Ghouri N, Atcha M, Sheikh A. **Influence of Islam on smoking among Muslims. BMJ. 2005;332:291.** <https://doi.org/10.1136/bmj.332.7536.291>

⁷⁴ Majid ABA, Johari LH, Nasir AM et al. **Religious beliefs in relation to smoking: A cross-sectional study among Muslim males in the month of Ramadan. Malaysian Journal of Public Health Medicine. 2002;2(2):32-35.** <https://doi.org/10.37268/mjphm/vol.2/no.2/art.1242>

⁷⁵ Barakat M, Jirjees F, Al-Tammemi AB et al. **The era of e-cigarettes: A cross-sectional study of vaping preferences, reasons for use and withdrawal symptoms among current e-cigarette users in the United Arab Emirates. Journal of Community Health. 2021;46:876-886.** <https://link.springer.com/article/10.1007/s10900-021-00967-4>

⁷⁶ Barakat MM, Al-Qudah RA, Alfayoumi I et al. **Electronic cigarettes' withdrawal severity symptoms among users during intermittent fasting: a cross-sectional study. Addiction Science & Clinical Practice. 2021;16:10.** <https://doi.org/10.1186/s13722-021-00219-9>

Enquiries about the report to be directed to;

DEREK YACH MBCHB MPH
derek@globalhealthconsults.net

Global Health Consults LLC,
205 Wakeman Lane,
Southport,
CT 06890
USA.