

Toward a Regulatory Framework for the Waterpipe

Waterpipe smoking has been dramatically increasing among youth worldwide and in the United States. Despite its general association with misperceptions of reduced harm, evidence suggests this is a harmful and dependence-inducing tobacco use method that represents a threat to public health. Waterpipe products continue to be generally unregulated, which likely has contributed to their spread.

The Family Smoking Prevention and Tobacco Control Act of 2009 granted the US Food and Drug Administration (FDA) the authority to regulate waterpipe products, and the FDA finalized a rule extending its authority over waterpipe products in May 2016. This critical step in addressing the alarming increase in waterpipe smoking in the United States has created urgency for research to provide the evidence needed for effective regulatory initiatives for waterpipe products.

We aim to stimulate such research by providing a framework that addresses the scope of waterpipe products and their unique context and use patterns. The proposed framework identifies regulatory targets for waterpipe product components (i.e., tobacco, charcoal, and device), the waterpipe café setting, and its marketing environment dominated by Internet promotion. (*Am J Public Health*. 2016;106:1773–1777. doi:10.2105/AJPH.2016.303322)

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The popularity of waterpipe smoking, also known as hookah, shisha, and narghile, is increasing rapidly among youths in the United States and globally.¹ According to the National Youth Tobacco Survey, the prevalence of current (past month) waterpipe smoking among US high school students almost doubled in 2014 from the previous year to become on par with cigarette smoking (9.4% for waterpipe vs 9.2% for cigarettes; Table 1).² Similar patterns have been observed among young adults, with 18.2% of respondents aged 18 to 24 years reporting current waterpipe use in the 2012–2013 National Adult Tobacco Survey.³ Despite these worrisome trends, waterpipe products continue to be by and large unregulated, a factor that is likely contributing to the spread of waterpipe smoking.¹

In waterpipes commonly used today, charcoal-heated air passes through perforated aluminum foil, separating the charcoal from the flavored tobacco, to generate smoke that cools as it passes through water on its way to the smoker. The passage of smoke through water underlies some of the widespread misperceptions about the reduced harm and addictiveness of waterpipe smoking compared with cigarettes.⁴ However, a growing body of evidence suggests that waterpipe smoking can lead to dependence and many of the known smoking-related diseases including cancer, cardiovascular disease, and adverse pregnancy

outcomes.^{5,6} Waterpipe smoking also has the potential to reverse achieved successes in tobacco control, as it can serve as a gateway to cigarette smoking among youths^{7,8} and thwart cigarette smoking cessation among adults.⁹

Recognizing the seriousness of the waterpipe epidemic in the United States, the US Food and Drug Administration (FDA) now regulates the manufacture, import, packaging, labeling, advertising, promotion, sale, and distribution of waterpipe tobacco, including components such as flavor enhancers; hose cooling attachments; water filtration base additives (including those that are flavored); charcoal made from wood, coconut shell, or other material; bowls; valves; hoses; and heads.¹⁰ This represents a critical step in addressing the alarming increase in waterpipe smoking among US youths and calls for a research framework to guide the complex regulatory landscape of waterpipe products. Given that the waterpipe is very distinct from cigarettes, a clear understanding of the complex nature of the waterpipe, its social context, and its marketing environment is

needed to guide such research. We hereby propose a framework to stimulate further regulatory research into waterpipe products that takes into account current knowledge of key waterpipe components, attributes, and contexts.

A UNIQUE REGULATORY CONTEXT

The Tobacco Control Act granted the FDA the authority to regulate the manufacture, marketing, and distribution of tobacco products. Instead of the FDA's traditional "safe and effective" standard for evaluating medical products, new tobacco products are evaluated based on a public health standard that considers the risks and benefits of the tobacco product on the population as a whole, including tobacco users and nonusers.¹⁰ Although the current ruling applies to cigarettes, cigarette tobacco, roll-your-own tobacco, and smokeless tobacco products, the law also gave the FDA the ability to extend its regulation to additional tobacco products,

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TABLE 1—Prevalence of Current Waterpipe Smoking Among US Young Adults and Adolescents: National Youth Tobacco Survey, 2011–2014

Year	High School		Middle School	
	Cigarette Smoking, Past 30 Day, % (95% CI)	Waterpipe Smoking, Past 30 Days, % (95% CI)	Cigarette Smoking, Past 30 Days, % (95% CI)	Waterpipe Smoking, Past 30 Days, % (95% CI)
2011	15.8 (13.7, 18.1)	4.1 (3.4, 5.0)	4.3 (3.5, 5.2)	1.0 (0.8, 1.4)
2012	14.0 (12.5, 15.7)	5.4 (4.6, 6.3)	3.5 (2.8, 4.3)	1.3 (1.0, 1.7)
2013	12.7 (11.3, 14.2)	5.2 (4.6, 6.0)	2.9 (2.3, 3.6)	1.1 (0.8, 1.5)
2014	9.2 (8.1, 10.4)	9.4 (8.2, 10.7)	2.5 (2.1, 3.0)	2.5 (2.0, 3.0)

Note. CI = confidence interval.

commonly referred to as *deeming* them through rulemaking. In May 2016, the FDA issued a final rule to assert jurisdiction over tobacco products not previously covered under the Tobacco Control Act, including the waterpipe.¹⁰

The Tobacco Control Act granted the FDA authority to regulate three primary areas of packaging and labeling: health warnings, the disclosure of product constituents or chemical “yields,” and prohibitions on potentially misleading packaging or labeling information with respect to reduced health risk.¹¹ Effective waterpipe control, however, requires a comprehensive policy and regulatory approach that also includes tools outside of FDA jurisdiction such as taxation, smoke-free laws, and banning advertisement and promotion. These can be directly addressed and evaluated in the context of cigarettes, but the waterpipe involves several nuances that make the application of these regulatory and policy strategies more challenging. For example, it has been established that a variety of product features related to waterpipe components (i.e., waterpipe tobacco, device and accessories, and charcoal) influence user perception of reduced harm and encourage waterpipe experimentation and use.^{12,13} Moreover, the waterpipe is typically associated with a particular

setting—the waterpipe café (i.e., hookah lounge or bar), which continues to be exempt from clean indoor air laws in many jurisdictions.¹⁴ The café setting, moreover, has implications on the application of packaging and labeling requirements, age restriction, sanitation, pricing, and clean indoor air laws. In this setting, the café menu becomes perhaps an essential component for disclosing product constituents and associated health risks, given that smokers are served a ready-to-consume waterpipe and are not exposed to the tobacco product packaging, where health warnings are usually displayed. Meanwhile, because many waterpipe users are adolescents who may not access waterpipe cafés, much of the marketing of waterpipe products may occur over the Internet.¹⁵ These marketing efforts involve concealment or inaccurate disclosure of harmful and potentially harmful constituents, deceptive health claims, and the absence of health warnings.^{16,17}

Therefore, in anticipation of further regulatory and policy steps to control waterpipe products and venues, research is needed to inform the development of effective waterpipe control measures. This research must address the complexity of waterpipe products, their unique context, and their marketing environment. The following

discussion expands on the unique aspects of the waterpipe with respect to the product itself, its social context, and its marketing environment in an attempt to establish parameters for waterpipe regulation (Figure 1).

A COMPLEX TOBACCO USE METHOD

As a tobacco use method, the waterpipe is composed of three main components: (1) waterpipe tobacco, (2) charcoal, and (3) device (e.g., bowl, stem, and head), all of which must be addressed in any regulatory framework.¹⁸ In fact, the assumption that evidence from cigarette smoking can be universally applied to the waterpipe has been identified as one of the main impediments to advancing an effective waterpipe control agenda.¹⁸ For example, cigarettes represent a relatively standardized and uniform product of a clearly defined industry, but waterpipe products comprise several components and varieties within these components, and these are usually marketed by diverse and loosely organized industries.¹ A recent analysis of waterpipe products and marketing practices highlights the importance of a multicomponent regulatory framework to cover waterpipe tobacco, device, and charcoal.¹⁸

One of the main aspects of how different waterpipe components and attributes can influence waterpipe use is through reinforcing the perception of reduced harm commonly associated with this tobacco use method. For example, tobacco flavoring creates pleasant aromas that can contribute to the misperception of a safe product and encourage waterpipe smoking.¹⁹ Waterpipe-related components (e.g., filters, mouthpieces), moreover, are often marketed as harm reduction accessories without supporting evidence, and charcoal marketing has used false claims of being a natural and safer product.^{16,17} These product varieties, attributes, and marketing claims about them can motivate young people, who otherwise may not smoke, to take up the waterpipe and thus need to be addressed in a comprehensive control framework of waterpipe products.^{12,16,18} Recently, we and others have shown that waterpipe tobacco flavor variety, as well as nicotine and charcoal labeling descriptors, can influence perceptions of waterpipe products and smoking decisions among adolescents and young adults.^{12,13}

Therefore, a systematic analysis of the role of waterpipe product varieties and their marketing in consumer perceptions, experiences, and smoking patterns is of paramount importance to

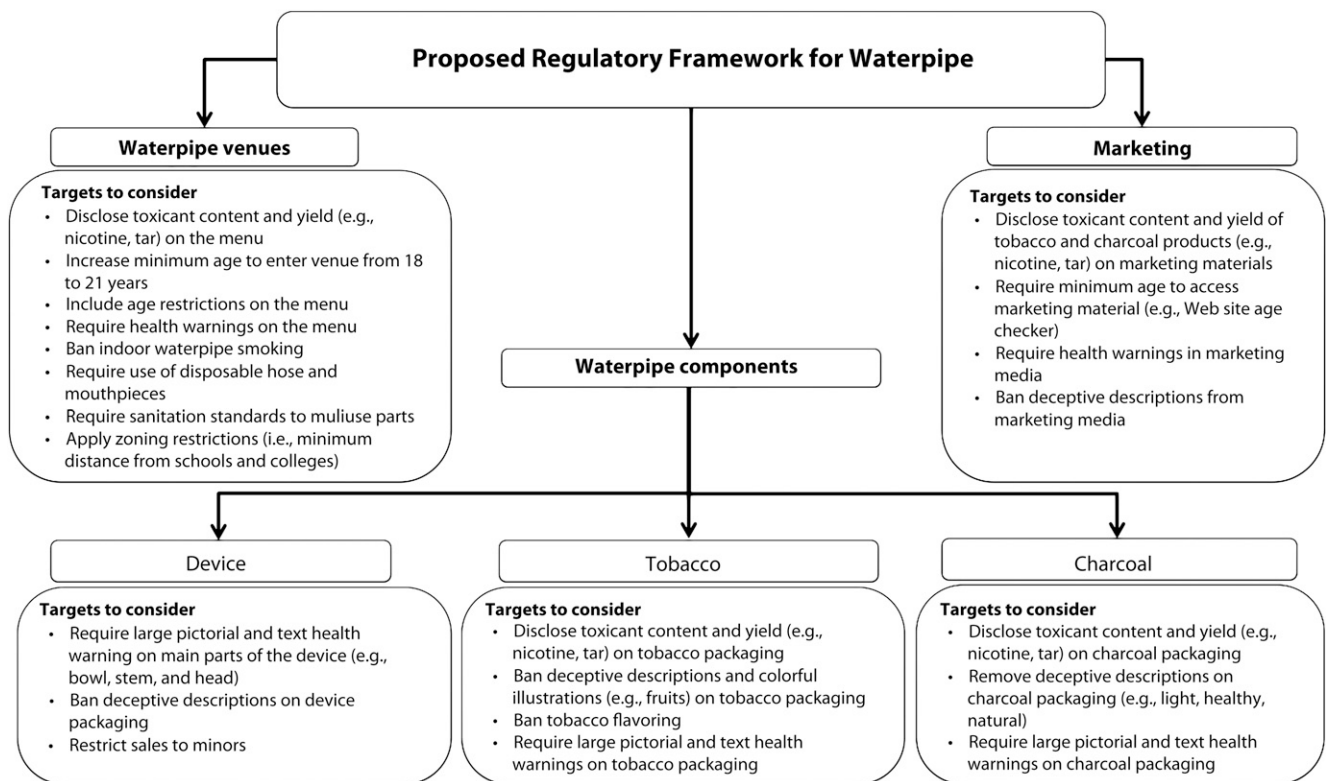


FIGURE 1—Proposed Schematic of the Waterpipe’s Main Components, Use Context, and Marketing Environment to Guide Research and Regulatory Efforts Into Its Unique Features and Complex Nature

advancing effective waterpipe control strategies (Figure 1). This analysis likely will involve a wide spectrum of research disciplines that extend from basic to population sciences and from clinical laboratory, to marketing, and bioinformatics studies.

A UNIQUE REGULATORY SETTING

Another distinctive feature of waterpipe smoking is its social nature, typically within the unique setting of a waterpipe café (i.e., hookah lounge or bar). Waterpipe smoking is a stationary and time-consuming tobacco use method (averaging one-hour sessions), which makes it optimal for social engagement with friends and family in a café

setting.¹² Smokers in waterpipe venues are served ready-to-consume waterpipes, without exposure to product packaging (i.e., consumers may be uninformed of the contents and health risks associated with these products). In addition, smokers are potentially exposed to health risks beyond those directly attributable to tobacco, such as those related to charcoal combustion and spread of infections from sharing and repeated use of waterpipe devices.⁵ For example, evidence suggests that the use of charcoal in waterpipe smoking is associated with high levels of exposure to carbon monoxide, leading in some instances to carbon monoxide poisoning.⁵ Presumably, an important source of carbon monoxide exposure in a café setting

can be from waterpipe smoking and lighting of charcoal by other customers. Therefore, the waterpipe café setting and the unique risks associated with it represent an important control context that involves product regulation and venue-related policies (Figure 1).

Generally, the waterpipe consumer’s contact time with the tobacco packaging is brief relative to the duration of a typical waterpipe smoking session. As such, significant adaptation of labeling and health warning approaches for waterpipes is needed to effectively communicate toxic constituents and potential health risks to consumers. In the café setting, these adaptations can include the disclosure of constituent and toxicant yield information on the café menu

and the addition of health warnings to various parts of the waterpipe device (e.g., water bowl, stem).²⁰ In addition to the effectiveness in communicating health risks to the consumer, disclosing waterpipe content information on the café menu will hold the product to the same standard as food and beverages served in these cafés, for which detailed content information is usually listed on the menu.

Multiple use of the same device within the café setting without clear information on sanitation and hygiene requirements exposes customers to potential risk of infectious disease.⁵ This potential risk can be a strong deterrent to customers, as well as a motivation for café owners to pay special attention to device cleanliness and

hygiene. Practices that may increase this risk, such as multihose waterpipes or use of non-disposable hoses that are difficult to clean (e.g., leather and complex material hoses), should be considered for regulatory action. In the absence of research evidence about the required standards for effective cleaning of multiuse waterpipes in cafés, requiring the use of disposable hoses and mouthpieces and applying the same sanitation standards as those for food service ware need to be considered. Research into infectious disease risk associated with sharing of waterpipe parts and the development of sanitation standards for these parts are urgently needed.

In summary, the waterpipe café is an important and unique setting for regulation and policy to curb waterpipe use and limit its health-damaging potential for smokers, bystanders, and venue employees. However, these policy tools also may be effective outside of the café environment, such as in extending health warning labels on the device itself to the retail environment where waterpipes are sold for personal use. Moreover, similar regulations can be applied to select cafés that offer home delivery of ready-to-consume waterpipes. Finally, given the observed proximity of waterpipe venues to educational institutions,²¹ zoning restrictions should be developed to ensure minimum distances away from schools, colleges, and universities.

THE WATERPIPE MARKETING ENVIRONMENT

The heterogeneity of waterpipe products available in the US market and their popularity

among young people have rendered the Internet a natural medium for waterpipe information and transactions.²² Young people are particularly vulnerable to social and environmental influences to use tobacco, and online messages and images that make smoking appealing to youths are commonplace.²³ For example, Twitter has become an important information source on emerging tobacco products because its content is user-centric, reflecting trends that surveys may not capture or that consumers may not discuss in formal contexts.²⁴ Our analysis of waterpipe-related Internet searches shows a large and increasing volume of such inquiries in the United States, mostly involving waterpipe products for home use.¹³ Undoubtedly, the Internet allows young people to engage with different waterpipe products and marketing claims about them before making decisions about waterpipe use.^{22,25} Tobacco companies spend millions of dollars enticing young smokers through youth-oriented media, and although the waterpipe industry is much more diverse and loosely defined relative to other tobacco products, it has a very considerable presence online.²² As young people migrate from traditional media to online social interactions, they are likely to encounter greater exposure to marketing of waterpipe products online and through social media.

The largely unregulated Internet allows waterpipe promoters to circumvent advertisement bans and reach their preferred customer pools. An analysis of 144 Web sites of waterpipe venues in the United States showed that only four percent included tobacco-related health warnings on their pages.¹⁵ A related analysis of

cigarette- and waterpipe-related YouTube videos found that user-generated videos on waterpipes were less likely to acknowledge the negative health consequences of smoking compared with cigarette videos; 92% of waterpipe-related videos portrayed smoking in a positive light compared with only 24% of cigarette-related videos.²⁵ Much of the tobacco promotion over the Internet and social media is organized around interest groups but in fact disguise waterpipe sellers and marketers.²⁴ Therefore, Web sites selling waterpipe products should enforce age restrictions, detailed content and yield disclosure, and health warnings and should not promote the waterpipe by using deceptive and misleading claims of reduced harm or healthy products. Finally, although the Internet appears to be a popular venue for the marketing of waterpipe products, a comprehensive regulatory framework should address all potential media venues, including print, television, and radio.

CONCLUSIONS

The dramatic rise in waterpipe smoking among young people in the United States and its threat to public health and tobacco control efforts call for a proportionate regulatory and policy response to curb these trends. Given the waterpipe's complexity and its specific features, an improved understanding of its unique context from a regulatory perspective can help advance research to identify promising regulatory targets to curb waterpipe use and spread. This proposed framework, we hope, could contribute to a research roadmap highlighting the scope and nature of key waterpipe varieties and their marketing environment and

how these can influence consumer experiences and decisions. It is also important to note other waterpipe regulatory areas worth exploring in greater detail, such as secondhand smoke exposure in private settings, particularly for children, and smoke exposure for workers in the café setting, which falls under occupational safety regulations. Ultimately, we hope to stimulate a comprehensive analysis of the waterpipe's unique context and marketing environment that will guide the further development of effective regulations to curb waterpipe trends in the United States and internationally. **AJPH**

CONTRIBUTORS

R. G. Salloum and W. Maziak originated the study. All the authors were involved in drafting and revising the article.

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REFERENCES

- Maziak W, Taleb ZB, Bahelah R, et al. The global epidemiology of waterpipe smoking. *Tob Control*. 2015;24(suppl 1): i3-i12.
- Arrazola RA, Singh T, Corey CG, et al. Tobacco use among middle and high school students - United States, 2011-2014. *MMWR Morb Mortal Wkly Rep*. 2015;64:381-385.
- Agaku IT, King BA, Husten CG, et al. Tobacco product use among adults—United States, 2012–2013. *MMWR Morb Mortal Wkly Rep*. 2014;63:542–547.
- Maziak W. The waterpipe: time for action. *Addiction*. 2008;103:1763–1767.
- El-Zaatari ZM, Chami HA, Zaatari GS. Health effects associated with waterpipe smoking. *Tob Control*. 2015;24(suppl 1): i31-i43.
- Aboaziza E, Eissenberg T. Waterpipe tobacco smoking: what is the evidence that it supports nicotine/tobacco dependence? *Tob Control*. 2015;24(suppl 1): i44-i53.
- Jaber R, Madhivanan P, Veledar E, Khader Y, Mzayek F, Maziak W. Waterpipe a gateway to cigarette smoking initiation among adolescents in Irbid,

- Jordan: a longitudinal study. *Int J Tuberc Lung Dis.* 2015;19(4):481–487.
8. Soneji S, Sargent JD, Tanski SE, Primack BA. Associations between initial water pipe tobacco smoking and snus use and subsequent cigarette smoking: results from a longitudinal study of US adolescents and young adults. *JAMA Pediatr.* 2015;169:129–136.
9. Asfar T, Weg MV, Maziak W, Hammal F, Eissenberg T, Ward KD. Outcomes and adherence in Syria's first smoking cessation trial. *Am J Health Behav.* 2008;32:146–156.
10. Food and Drug Administration, Department of Health and Human Services. Deeming tobacco products to be subject to the Federal Food, Drug, and Cosmetic Act, as amended by the Family Smoking Prevention and Tobacco Control Act; restrictions on the sale and distribution of tobacco products and required warning statements for tobacco products: final rule. *Fed Regist.* 2016;81(90):28973–29106.
11. Hammond D, Reid JL, Driezen P, Boudreau C. Pictorial health warnings on cigarette packs in the United States: an experimental evaluation of the proposed FDA warnings. *Nicotine Tob Res.* 2013;15(1):93–102.
12. Akl EA, Ward KD, Bteddini D, et al. The allure of the waterpipe: a narrative review of factors affecting the epidemic rise in waterpipe smoking among young persons globally. *Tob Control.* 2015;24(suppl 1):i13–i21.
13. Salloum RG, Maziak W, Hammond D, et al. Eliciting preferences for waterpipe tobacco smoking using a discrete choice experiment: implications for product regulation. *BMJ Open.* 2015;5:e009497.
14. Primack BA, Hopkins M, Hallett C, et al. US health policy related to hookah tobacco smoking. *Am J Public Health.* 2012;102:e47–e51.
15. Primack BA, Rice KR, Shensa A, et al. US hookah tobacco smoking establishments advertised on the Internet. *Am J Prev Med.* 2012;42:150–156.
16. Nakkash R, Khalil J. Health warning labelling practices on narghile (shisha, hookah) waterpipe tobacco products and related accessories. *Tob Control.* 2010;19:235–239.
17. Vansickel AR, Shihadeh A, Eissenberg T. Waterpipe tobacco products: nicotine labelling versus nicotine delivery. *Tob Control.* 2012;21(3):377–379.
18. Jawad M, El Kadi L, Mugharbil S, Nakkash R. Waterpipe tobacco smoking legislation and policy enactment: a global analysis. *Tob Control.* 2015;24(suppl 1):i60–i65.
19. Griffiths MA, Ford EW. Hookah smoking: behaviors and beliefs among young consumers in the United States. *Soc Work Public Health.* 2014;29(1):17–26.
20. Islam F, Salloum RG, Nakkash R, Maziak W, Thrasher JF. Effectiveness of health warnings for waterpipe tobacco smoking among college students. *Int J Public Health.* 2016; Epub ahead of print.
21. Kates FR, Salloum RG, Thrasher JF, Islam F, Fleischer NL, Maziak W. Geographic proximity of waterpipe smoking establishments to colleges in the US. *Am J Prev Med.* 2016;50:e9–e14.
22. Salloum RG, Osman A, Maziak W, Thrasher JF. How popular is waterpipe tobacco smoking? Findings from Internet search queries. *Tob Control.* 2015;24(5):509–513.
23. US Department of Health and Human Services. Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General. Atlanta, GA: National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2012. Available at: <http://www.surgeongeneral.gov/library/reports/preventing-youth-tobacco-use/exec-summary.pdf>. Accessed December 11, 2015.
24. Myslín M, Zhu SH, Chapman W, Conway M. Using Twitter to examine smoking behavior and perceptions of emerging tobacco products. *J Med Internet Res.* 2013;15(8):e174.
25. Carroll MV, Shensa A, Primack BA. A comparison of cigarette- and hookah-related videos on YouTube. *Tob Control.* 2013;22(5):319–323.