



## Commentary

# Not Quite the Rule, But No Longer the Exception: Multiple Tobacco Product Use and Implications for Treatment, Research, and Regulation

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### Abstract

The patterns of tobacco product use in the United States have changed during the past several decades. Currently, a large proportion of tobacco users report using multiple tobacco products (MTPs). The prevalence of MTP use varies significantly by cigarette smoking frequency, as well: nearly half (46.9%) of all non-daily smokers report using other tobacco products within the past 30 days. Despite this, much of extant tobacco dependence treatment efforts, tobacco regulatory science research, and tobacco product research, in general, has focused largely on single product use (ie, cigarette smoking). To effectively design interventions and model the potential impact of regulations on tobacco products aimed at reducing tobacco use, as well as effectively study tobacco users, it is essential to consider actual use patterns in the population of tobacco users.

**Implications:** MTP use is increasingly common in the United States. This commentary highlights the impact that MTP use has for efforts to treat tobacco dependence, tobacco regulatory science efforts, as well as on tobacco research, in general.

The patterns of tobacco product use—including cigarette smoking—have been changing over the past several decades. For instance, increases in the prevalence of intermittent smoking instead of daily smoking,<sup>1</sup> and reductions in cigarette consumption among smokers<sup>2</sup> have been observed. Concurrent with changes in cigarette use, sales,<sup>3-5</sup> and use<sup>3,6,7</sup> of non-cigarette tobacco products (eg, little cigars and e-cigarettes) have increased significantly. Moreover, the use of multiple tobacco products (ie, using more than a single product; MTP) has become increasingly prevalent: Our recent analysis of PATH Wave 3 data indicates that the prevalence of MTP use is substantial, and varies based on the type of tobacco product used. MTP use is common among users of all tobacco products, and exceeds 50% among users of e-cigarettes, cigars, cigarillos, little cigars, pipe tobacco, hookah, smokeless tobacco, and snus (Table

1). It is also worth noting that MTP use varies significantly by cigarette smoking frequency as well as sociodemographic characteristics. MTP use is significantly more prevalent among non-daily cigarette smokers (46.9%) than among light (36.4%) and heavy (34.1%) daily smokers; MTP use was equally prevalent among the latter two groups. Sociodemographic correlates of MTP use are shown in [Supplementary Table 1](#), available at *Nicotine and Tobacco Research* online.

The prevalence of MTP use, and the increased or increasing prevalence of their use in some segments of the population, may be attributable in part to the continually evolving tobacco marketplace and emergence of novel tobacco products. Consumers are presented with an array of increasingly diverse products that deliver nicotine,<sup>8</sup> providing the opportunity to sample and experiment with—and

**Table 1.** Prevalence of Past 30-Day Multiple Tobacco Product (MTP) Use, PATH<sup>®</sup> Wave 3, 2015–2016

	Any cigarette use (n = 8773)		Non-daily smokers <sup>b</sup> (n = 1759)		Light daily smokers <sup>c</sup> (n = 1847)		Heavy daily smokers <sup>d</sup> (n = 5156)		E-cigarettes (n = 3793)		Traditional cigars (n = 1774)		Cigarillos (n = 2436)		Little cigars (n = 984)		Pipe tobacco (n = 426)		Hookah (n = 1340)		Smokeless tobacco (n = 1440)		Snus (n = 419)	
	wt% <sup>e</sup>	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%
Any other tobacco product	37.2	46.9 <sup>A</sup>	36.4 <sup>B</sup>	34.1 <sup>B</sup>	69.7	74.6	84.7	91.2	82.7	73.0	52.6	86.8												
Any cigarette use	—	—	—	—	51.5	40.7	51.8	63.0	46.9	35.2	30.2	41.7												
Non-daily smokers	—	—	—	—	13.8	10.6	13.9	13.4	9.6	12.0	8.9	11.6												
Light daily smokers	—	—	—	—	9.9	6.4	10.5	13.6	8.5	9.3	3.5	4.2												
Heavy daily smokers	—	—	—	—	27.8	23.6	27.2	35.5	28.4	13.8	17.7	25.7												
E-cigarette	20.2	25.9 <sup>A</sup>	19.9 <sup>B</sup>	18.3 <sup>B</sup>	—	23.9	30.7	37.3	35.9	48.9	18.6	33.6												
Traditional cigars	8.6	10.8 <sup>A</sup>	7.0 <sup>B</sup>	8.4 <sup>B</sup>	13.0	—	43.1	39.5	41.8	21.6	15.8	22.2												
Cigarillos	12.3	15.9 <sup>A</sup>	12.8 <sup>B</sup>	10.9 <sup>C</sup>	18.7	48.4	—	51.7	36.5	29.7	13.6	21.3												
Little cigars	6.5	6.7 <sup>A</sup>	7.1 <sup>A</sup>	6.1 <sup>A</sup>	9.9	19.3	22.5	—	24.1	14.1	6.6	13.0												
Pipe tobacco	2.2	2.1 <sup>A</sup>	2.0 <sup>A</sup>	2.2 <sup>A</sup>	4.2	9.1	7.0	10.8	—	7.8	5.4	9.9												
Hookah	4.3	7.1 <sup>A</sup>	5.9 <sup>A</sup>	2.8 <sup>B</sup>	15.3	12.5	15.3	16.7	20.7	—	6.0	11.0												
Smokeless tobacco	5.3	7.5 <sup>A</sup>	3.1 <sup>B</sup>	5.2 <sup>C</sup>	8.3	13.0	9.9	11.1	20.5	8.5	—	66.8												
Snus	1.9	2.6 <sup>A</sup>	1.0 <sup>B</sup>	2.0 <sup>A</sup>	4.0	4.9	4.2	5.8	9.9	4.2	17.9	—												

For non-daily smoker, light daily smoker, and heavy daily smoker columns only: columns that do not share superscripts (A, B, or C) refer to statistically significant differences between groups. Aside from non-daily smoker, light daily smoker, and heavy daily smoker columns, columns are not mutually exclusive.

<sup>a</sup>PATH = Population Assessment of Tobacco and Health survey.

<sup>b</sup>Non-daily smokers = smoking on 1–29 days in the past 30.

<sup>c</sup>Light daily smokers = smoking on 30 days in the past 30; 1–10 cigarettes per day.

<sup>d</sup>Heavy daily smokers = smoking on 30 days in the past 30; greater than 10 cigarettes per day.

<sup>e</sup>wt% = weighted percentage.

potentially progress to regular use of—a variety of new tobacco products. The increased prevalence of MTP use has important implications for tobacco use treatment, research, and policy. Below, we highlight implications for each of these three areas. Given that much of the extant literature has focused on MTP use among cigarette smokers, the remainder of this commentary will focus on MTP use in this population.

### Implications for Tobacco Treatment Efforts

Prior research has highlighted a variety of differences between cigarette-only users and cigarette smokers who also use other tobacco products. Dual and MTP use are associated with greater nicotine exposure,<sup>9</sup> nicotine dependence,<sup>10</sup> and poorer smoking cessation outcomes,<sup>9,11</sup> as compared to cigarette-only use.

To date, the vast majority of tobacco use cessation research and clinical intervention guidelines have focused specifically on the cessation of a single tobacco product—traditionally a focus on the cessation of cigarettes. The U.S. Clinical Practice Guideline for Treating Tobacco Use and Dependence, last updated in 2008,<sup>12</sup> for instance, only briefly discusses treatment strategies for non-cigarette tobacco products such as cigars, pipes, and smokeless tobacco. Most notably, MTP use is not discussed within these guidelines at all. The 2015 U.S. Preventive Services Task Force recommendations address cessation of “tobacco smoking,” more generally, noting that “although the USPSTF acknowledges that tobacco may be used in other forms and that other substances aside from tobacco may be smoked, they are not the focus of this recommendation.”<sup>13</sup> Similar to the PHS guidelines, however, MTP use is not addressed. The rise of modern electronic health records has identified the assessment of tobacco use as essential to early implementation efforts. While the electronic health record prompts or requires clinicians to ask about and intervene on cigarette use (eg, “Do you smoke?”), other tobacco product use is not nearly as universally or comprehensively assessed or documented.<sup>14</sup>

Treatment recommendations have also failed to keep up with light or non-daily cigarette users, the population among whom MTP use is most prevalent.<sup>13</sup> A non-daily cigarette smoker who is also using other tobacco products on a daily basis will likely require a different—and potentially more intensive—intervention as compared to a non-daily cigarette smoker who is not using other tobacco products (ie, is a truly intermittent cigarette smoker/tobacco user). Within the context of MTP use, psychosocial interventions may need to focus on the fact that various tobacco products—while all capable of delivering nicotine—may be used for different reasons and in different contexts.<sup>15</sup> It is likely that addressing the role of cues, norms, and motivations for the use of multiple products will be more complex than for a single product.

Attempting to utilize pharmacological cessation interventions for the purposes of treating MTP use can pose difficulties as well. For instance, the dosing instructions for nicotine replacement therapy are based on the number of cigarettes smoked per day (eg, 21 mg nicotine patch greater than 10 cigarettes per day),<sup>16</sup> with no recommendations for dosing based on the use of other tobacco products. Moreover, the use of nicotine replacement therapy is only approved by the Food and Drug Administration for cigarette smoking cessation, and not as an aid to quit using other tobacco products.<sup>17</sup> These current guidelines are problematic, given that smokers are increasingly using tobacco products in addition to cigarettes, and that the precise contents of those products can be ambiguous (eg, poor/inaccurate product labeling or user uncertainty regarding e-cigarette nicotine content).

One potential alternative approach may be to adopt a biomarker-based dosing strategy, whereby effective nicotine replacement therapy dosing is developed based on individuals’ baseline cotinine levels—though the feasibility of such an approach remains unestablished. Persons presenting for tobacco dependence treatment would provide a biological sample (eg, saliva, urine, and blood) to be analyzed via rapid cotinine testing, with appropriate nicotine replacement therapy dosing to be dispensed based on the test values. In general, guidelines for treating tobacco dependence need to reflect the reality that MTP use is increasingly prevalent. Additionally, treatment guidelines should be developed and disseminated to providers in light of the possibility that some tobacco users presenting for treatment may be willing to cut down on or quit some but not all tobacco products. For example, a dual combusted cigarette and little cigar user may be willing to cease use of combusted cigarettes, but not little cigars. Scenarios such as this may have implications for the potential lapse and/or relapse to combusted cigarette use.

### Implications for Tobacco Research

The prevalence of MTP use—particularly among non-daily cigarette smokers—also has significant implications for tobacco research. For instance, recruiting samples of cigarette smokers with exclusion criteria that rule out participation based on the use of MTPs or use of MTPs over some threshold (eg, using non-cigarette tobacco products on or greater than a specified number of days per month) runs the risk of arriving at findings that will not generalize to nearly half of the cigarette smoking population (and just over half in the case of non-daily cigarette smokers). Given the increasing prevalence of other tobacco product use<sup>3,7,18,19</sup> this is an issue that requires continued consideration. Clinical researchers should be mindful in the design of their study whether and how MTP use will impact the effect of their intervention on study outcomes and whether inclusion criteria or intervention design can be altered to allow for MTP-using participants. They should also note the tobacco-using populations to which their study findings generalize (ie, non-daily cigarette smokers in general versus the approximately half of non-daily cigarette smokers who do not use other products), and emphasize as a limitation that their findings results from study of single tobacco product users will likely not generalize to the population as a whole.

### Implications for Tobacco Regulation

Many tobacco regulatory science studies conducted to date have evaluated the impact of a potential regulation aimed at a *single tobacco product* among users of *that single tobacco product* (eg, investigating the impact of nicotine reduction in cigarettes among cigarette-only smokers). The exclusion of MTP users in this research potentially limits the degree to which regulatory scientists can infer and model how potential regulatory actions might impact a sizable proportion of cigarette smokers.<sup>15</sup> For instance, dual and MTP users may be at risk of increasing the use of one tobacco product in response to regulation that is targeted at another tobacco product. Such effects may not necessarily increase health risk (eg, increased use of e-cigarettes as a result of regulation that limit the nicotine content of cigarettes), but in some cases may (eg, increased use of cigarettes following regulations that limit flavors in e-liquid). Mapping out and estimating the potential patterns of tobacco product substitution in response to regulations should remain a key priority in designing tobacco regulatory research.<sup>15</sup>

## Conclusions

A significant proportion of the U.S. population uses MTP: MTP use is common across users of all tobacco products, with nearly half of all non-daily cigarette smokers reporting MTP use. These findings highlight the need to address MTP use in the design and implementation of tobacco dependence treatment interventions and tobacco regulatory science efforts, as well as in inclusion criteria for research among cigarette smoking populations. Complex patterns of MTP use make this a difficult task, yet it should be a key priority for tobacco control in the current marketplace. Dedicated efforts across preclinical, clinical, public health, and policy researchers are needed to define metrics or scales of MTP use that can drive novel research on treatment and policy interventions in the growing population of MTP users.

## Supplementary Material

Supplementary data are available at *Nicotine and Tobacco Research* online.

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## Declaration of Interests

None declared.

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