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# Waterpipe tobacco smoking legislation and policy enactment: a global analysis

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## ABSTRACT

**Objective** (1) To review how current global tobacco control policies address regulation of waterpipe tobacco smoking (WTS). (2) To identify features associated with enactment and enforcement of WTS legislation.

**Data Sources** (1) Legislations compiled by Tobacco Control Laws ([www.tobaccocontrollaws.org](http://www.tobaccocontrollaws.org)). (2) Weekly news articles by 'Google Alerts' ([www.google.com/alerts](http://www.google.com/alerts)) from July 2013 to August 2014.

**Study Selection** (1) Countries containing legislative reviews, written by legal experts, were included. Countries prohibiting tobacco sales were excluded. (2) News articles discussing aspects of the WHO FCTC were included. News articles related to electronic-waterpipe, crime, smuggling, opinion pieces or brief mentions of WTS were excluded.

**Data Abstraction** (1) Two reviewers independently abstracted the definition of "tobacco product" and/or "smoking". Four tobacco control domains (smokefree law, misleading descriptors, health warning labels and advertising/promotion/sponsorship) were assigned one of four categories based on the degree to which WTS had specific legislation. (2) Two investigators independently assigned at least one theme and associated subtheme to each news article.

**Data Synthesis** (1) Reviewed legislations of 62 countries showed that most do not address WTS regulation but instead rely on generic tobacco/smoking definitions to cover all tobacco products. Where WTS was specifically addressed, no additional legislative guidance accounted for the unique way it is smoked, except for in one country specifying health warnings on waterpipe apparatuses (2) News articles mainly reported on noncompliance with public smoking bans, especially in India, Pakistan and the UK.

**Conclusions** A regulatory framework evaluated for effectiveness and tailored for the specificities of WTS needs to be developed.

## INTRODUCTION

Current tobacco control policy frameworks, including the WHO Framework Convention on Tobacco Control (WHO FCTC), are largely based on evidence derived from cigarette policy effectiveness.<sup>1</sup> While such frameworks may support regulation of other tobacco products, global increases in their prevalence, particularly waterpipe tobacco smoking (WTS),<sup>2</sup> has posed several challenges.<sup>3</sup> A major challenge to WTS regulation is the proliferation of producers, importers and manufacturers of waterpipe tobacco and accessories. This is in stark contrast to cigarettes, where the industry is dominated by a handful of multinational companies.<sup>4</sup> WTS also exhibits unique differential features to cigarette smoking, such as the use of charcoal briquettes, a large apparatus and hose available in variety of

sizes, and a wide array of tobacco flavours and packaging modes, which may require an alternative regulatory mechanism to complement the current suggested framework prescribed by the WHO FCTC.<sup>5</sup>

In addition to the need for waterpipe specific legislation to address these unique challenges, existing laws need to be strengthened and revised to appropriately address waterpipe tobacco use. In the case of health warning labels, current tobacco control policy frameworks may not specify whether health warning labels should be applied to water pipe apparatuses and other accessories, and if they do, guidance lacks on their practical application.<sup>6</sup> This is particularly important considering that those who smoke at the waterpipe-serving premises do not routinely view waterpipe tobacco packages; instead, they are presented only with a waterpipe apparatus.<sup>6</sup> Even so, health warning labels on existing waterpipe tobacco packets contain a variety of deliberately misleading features,<sup>7</sup> including incorrect ingredients labelling,<sup>8</sup> and do not conform with guidelines suggested by the WHO FCTC.<sup>9</sup> Matters are further complicated by the production of harmful waterpipe tobacco substitutes (dubbed 'herbal' or 'non-tobacco'), which may be exempt from tobacco control laws, but are sold and consumed alongside waterpipe tobacco from which it could be indistinguishable.<sup>10</sup>

With regards to indoor smoking bans, WTS exemptions are common in current tobacco control policy frameworks. In the USA, many large cities have smoke-free laws applicable to cigarette smoking but not to WTS, due to the fact that waterpipe-serving premises are classified as tobacco retail shops (in a similar fashion to pipe or cigar retail shops).<sup>11</sup> This is despite the quality of air inside waterpipe-serving premises being as detrimental as in the areas where cigarette smoking was permitted.<sup>12 13</sup> In the European Union, recently passed bans on flavoured tobacco, due for national implementation by mid-2016, will be specific to manufactured and hand-rolled cigarettes, and WTS is exempt.<sup>14</sup> In the USA, the Food and Drug Administration (FDA) Family Smoking Prevention and Tobacco Control Act specifies a section banning flavoured cigarettes but does not mention waterpipe tobacco.<sup>15</sup> This is particularly worrisome as flavour is a major motive for initiation and maintenance of tobacco, especially among younger users.<sup>16–18</sup>

In addition, little is known about taxation and the bans on advertising and promotion of waterpipe tobacco and its related accessories; two effective tobacco control measures are also prescribed by the FCTC. In fact in the USA, for example, waterpipe tobacco is taxed at a lower rate than cigarette



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tobacco,<sup>19</sup> and waterpipe tobacco advertising and promotion is generally unregulated.<sup>7 20 21</sup>

Despite these concerns, no studies to date have attempted to describe the legislative framework available to regulate WTS and the difficulties associated with its enactment. Local, anecdotal reports suggest WTS legislation enactment and enforcement is dogged by unclear interpretation of the law and potential loopholes.<sup>6 10 22</sup> In an attempt to understand the current state, we undertook a review to identify how WTS is addressed in current tobacco control frameworks globally and features associated with its enactment and enforcement.

## METHODS

Two sources of data were used: (1) legislation compiled by the website Tobacco Control Laws (<http://www.tobaccocontrollaws.org>), and (2) news articles received by email from the internet content retrieving service ‘Google Alerts’ (<http://www.google.com/alerts>). Both methods will be described in detail below.

### WTS legislation

We systematically reviewed the legislation content of the website Tobacco Control Laws, a project of the International Legal Consortium of the Campaign for Tobacco-free Kids. Details of this project can be found on its’ website. Briefly, the project provides public access to all tobacco control legislation documents from 193 countries or regions (which we will simply refer to as ‘countries’). Legislation reviews, written by legal advisors in collaboration with in-country lawyers if possible, determine the extent to which legislation complies with the WHO FCTC<sup>5</sup> framework in three key tobacco control domains: smoke-free law (FCTC article 8), tobacco advertising, promotion and sponsorship (FCTC article 13) and tobacco packaging and labelling (FCTC article 11). Legislative reviews are only available for selected countries.

### Eligibility criteria

We included countries that only had legislative reviews (n=63). The presence of legislative reviews enabled triangulation between our findings and the findings of legal attorneys working for the Tobacco Control Laws project. We felt this was an important component of our study due to our lack of formal legal expertise. No information is provided on how countries are selected for legislative review. We excluded countries where tobacco sales were prohibited (n=1).

**Table 1** Examples of each category based on our coding framework

Category	Definition	Example
Generic	Waterpipe tobacco is entirely on par with cigarettes by virtue of a generic definition of ‘tobacco product’ or ‘smoking’	“Means a product consisting wholly or partly of tobacco whether genetically modified or not and intended to be smoked snuffed, sucked or chewed” (England 2002 No 3041 consumer protection)
Defined	Waterpipe tobacco is entirely on par with cigarettes by virtue of a definition of ‘tobacco product’ or ‘smoking’ which makes reference to waterpipe tobacco	“tobacco products shall be understood as cigarettes, cigars, tobacco, chopped tobacco, hookah or waterpipes, tobacco leaf extracts and other products of similar use, prepared entirely or in part by using tobacco leaves as raw material and which are designed to be smoked, inhaled, sucked, chewed or used as snuff. It also includes electronic nicotine delivery systems” (Ecuador- TC Regs)
Waterpipe-specific	At least part of the law is specific to waterpipe tobacco	“The list of health warnings concerning the fatal and harmful effects of waterpipes includes the following sentences.....” (Lebanon-Decree 8991)
Cigarette-specific	At least part of the law is specific to a tobacco product(s), usually cigarettes, and does not include waterpipe tobacco	Every single package of cigarettes to be sold in Poland should contain the following information printed clearly, legibly and permanently (1) at least two different warnings against the adverse effects of tobacco use; one of which is of general character.... (Poland—Act 9.11.1995 as amended)

### Search strategy

Two reviewers independently read each country’s legislative review for the three tobacco control domains and also read each country’s individual legislation documents pertaining to each of the three domains, searching for synonyms of waterpipe (‘shisha’, ‘hookah’, ‘narghile’, ‘bubble-bubble’, ‘goza’).

### Data abstraction

The two reviewers independently abstracted data using a pilot-tested spreadsheet, resolving disagreements by consulting a third reviewer. We first collected data on each country’s definition of ‘tobacco product’ and/or of ‘smoking’ (if applicable), noting any mention of WTS. We did not consider ‘pipe smoking’ to be synonymous with WTS throughout the study.

We then collected data which described how waterpipe was addressed in each country’s legislation. A variety of laws were associated with the domain ‘tobacco packaging and labelling’. So we divided this into two domains: health warning labels and misleading descriptors. In addition to smoke-free law and tobacco advertising, promotion and sponsorship, this resulted in the use of four domains in total.

Each domain was assigned one of the following categories: generic (waterpipe tobacco is entirely on par with cigarettes by virtue of a generic definition of ‘tobacco product’ or ‘smoking’); defined (waterpipe tobacco is entirely on par with cigarettes by virtue of a definition of ‘tobacco product’ or ‘smoking’ which makes a reference to waterpipe tobacco); cigarette-specific (at least part of the law is specific to a tobacco product(s), usually cigarettes, and does not include waterpipe tobacco); waterpipe-specific (at least part of the law is specific to waterpipe) or no law present. **Table 1** gives examples of each category.

### Data analysis

We undertook a narrative synthesis to provide globally pooled results and to provide examples of countries with laws different to the majority.

### Enactment and enforcement of WTS legislation

#### Eligibility criteria

We used the automatic internet content retrieving service ‘Google Alerts’ (<http://www.google.com/alerts>) to receive news articles by email. We included news articles relating to any aspect of WHO FCTC and excluded articles relating to electronic waterpipe products as they appear to be electronic cigarettes rather than waterpipe products.<sup>23</sup> We excluded news

## Supplement

articles that reported on crime, smuggling of waterpipe tobacco or where waterpipe was mentioned only in passing. We also excluded duplicate stories, articles that could not be accessed in full and opinion articles.

### Search strategy

The 'Google Alerts' service was implemented using common synonyms and various spellings of the word 'waterpipe' (arghile, hookah, hubble bubble, narghile, shisha). Search terms were based on known synonyms of WTS based on recent systematic reviews of the topic.<sup>2</sup> We ran the service from 9 July 2013 to 15 August 2014, receiving weekly emails.

### Selection process and theme development

Each email contained a list of recent news headlines with its URL, and each headline was accompanied by a 20–30 word excerpt of the article which included one of our keywords. One reviewer screened these emails for potential eligibility. Two reviewers independently screened the first 100 news articles for choosing from suggested articles those relevant to the WHO FCTC. This enabled the development of a pilot-tested spreadsheet and coding framework, and both reviewers agreed on the creation of themes and subthemes, giving examples of articles they would include.

### Data abstraction

Two investigators independently abstracted data using the pilot-tested spreadsheet. Each news article was assigned at least one major theme and an associated subtheme. Major themes were health messages (subthemes: negative effects of waterpipe, claims denying health effects, controversy), promotion (subthemes: cafés/lounge, prices, flavours, celebrity involvement, other), and other legislative issues (subthemes: smoking ban on sales/imports/advertising, smoking ban violations, zoning, taxation and price, health warning labels, licensing, underage waterpipe smoking and general discussions on regulation). We further divided the subtheme 'smoking ban' into indoor, general or public places. Correct or incorrect public health messages were coded based on the expertise of the authors and the use of a similar framework in a previously published study on the topic.<sup>24</sup>

After reviewing 200 articles, Cohen's  $\kappa$  for inter-rater reliability was at least 0.60 for all major themes and subthemes, except for the subtheme 'smoking ban' which was 0.53. Discrepancies were resolved for this subtheme and one reviewer continued with the data abstraction from the remaining news articles.

### Data analysis

We undertook a narrative synthesis of countries that reported several news articles on the same major theme in order to gauge how waterpipe tobacco control legislation was enacted and enforced globally.

## RESULTS

### WTS legislation

Of the 193 countries with legislation data available on the Tobacco Control Laws website, 63 countries had completed legislative reviews. Bhutan was excluded as it prohibits the agriculture, manufacture, import or sale of tobacco products; this left 62 countries for analysis (see online supplementary appendix 1). These 62 countries represent over five billion (72.1%) of the world's population. The Tobacco Control Laws website made 754 laws available for these 62 countries of which 661 (87.7%) were in English. In terms of website updatedness, two countries were last updated in 2012, while most ( $n=43$ ) were

last updated in 2013 and the remainder ( $n=17$ ) were last updated in 2014.

Four countries (China, Colombia, Malaysia and Sweden) had no definition for 'tobacco product' or 'smoking' (although Malaysia defined cigarettes), but for analysis purposes it was assumed their references to tobacco generically included waterpipe tobacco (ie, categorised as 'generic'). Ten countries (Argentina, Bangladesh, Ecuador, India, Israel, Lebanon, Namibia, Russia, South Africa and Vietnam) specifically mentioned waterpipe or one of its synonyms in their definition of 'tobacco product' and/or 'smoking' in at least one of their laws. Mauritius had generic tobacco control laws but specifically prohibited the consumption of waterpipe tobacco.

**Table 2** presents a pooled analysis showing how waterpipe tobacco is addressed under each tobacco control domain. A list of countries with cigarette-specific laws under each domain can be found in online supplementary appendix 2. For smoke-free laws, waterpipe tobacco was categorised as 'generic' in 80.3% ( $n=49$ ) of countries and 'defined' in 13.1% ( $n=8$ ) of countries. We found waterpipe-specific smoke-free laws in 6.6% ( $n=4$ ) of countries: Costa Rica, Israel, Turkey and Ukraine, excerpts of which are given in **table 3**. In practice, these waterpipe-specific laws did not differ to countries where waterpipe tobacco was categorised as 'generic' or 'defined', that is, no additional legislative guidance was provided for enforcing waterpipe tobacco smoke-free laws in any country. We did not find any cigarette-specific smoke-free laws.

For laws on misleading descriptors, waterpipe tobacco was categorised as 'generic' in 63.9% ( $n=39$ ) of countries and 'defined' in 16.4% ( $n=10$ ) of countries. We did not find any waterpipe-specific laws on misleading descriptors. We did, however, find cigarette-specific laws on misleading descriptors in 9.8% ( $n=6$ ) of countries, where we believed waterpipe tobacco could be exempted. Furthermore, we found no laws on misleading descriptors in six other countries: Brunei, Chad, Guatemala, New Zealand, Pakistan and the Philippines. We, therefore, believe waterpipe tobacco is exempt from laws on misleading descriptors in 19.7% ( $n=12$ ) of our sample.

For laws on health warnings, waterpipe tobacco was categorised as 'generic' in 59% ( $n=36$ ) of countries and 'defined' in 13.1% ( $n=8$ ) of countries. Three countries had waterpipe-specific laws on health warnings (Israel, Lebanon and Turkey), excerpts of which are given in **table 3**. In practice, only Lebanon described using health warning messages relating specifically to evidence-based health outcomes of waterpipe tobacco,<sup>25</sup> whereas Israel and Turkey suggested using generic tobacco warnings. Also, only Turkey described enforcing health warnings on waterpipe apparatuses, while Lebanon and Israel did not. Fourteen

**Table 2** Globally pooled analysis showing how waterpipe tobacco is addressed under each tobacco control domain

Category	Smoke-free law (%)	Misleading descriptors (%)	Health warnings (%)	Advertising, sponsorship, promotion (%)
Generic	49 (80.3)	39 (63.9)	36 (59.0)	48 (78.7)
Defined	8 (13.1)	10 (16.4)	8 (13.1)	9 (14.8)
Waterpipe-specific	4 (6.6)	0 (0.0)	3 (4.9)	2 (3.3)
Cigarette specific	0 (0.0)	6 (9.8)	14 (23.0)	2 (3.3)
No law present	0 (0.0)	6 (9.8)	0 (0.0)	0 (0.0)
Total	61 (100.0)	61 (100.0)	61 (100.0)	61 (100.0)

**Table 3** Nine waterpipe-specific laws from six countries

Country	Extract from legislation
<b>Smoke-free law</b>	
Costa Rica	"It is prohibited to smoke or to hold lit tobacco products and derivatives that discharge smoke, gases or vapors, in any of their forms or in devices, including the electronic cigarette and the waterpipe or <i>hookah</i> and similar devices used to concentrate or discharge smoke, gases or vapors of tobacco products and derivatives, in the following public and private spaces or places,...." (TC Regs Decree 37185)
Israel	"Personally or by means of another on his behalf, approached a person smoking or holding a lit cigarette, cigarillo, <i>hookah</i> , cigar or pipe in a public place requesting that he desist from the prohibited act, or took all reasonable steps to ensure the prevention of offenses under subsections 1(A) and 1(B)." (Prevention of Smoking and Exposure in Public Places Act)
Turkey	"No use of tobacco products shall be allowed in any indoor areas of any public and private buildings, including any places providing entertainment such as cafes, cafeterias, beer houses, hookah places, popular spots and club houses of any organisations and foundations, as well as restaurants. In any outdoor areas of any places providing entertainment such as cafes, cafeterias, beer houses, hookah places, popular spots and club houses of any organisations and foundations, as well as restaurants, certain arrangements shall be implemented in order to prevent any impact of smoke on other people by taking measures such as blocking tobacco smoke from leaking into the indoor areas." (Turkey—Circular 2009–2013)
Turkey	"In addition to the regulations in the Regulation Concerning the Principles and Procedures for the Sale and Presentation of Tobacco Products and Alcoholic Beverages, the area/areas created for smoking hookah tobacco products belonging to businesses must;(a) be located at least 200 meters away from preschool institutions, after school course centers, student dormitories and primary, secondary and high school institutions including private learning and teaching institutions...." Turkey-Regs on Hookah Business
Ukraine	"Smoking of tobacco products as well as electronic cigarettes and <i>hookahs</i> is prohibited" (Ukraine- Law No. 4844, SF amdt.)
<b>Health warnings</b>	
Israel	"No person shall market tobacco products in a package, including pipe tobacco or <i>tobacco for narghilas</i> in a bag, unless there is printed on it a warning in print letters, ... (Law Restricting Advertising)
Lebanon	"The list of health warnings concerning the fatal and harmful effects of waterpipes includes the following sentences....." (Lebanon-Decree 8991)
Turkey	"Health warnings for which the principle and procedure will be determined by the Board will be placed on the <i>hookah bottles</i> ." (Turkey- Regs on Hookah Businesses)
<b>Advertising, sponsorship and promotion</b>	
Turkey	"No type of advertisement, introduction, campaign, promotion or any type of activity whatsoever that promotes or encourages the consumption of tobacco products shall be organised in the area/areas belonging to the business where <i>hookah tobacco</i> is provided for consumption" (Regs on Hookah Business)
Russia	"Advertising of tobacco, tobacco products and smoking requisites, including pipes, <i>hookahs</i> , cigarette papers, lighters, and other similar products should not..." (Law No. 38 FZ)

countries had cigarette-specific health warnings, where we believed waterpipe tobacco health warnings could be exempted.

For laws on advertising, sponsorship and promotion, waterpipe was categorised as 'generic' in 78.7% (n=48) of countries and 'defined' in 14.8% (n=9) of countries. Two countries had waterpipe-specific laws on advertising, sponsorship and promotion (Russia and Turkey), excerpts of which are given in table 3. Turkey's law on advertising, sponsorship and promotion was specific to waterpipe-serving premises, whereas Russia's law was applicable more generally. Two countries had cigarette-specific laws.

### Enactment of WTS legislation

A total of 1307 articles were retrieved from Google Alerts of which, after applying our exclusion criteria, 527 were used in the analysis. A review of these articles indicated that, in a descending order, the USA (n=232), UK (n=73), India (n=34), UAE (n=32) and Pakistan (n=23) had the most articles (see online supplementary appendix 3). Legislation was the most discussed major theme across these five countries (n=264), and 'smoking bans' was the most addressed subtheme. Waterpipe premise licensing and zoning in residential areas were also common subthemes. Other subthemes under legislation ('health warning labels', 'taxation', 'ban of sales/imports/advertisements') received the least coverage and will not be discussed in detail here. Examples from the US, UK, India, UAE and Pakistan will be discussed below focusing on enactment of WTS legislation.

In the USA, articles mostly reported on small towns and cities trying to rule in favour of or against waterpipe-serving premises opening business. Some articles discussed issuance of a moratorium on current locations until a decision is taken on appropriate legislative and regulatory actions. Owing to non-compliance and owners' demands to run such businesses, the idea of

exemptions, licensing and zoning was addressed despite having smoking bans in place. For example, in the case of Washington DC, under the exemption, waterpipe lounges are permitted to operate given that 'a majority of the revenue generated from the business must come from smoking, not food, wine or beer' (In the Capital, September 17, 2013; <http://bit.ly/ZmiRte>)

Articles from the UK mainly addressed the growing number of waterpipe-serving premises nationwide and difficulties associated with enforcing the smoke free legislation. Recurring violations occurred despite several warnings from local authorities. One councillor from Manchester said: "We fine the establishments as well, but these owners are making £2000 a day so they are not bothered about getting fined." (Mancunian Matters, 14 April 2014; <http://bit.ly/ZmgmqH>) fines ranged from £500 to £5000 for smoke-free law breaches. Licensing waterpipe-serving premises in a similar fashion to alcohol-serving premises was brought up as a possible solution as this would give more power to local authorities to take stronger action.

Articles from India reported that India banned indoor and outdoor public consumption of WTS in some regions. However, non-compliance was commonplace: 'Two years after the district administration banned hookah bars in the city, indoor smoking in public places and hookah lounges are still thriving in the city.' (The Times of India, 4 September 2013; <http://bit.ly/1uOihOH>). One article suggested that waterpipe-serving premises were owned by relatives of affluent people or politicians 'making them harder to control or impose a ban on' (Prune Mirror, 27 May 2014; <http://bit.ly/1tUsaJL>). Many news articles call for a more stringent crackdown on waterpipe-serving premises; a call made more pertinent after a waterpipe-serving premise owner allowed 100 underage school children to smoke waterpipe. (The Times of India, 15 July 2013; <http://bit.ly/1pgbFDY>)

Articles from the UAE mentioned zoning regulations that waterpipe-serving premises must abide by (at least 150 metres from residential areas, worship areas and educational establishments). Waterpipe-serving premises are also subject to strict hours of trade (10:00 to midnight), prohibition of underage sales and prohibition of entry to pregnant women onto their premises. Reports highlighted waterpipe-serving premises being shut down for breaching these laws, but there was no evidence of recurrent or deliberate breach. The director of the Public Parks & Horticulture Department has been quoted as saying that they have "assigned a 23-member team to book violators. [The team] will carry out regular and surprise inspections on beaches and public parks." (Arab News, 24 December 2014; <http://bit.ly/1qPRNww>)

Articles from Pakistan highlighted that sales, promotion, and both indoor and outdoor public consumption of WTS are prohibited throughout the country. Articles report on the closure of illegal waterpipe-serving premises and arrests/fines for users who continue to consume waterpipe in public. Pakistan's stance on WTS was justified by the negative health effects associated with its' use. However, articles emphasise that this law is poorly implemented and 'the practice is in full swing in some cafes and restaurants of the federal capital.' (Pakistan today, 8 July 2013; <http://bit.ly/1m7xR8k>)

## DISCUSSION

This manuscript is the first to provide a review of how WTS regulation is addressed in current tobacco control frameworks globally as well as is the first documentation of the challenges and experiences some countries face in regulating WTS.

Our systematic review of the Tobacco Control Laws website benefits from the large sample of countries from all major continents that gives a unique insight into how waterpipe is addressed globally in current tobacco control legislation. Among legislations of reviewed countries, the majority did not specifically address regulation of WTS but instead relied on a 'generic' tobacco definition. In countries where WTS was mentioned in tobacco control frameworks, often these did not provide any additional legislative guidance compared to 'generic' tobacco control laws. We identified countries where WTS could be exempt from tobacco control policy, particularly with regard to enforcement of misleading descriptors where nearly 20% of laws appeared to exempt WTS. Generic laws are not sensitive to the particularities and challenges inherent in regulating WTS as well as associated waterpipe tobacco products and accessories.<sup>26</sup>

Findings from the review of news articles show that the growth of the WTS epidemic could undermine existing tobacco control policies. Country experiences such as in US, UK, Pakistan, India and UAE showcase how current smoking bans in place are compromised by non-compliance and violation. These also show the gaps between a piece of legislation and its implementation, reinforcing the need for proper regulation of such practices. It may require regulations specific to the practices of waterpipe-serving premises and not necessarily only to waterpipe tobacco itself or waterpipe accessories.

It is clear that there is much room for development of WTS specific laws. Turkey appeared to have the most tailored WTS policy, however, we were unable to find peer-reviewed papers evaluating WTS health policy effectiveness in Turkey. Turkey and its neighbouring countries from the Eastern Mediterranean region, that experience a high burden of WTS prevalence, should take up leading roles in evaluating WTS health policy effectiveness. One study from India, which measured indoor air quality before and after a comprehensive smoke-free law was

implemented, showed that waterpipe-serving premises were non-compliant and have also started allowing cigarette smoking onsite.<sup>27</sup> Suggestions have been made that waterpipe tobacco may be less price elastic than cigarettes and therefore, changes in taxation may not be effective in changing WTS behaviour.<sup>3</sup> Rigorous evaluation of health policy related to WTS should include how zoning laws protect non-smokers from secondhand smoke (SHS), how health warning labels on waterpipe apparatuses affect health behaviour and whether licensing is a feasible and acceptable option. A number of local and state jurisdictions in the US address waterpipe in various ways.<sup>28</sup> Exemptions as a policy option, for example, is practiced; however, this might not be a proper policy option as it does not ensure employee protection from SHS of WTS.<sup>11 29</sup> Moreover, some countries have attempted a complete ban of waterpipes as a solution but enforcement is troublesome, as can be seen in Pakistan and India.

Evidence from England suggests cultural behaviours should be considered when formulating new tobacco control laws. For example, female Somalis living in England smoked inside waterpipe-serving premises to 'hide' from the taboo associated with female smoking.<sup>30</sup> Once smoke-free laws were implemented, female Somalis adapted their behaviour by smoking indoors in illegally-run, 'underground' waterpipe-serving premises or by smoking indoors at home. Any development of waterpipe-specific laws in the West should consider engaging local communities to avoid the development of an underground café culture.

With regards to limitations, the Tobacco Control Laws website acknowledges several limitations of their project (<http://www.tobaccocontrollaws.org/learn-more/about/>) and briefly includes the difficulties in reviewing laws when in-country lawyers are not contactable (leading to uncertainty in legislative interpretations), lack of subnational analyses which may address WTS differently and the lack of real time updates. No information was provided on how countries are selected for legislative review, indicating the possibility of selection bias. In addition, 12.3% of all laws were not translated into English; in such cases, we relied only on the interpretation of the legislative reviews when this was necessary, but the reviewers do not believe this impacted on their final codes. Moreover, we were unable to review laws addressing taxation or cessation services as these were not consistently available on the Tobacco Control Laws website.

Google Alerts is a novel method to gather current affairs information, although a large number of URL links had expired at the time of this analysis thus limiting our number of eligible articles. In addition, only English articles were specified, explaining why the majority of articles were from the USA and UK. We could not validate whether English articles from India, Pakistan and UAE significantly differed from articles published in local languages. Although these findings are largely anecdotal, we encourage countries with waterpipe legislation to evaluate these in a similar fashion to the International Tobacco Control Policy Evaluation (ITC) Project.<sup>1</sup>

## CONCLUSION

Gaps in policies to regulate WTS exist globally and these may compromise existing tobacco control policy frameworks. There is an opportunity to evaluate current and proposed policy options to curb WTS and to use that knowledge to develop a new tobacco control policy framework. Challenges to enforcement and compliance, as reported in the USA, UK, India, Pakistan and UAE, provide lessons to be learnt for policymakers and law enforcers. Researchers in tobacco control have an important role in providing the appropriate evidence for

policymakers in order to suggest effective legislations. This manuscript calls for a scientific working group set up by the WHO FCTC secretariat to study WTS regulatory issues and develop a complementary framework to the WHO FCTC. Countries that carry the burden of disease and have experience in regulating WTS should be involved.

## What this paper adds

### What is already known on this subject

- Waterpipe tobacco smoking (WTS) is a growing epidemic.
- Although there are regulations for cigarettes and other tobacco products, the waterpipe's unique idiosyncrasies pose challenges to regulation.
- Local, anecdotal reports suggest WTS legislation enactment and enforcement is dogged by unclear interpretation of the law and potential loopholes.

### What important gaps in knowledge exist on this topic

- No studies are available reporting on the legislative actions that attempt to regulate WTS and the difficulties associated with the enactment of these WTS regulations.

## What this paper adds

- Regulation of WTS in current tobacco control policy frameworks globally is weak.
- WTS compromises enforcement of current tobacco control legislation frameworks in place, leading to violations and non-compliance of smoke-free bans.
- There is a need to develop tailored and evaluated waterpipe tobacco smoking specific regulatory frameworks to complement current tobacco control policy frameworks.

**Contributors** RN developed the concept for the paper; contributed to data collection and analysis; wrote the introduction and discussion as well as contributed to rewriting and reviewing all parts of the manuscript. LEK and SM conducted data collection and analysis, and drafted the results and methods sections. MJ conducted data collection and analysis; wrote and reviewed the methods and results sections; and contributed to reviewing and writing of other parts of the manuscript. All authors approved the final version of the manuscript.

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