

Evaluating tobacco retailer experience and compliance with a flavoured tobacco product restriction in Boston, Massachusetts: impact on product availability, advertisement and consumer demand

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ABSTRACT

Background Flavoured tobacco products are widely available in youth-accessible retailers and are associated with increased youth initiation and use. The city of Boston, Massachusetts restricted the sale of flavoured tobacco products, including cigars, smokeless tobacco and e-cigarettes, to adult-only retailers. This paper describes the impact of the restriction on product availability, advertisement and consumer demand.

Methods Between January and December 2016, data were collected in 488 retailers in Boston at baseline and 469 retailers at 8-month follow-up, measuring the type, brand and flavour of tobacco products being sold. Process measures detailing the educational enforcement process, and retailer experience were also captured. McNemar tests and t-tests were used to assess the impact of the restriction on product availability.

Results After policy implementation, only 14.4% of youth-accessible retailers sold flavoured products compared with 100% of retailers at baseline ($p < 0.001$). Flavoured tobacco product advertisements decreased from being present at 58.9% of retailers to 28.0% at follow-up ($p < 0.001$). Postimplementation, retailers sold fewer total flavoured products, with remaining products often considered as concept flavours (eg, jazz, blue). At follow-up, 64.0% of retailers reported that customers only asked for flavoured products a few times a week or did not ask at all. Retailers reported that educational visits and the flavoured product guidance list aided with compliance.

Conclusion Tobacco retailers across Boston were largely in compliance with the regulation. Availability of flavoured tobacco products in youth-accessible retailers declined city-wide after policy implementation. Strong educational and enforcement infrastructure may greatly enhance retailer compliance.

BACKGROUND

The increasing availability of flavoured tobacco products in youth-accessible stores remains a concerning public health issue, as these products are appealing to children, adolescents and young adults.¹ Youth use flavoured tobacco products at rates that are generally much higher than non-flavoured products, partially due to the added fruit,

alcohol and candy flavourings which tend to blunt the harsh taste and smell of traditional tobacco.^{1,2} In response to youth use of flavours, the US Food and Drug Administration (FDA) in 2009 banned flavoured cigarettes. However, this legislation did not extend to other types of tobacco products, such as cigars, cigarillos, smokeless tobacco and electronic cigarettes, with flavoured varieties that continue to be manufactured and sold at high rates.^{3–5}

The FDA Commissioner, in late 2018, strongly indicated that flavoured tobacco products were being scrutinised by the agency with some regulatory action limiting youth access to these products potentially pending. Cities across the country (eg, New York City, New York; Chicago, Illinois and Providence, Rhode Island) have enacted regulations restricting or banning the sale of flavoured tobacco products and there is some evidence from New York that these more localised bans diminish youth's use of these products and significantly reduce flavoured product sales.^{6,7} Studies from Minnesota and Massachusetts show that communities with a flavoured tobacco product restriction experienced a significant decrease of flavoured product availability in stores than in comparison communities, with high overall retailer compliance.^{8,9}

In December 2015, the Boston Board of Health passed a city-wide flavoured tobacco product restriction (FTPR), which restricted the sale of flavoured tobacco products and nicotine-delivery products in all retail outlets other than adult-only (individuals under 21 prohibited from establishment) retail tobacco stores (eg, tobacconists, vape shops). Products such as cigars, little cigars, pipe tobacco, chewing tobacco, blunt wraps, hookah, shisha, electronic cigarettes and e-liquids were all covered by this regulation and were no longer allowed to be sold in flavours, excluding mint and menthol. The exclusion of mint and menthol mirrors the FDA's 2009 ban on the sale of flavoured cigarettes, which also excluded mint and menthol. Increasingly, localities across the USA (eg, San Francisco, California; Minneapolis, Minnesota) are beginning to include mint and menthol as part of their flavour product restrictions.

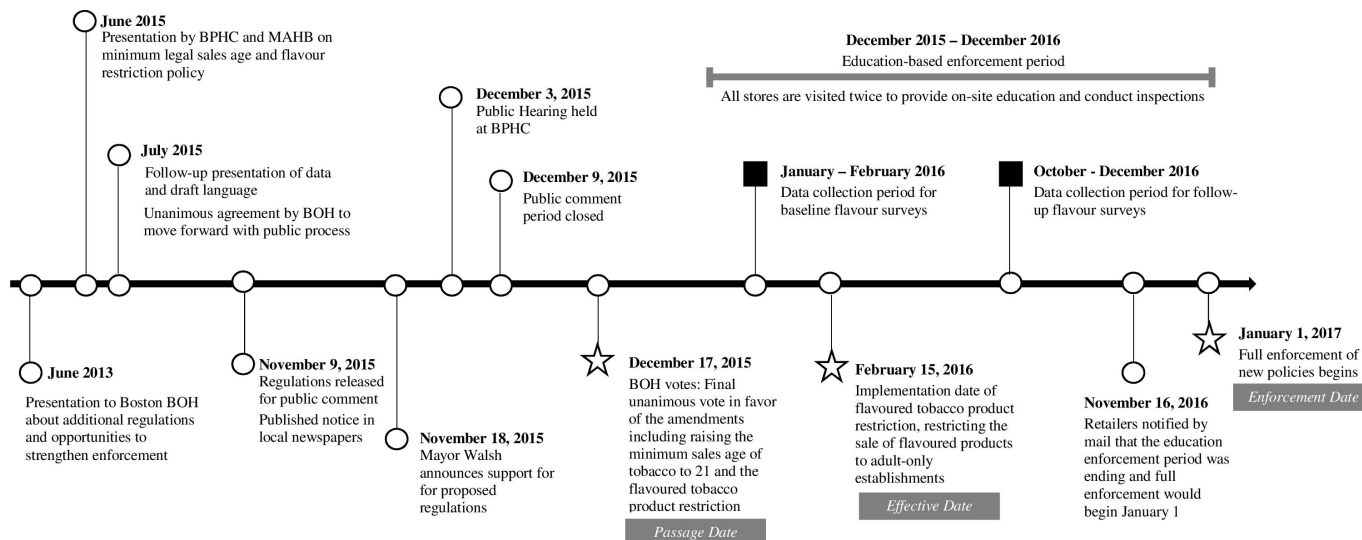


Figure 1 Timeline of Boston policy activities during implementation of a flavoured tobacco product restriction. Boston BOH, Boston Board of Health; BPHC, Boston Public Health Commission; MAHB, Massachusetts Association of Health Boards.

Multiple steps preceded passage of the regulation, including presentations to the Board of Health; a public comment period; notification to all tobacco retailers; a press release; a Mayoral press conference; a public hearing and the final presentation of findings. These activities culminated with the Board’s vote to pass the regulation on 17 December 2015, with an effective date of 15 February 2016 (for a specific timeline of key events, see figure 1). From December 2015 to December 2016, retailers were visited multiple times, with education conducted in multiple languages to accommodate retailers with limited English proficiency, as part of an education-based enforcement period, and were provided with a flavoured product guidance list (‘Guidance List’) developed in part by the Massachusetts Association of Health Boards (MAHB).¹⁰ Beginning in 2014, field staff in early adopting communities in Massachusetts, outside of Boston, populated the Guidance List with the product type, brand name and flavour name of tobacco products that were explicitly promoted as being flavoured, as well as concept flavours (ie, flavoured tobacco products that are not designated as a flavour, eg, blue, red). Products on the list are tobacco products that have a taste or aroma other than mint, menthol or plain. A Guidance List makes clear to both retailers and enforcement agents what products are prohibited under the FTPR. List updates may be necessary as tobacco distributors add and change their flavoured tobacco product offerings. At the time of policy implementation, the Guidance List had been updated twice since its creation in 2014. Updated lists are redistributed to both enforcement agents and tobacco retailers, with time given to comply with new updates to the list.

On 16 November 2016, all retailers were notified by mail that full enforcement (ticketing and fines) of the flavoured product restriction would commence on 1 January 2017. In the case of violations, retailers would be fined US\$200 for the first violation, US\$400 with a 7-day suspension for a second violation within 24 months of the first violation, US\$600 with a 30-day suspension for the third violation within 24 months of the first and second violation and US\$800 with a 60-day suspension for the fourth or more violations within 24 months of the first, second and third violation. Authority to enforce the flavoured tobacco restriction is primarily held by the Boston Public Health Commission.

The Massachusetts Tobacco Cessation and Prevention (MTCP) programme conducted an evaluation of these activities to determine the extent to which this regulation was associated with reducing the availability of flavoured tobacco products in youth-accessible retailers in Boston. This paper describes the results of this evaluation in three areas. First, it presents a detailed overview of flavoured product availability and advertisements in the retail environment in Boston prior to the enactment of the FTPR. Second, it evaluates the impact of the FTPR on flavoured tobacco advertising and availability of flavoured tobacco products in the retail environment (ie, retailer compliance with the FTPR). Third, it assesses retailer experience with compliance, including facilitators and barriers to compliance, changes in shelf-space and reported demand of flavoured products postregulation enactment.

METHODS

MTCP maintains a database of all active tobacco retailers in Massachusetts. Boston is the largest community in Massachusetts, with over 800 retailers across 23 neighbourhoods in 2015. Although Boston is a racially and ethnically diverse city, neighbourhoods tend to remain highly homogenous due to a history of racial residential segregation.¹¹ Neighbourhoods in Boston that are primarily made up of people of colour, or are low-income, report greater rates of health risk behaviours such as smoking, and a higher burden of chronic diseases.¹² Prior research from Boston shows that low-income neighbourhoods and neighbourhoods of colour have a greater density of tobacco retailers and more tobacco advertisements.^{13 14} As a result, a purposeful sample of 565 youth-accessible retailers was selected for surveying, with emphasis on surveying in neighbourhoods with known racial and socioeconomic health disparities.

One hundred per cent of stores from the neighbourhoods of Allston, Brighton, Charlestown, Dorchester, East Boston, Hyde Park, Jamaica Plain, Mattapan and Roxbury were included in this sample. Although funding did not allow for a full sample, 50% of stores from the neighbourhoods of Mission Hill, Roslindale, South End and South Boston were sampled, in order to collect data in smaller neighbourhoods that experience greater exposure to tobacco products in the retail environment. Adult-only

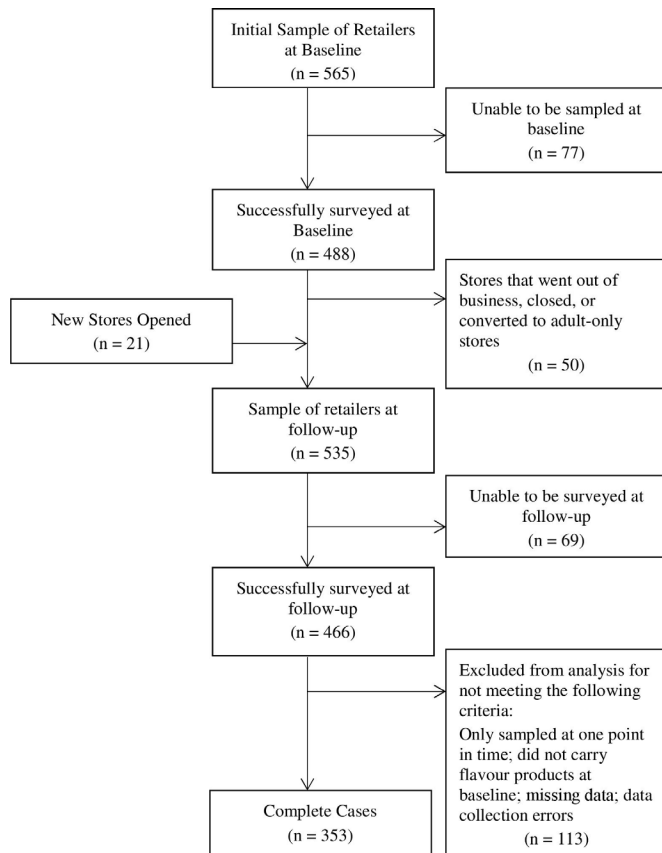


Figure 2 Sampling of Boston retailers.

retailers were exempted from the regulation and thus our sample comprised youth-accessible retailers only.

A total of 488 stores were successfully surveyed during baseline (86.4% response rate) and 469 stores were surveyed at follow-up (87% response rate), with 410 stores surveyed at both time points. Retailers surveyed at only one time point or were missing data on key measures (eg, flavour product availability or advertisement) were excluded from the final analytic sample (figure 2). Thus, comparisons on flavoured product availability and advertising between baseline and follow-up use only complete case retailers (n=353). Boston demographics and retailer information are detailed in table 1.

Survey development

MTCP evaluation staff developed a store survey to evaluate the FTPR, administered by Tobacco Compliance Officers (trained staff from the Boston Tobacco Prevention and Control Programme), who perform inspections in-store to ensure compliance with municipal and state tobacco control regulations. Surveys were administered at baseline, before the regulation went into effect (January to February 2016), and at follow-up, 8–12 months after the regulation went into effect but before official enforcement of the flavour restriction began (October through December 2016). The baseline and follow-up surveys documented: 1) number of flavoured tobacco products sold in the retail environment; 2) number of advertisements for flavoured tobacco products inside and/or outside of the store; 3) store type (convenience store, grocery store, gas station mini-mart, liquor store or supermarket). Both baseline and follow-up surveys also captured any enforcement and educational activities conducted by Compliance Officers during the visit (eg, handing

Table 1 Boston demographics and prepost change after the enactment of a flavoured tobacco product restriction

Demographic measures		
Boston demographics†		
Total population (N)	650281	
Number of designated neighbourhoods (N)	23	
Non-white (%)	54.5	
Median income (US\$)	55777	
Independent retailers (%)	81.3	
Tobacco retail density	1.40	
Stores selling flavoured products at baseline‡ (%)	88.6	
Complete case retailers	353	
Prepost change (complete case retailers)‡		
Measures	Baseline	Follow-up
% stores selling flavoured tobacco products	100.0	14.4*
Average number of flavoured products sold	19.5	0.39*
% of stores with flavoured product advertisements	58.9	28.0*

*P<0.05.

†Demographic data from the 2011–2015 American Community Survey (ACS) Estimates.

‡All stores who were surveyed at baseline (N=488).

§Prepost change is assessed only among complete case retailers who were surveyed at both baseline and follow-up periods (N=353).

out the Guidance List, answering questions from retailers) and any barriers experienced by Compliance Officers during data collection (eg, language barriers, manager/owner unavailable).

The follow-up survey included the following measures, asked of retailers, to better understand their experiences during and after implementation of the FTPR: 1) methods retailers used to vacate their stock of flavoured tobacco (eg, sold down, returned stock to distributor); 2) factors that helped facilitate retailer compliance (eg, in-person education, Guidance List); 3) barriers to retailer compliance (eg, not enough time to sell down, unsure if a product is flavoured) and 4) whether and how often customers still asked for flavoured tobacco products.

MTCP contracted with CounterTools,¹⁵ a non-profit organisation that provides technical assistance and tools to help states and communities counter tobacco industry tactics, to develop an online, mobile version of the survey to help expedite data collection for flavoured tobacco products in stores. The online mobile survey featured an automated look-up function that allowed Compliance Officers to quickly look-up flavoured products from a database based on the flavoured product guidance list to expedite inventory documentation. At the time of data collection, Compliance Officers also had the opportunity to document any additional flavoured products found that were not captured in the original list. Members from MTCP and CounterTools provided in-person training to Compliance Officers on the data collection process and the mobile survey prior to baseline data collection.

Flavored tobacco product inventory

As part of the data collection process, Tobacco Compliance Officers collected information about types of flavoured tobacco products sold including: the brand name (eg, Backwoods, Game), type (eg, cigar, cigarillo, smokeless tobacco, electronic (e)-cigarette or e-liquid), flavour (eg, vanilla, grape) and if products

were explicitly designated as a flavour (eg, Dutch Master Vanilla) or a concept flavour (eg, Dutch Master Blue). Compliance Officers did not collect the total inventory count of a single type of product that was being sold, but rather the number of unique products present at each store (eg, Game Blue, Game Red, Blunt Ville Pink, etc).

Data analysis

The main analysis compared retailer characteristics before and after regulation implementation using the complete case analytic sample. T-tests were used to assess differences in responses during one point in time. McNemar’s test for categorical variables and paired sample t-tests for continuous variables were used for bivariate comparisons between baseline and follow-up measures. The analysis assessed group differences prior to regulation enactment (baseline) as well as postregulation (follow-up) to evaluate the impact attributable to the regulation implementation. All analyses were conducted in R V.3.4.4 (<https://cran.r-project.org/>).

RESULTS

Baseline: retail environment prior to regulation enactment

Of the 488 youth-accessible retailers in Boston surveyed at baseline, 88.6% of retailers sold flavoured tobacco products (table 1). Among our final analytic sample of prepost retailers (excluding retailers who did not sell flavoured products at baseline, n=353), tobacco retailers sold an average of 19.5 types of flavoured products (SD=13.4, max=83) (table 1). Advertising for flavoured tobacco products was present at over half (58.9%) of tobacco retailers at baseline.

Twenty-three per cent of retailers had flavoured product advertising outside and 54.7% of retailers had flavoured product advertisements inside the stores (data not shown). The most common type of flavoured tobacco product sold was cigars, cigarillos or blunt wraps, making up 72.6% of all flavoured products, followed by e-cigarettes or e-liquids (16.4%) (table 2).

One hundred and eighteen unique brands of flavoured products were identified at baseline (table 2). Cigars, cigarillos and blunt wraps made up the greatest proportion of flavoured tobacco products sold, while smokeless tobacco and pipe tobacco only made up a small percentage of flavoured products found in stores (<4%). The most common flavours were grape, vanilla, ‘blue’, chocolate and wine (table 2).

Follow-up: postregulation retail environment

At the follow-up period, only 14.4% of youth-accessible tobacco retailers still sold flavoured tobacco products compared with 100% among all complete case retailers at baseline (n=353, p<0.001). In Boston overall, flavoured tobacco product advertising decreased by 28.6 percentage points between the baseline and follow-up period (54.5%–25.8%, p<0.001) (table 1).

There was also a substantial reduction in the total number of flavoured products inventoried at follow-up. The average number of flavoured products being sold at follow-up was 0.39 products among all stores, a significant decrease from the average of 19.5 flavoured product being sold at baseline (p<0.001). Among stores who were still selling flavoured tobacco products at follow-up (n=51), the average number of flavoured products being sold was three products. Of these stores, 45% (n=23) were only selling one product and 88% (n=45) were selling five types of products or less (data not shown). Of the 144 flavoured product types still available in stores follow-up, 84% products were specifically labelled with a fruit, food or alcohol flavour.

Table 2 Most prevalent flavoured tobacco products sold at retailers during baseline and follow-up in Boston, Massachusetts

	Baseline n=353 retailers		Follow-Up n=353 retailers	
Total number of flavoured products inventoried*	6916		144	
Total number of unique brands	118		26	
Total number of unique flavours	441		40	
	N	%	N	%
Product type				
Cigars/Cigarillos/Blunt wraps	5020	72.6	123	85.4
Electronic (e)-cigarettes or e-liquids	1135	16.4	17	11.8
Hookah/Shisha	507	7.3	4	2.8
Smokeless/Dissolvable	247	3.6	0	0.0
Pipe tobacco	7	0.1	0	0.0
Brand name				
Dutch Master	1243	18.0	19	13.2
Blunt Ville	931	13.5	11	7.6
Black & Mild	585	8.5	16	11.1
Backwoods	506	7.3	11	7.6
Garcia Y Vega Game	409	5.9	22	15.3
Flavour name				
Grape	708	10.2	12	8.3
Vanilla	681	9.9	17	11.8
Blue	374	5.4	21	14.6
Chocolate	337	4.9	10	6.9
Wine	284	4.1	6	4.2
Flavoured tobacco product				
Dutch Master Vanilla	280	4.1	6	4.2
Black & Mild Wine	266	3.9	6	4.2
Dutch Master Grape	260	3.8	4	2.8
Dutch Master Chocolate	237	3.4	4	2.8
Blunt Ville Vanilla	205	3.0	5	3.5
Top concept flavours available				
Blue	374	5.4	21	14.6
Palma	189	2.7	2	1.4
Jazz	79	1.1	0	0.0
Red	56	0.8	0	0.0
Green	16	0.02	0	0.0

This table reports the products most frequently found in youth-accessible tobacco retailers in Boston.

*During each retailer visit, field staff collected information on each unique product seen in stores (eg, Game Red, Game Blue). This number represents the total number of product types inventoried among all stores surveyed and is not de-duplicated.

The other products at follow-up were typically labelled with concept flavours, including colours (eg, jazz, blue).

Enforcement/Educational activities and retailer compliance

Tobacco Compliance Officers performed a number of educational activities at both baseline and follow-up visits (online supplementary table 1). Nearly half of retailers (49.6%) received at least one retailer handout prior to the follow-up data collection visit, which described the details of FTPR, including the adult-only exemption, penalties for non-compliance, rationale for the regulation and products covered by the regulation. Compliance Officers were also asked about common barriers experienced during the data collection visits at baseline and follow-up. At 10.5% of visits at baseline and 2.9% of visits at follow-up, retailers did not speak English. At 8.8% of visits at

baseline, retailers or clerks were not knowledgeable about or familiar with flavoured tobacco product stock compared with 2.4% at follow-up (online supplementary table 1).

Of the 51 retailers that were not in compliance during the follow-up period (after the policy effective date, but prior to sanctioned enforcement of the policy), 72.5% did not know a product was in violation of the policy (table 3). During the follow-up period, 85.5% of retailers reported that educational visits and 62.2% reported that the MAHB flavoured product guidance list were the most helpful for achieving compliance. When asked about challenges in complying, 35.6% of retailers indicated that distributors would not take back their flavoured product stock, 34.4% did not know which products they were allowed to sell and 29.8% reported they did not have enough time to sell down their stock (table 3).

Impact on shelf-space and subsequent demand

Retailers were asked about what was done with shelf-space after the policy and most replaced flavoured products with more or new non-flavoured tobacco products (70.2%) (table 3). Shelf-space was also used for other non-tobacco products, such as medication, alcohol or liquor, or other personal toiletries and hygiene products in 13.0% of retailer stores, and 6.9% of retailers left the space vacant. Customers still asked for flavoured products a few times a day according to 32.9% of retailers, but nearly two-thirds of retailers (64%) reported that customers only asked a few times a week or did not ask for flavoured products at all. However, when looking at retailers who took down their flavoured tobacco ads versus retailers that did not take down ads, 23.4% of retailers that took down ads reported that customers do not still ask for flavoured tobacco products compared with 54.2% of retailers who did not take down their flavoured ads ($p < 0.001$) (data not shown).

DISCUSSION

To the best of our knowledge, this study is the first to collect information on the brand, type and flavour of other tobacco products available in a large, urban community prior to the implementation of an FTPR. At both baseline and follow-up, cigars, cigarillos and blunt wraps made up the greatest proportion of total flavoured tobacco products sold in stores. Prior analysis of tobacco industry documents indicates that cigars have historically been used by the industry as 'starter products' for youth and other inexperienced users of tobacco, by using flavours and menthol to mask the harsh taste, reduce throat irritation and make smoke easier to inhale.³ Research conducted by Market Street Research in 2010 indicated that there were over 100 different flavours of cigars or cigarillos being sold across retailers in Boston.¹⁶ Half a decade later, our study found several thousand products in the retail environment, including four times the number of unique flavours recorded.

Overall, the FTPR was effective in removing flavoured products from youth-accessible retailers. This result is similar to Saint Paul and Minneapolis, Minnesota, where significantly fewer convenience and grocery stores sold flavoured products after implementation of a flavoured product restriction.⁸ A prior evaluation of the flavoured tobacco product sales ban in New York City found that flavoured tobacco sales significantly decreased by 87% following the ban.⁶

While some Tobacco Compliance Officers experienced barriers (eg, language barrier, clerk knowledge of products) during data collection, results indicate that most retailers are complying with the policy. High compliance is likely a result of

Table 3 Retailer experience during implementation of the flavoured tobacco product restriction in Boston, Massachusetts (n=353)

	N	%
Reasons why retailer was not in compliance* (n=51)		
Was not aware of policy	2	3.9%
Disagreed with the policy	1	2.0%
Distributor sent the products	4	7.8%
Did not know the product was in violation	37	72.5%
Unable to sell down stock	5	9.8%
Do not know or other	18	35.3%
Resources that helped retailers comply with regulation* (n=352)		
Educational visit	301	85.5%
Retailer FAQ	15	4.3%
Flavoured product Guidance List (FPGL)	219	62.2%
Information from my distributor(s)	22	8.7%
Other	5	1.4%
None of the above	8	2.3%
Do not know	34	9.7%
Challenges with compliance experienced in first 6 months after regulation* (n=326)		
Did not have enough time to sell down stock	97	29.8%
Distributor would not take back all of my flavoured products	116	35.6%
Did not know which products I could or could not sell	112	34.4%
Other	18	5.5%
Do not know	162	49.7%
What was done with shelf space previously occupied with flavoured tobacco products* (n=346)		
Began carrying more or new non-flavoured tobacco products	243	70.2%
Replaced with other non-tobacco products	45	13.0%
Left space vacant	24	6.9%
Other	9	2.6%
Do not know	34	9.8%
What the distributor did regarding flavoured tobacco products* (n=343)		
Provided a product list of non-flavoured products that can be sold	69	20.1%
Continue to promote and encourage me to sell products on the FPGL	6	1.7%
Actively promote and encourage me to carry new flavoured products not yet on the FPGL	4	1.2%
Other	85	24.8%
Do not know	184	53.6%
Distributor(s) changed retailer contracts (n=191)		
Yes	1	0.5%
No	190	99.5%
In the past week, how often did customers come in and ask to purchase flavoured tobacco products on the FPGL (this does not include sweet or menthol-flavoured products)? (n=353)		
A few times a day	116	32.9%
A few times a week	129	36.5%
Not at all	97	27.5%
Do not know	11	3.1%

Retailers may not have answered every question asked during the follow-up data collection period. N's represent the number of retailers who answered that particular survey question. Answers were drawn only from retailers part of the final analytic sample (n=353).

*Survey respondents had the option to choose multiple responses. Per cents do not add up to 100%.

a multitude of factors that occurred during policy implementation. Tobacco retailers were given 1 year to fully comply with the provisions of the regulation, allowing ample time for sell-down. Additionally, Boston has a strong educational and enforcement infrastructure in the form of the Boston Tobacco Prevention and Control Programme (BTPC), where Compliance Officers performed in-person educational visits in multiple languages and provided educational materials, such as the Guidance List. While we saw large reductions in flavoured tobacco product availability across the whole city, the reduction of flavoured tobacco availability and advertisement in neighbourhoods that already had a disproportionate amount of tobacco retailers and tobacco advertisements could benefit youth in these neighbourhoods, as both higher retailer density and advertisements have been shown to be associated with youth initiation of tobacco products.^{17–19}

Retailers cited educational visits and the flavoured product guidance list as the most helpful for complying with the FTFR. Guidance Lists, such as those developed by Chicago²⁰ or the MAHB,²¹ are hosted online and can be downloaded for free. A flavoured product guidance list can assist both retailers and enforcement officers with compliance and can be used as an educational tool in the face of limited resources. However, concept flavours pose a challenge for compliance as retailers may not know whether these products violate the FTFR or not. Several of the flavoured products still being sold in the follow-up period were concept flavours. Results from a 2017 study of 16 concept flavours available in New York City retailers indicated that 14 out of 16 products had flavour chemical levels that were just as high as tobacco products explicitly labelled as flavour.²² Sales data from 2012 to 2016 indicated that the proportion of concept flavour sales increased from 9% to 15%, coinciding with an increase in the number of state and local restrictions on the sale of flavoured tobacco products.²³

While the FTFR reduces availability of flavoured tobacco products in the retail environment, it may not reduce overall tobacco availability if retailers re-stock the shelf space with non-flavoured tobacco. Additionally, as this particular FTFR excludes mint or menthol from its definition of flavour, these products are still widely available and may encourage youth initiation of cigarettes and other tobacco products, similar to products that are available in candy, alcohol or fruit flavours.^{24 25} However, a small portion of retailers used this space for non-tobacco products, thus reducing the size of the power wall (shelves that prominently display several types of tobacco products and advertisements, typically located behind the register).

There are some limitations to our study. A full sample of retailers across Boston was not conducted due to limited time and resources; as a result, some neighbourhoods in Boston are not represented in the sample (eg, Beacon Hill, North End). As Boston is a large, diverse city, with a robust tobacco control programme that can perform both education and enforcement, results may not be generalisable to smaller geographies or geographies without a similar infrastructure. Follow-up surveys were done before the official enforcement period of the FTFR policy that started in January 2017. Despite this, most retailers were in-compliance with the regulation, suggesting that retailers begin complying with the regulation prior to fine-based enforcement. It is possible that more retailers would have complied once fine-based enforcement of the FTFR policy began and our surveys may capture an underestimate of true compliance with the policy.

There are also several strengths to the study. Although not all Boston retailers are captured in this study, a sample of the same retailers was surveyed at both baseline and follow-up, allowing for a true longitudinal comparison over time. This study also

captures the availability and change in both indoor and outdoor advertising for flavoured tobacco products at two time points. This is the first study of its kind to capture detailed information about both the education and enforcement process conducted by the BTPC and the retailer experience postimplementation of an FTFR.

CONCLUSION

The flavoured tobacco product restriction enacted in Boston led to a substantial decrease in the availability of flavoured tobacco products in youth-accessible retailers. As flavoured tobacco products appeal to youth and are associated with youth initiation, this policy may be an effective tool in addressing youth initiation of tobacco and youth use of other tobacco products, including e-cigarettes.

What this paper adds

- ▶ Data collection before the implementation of a flavoured tobacco product restriction in Boston, Massachusetts shows that cigars, little cigars or cigarillos and electronic cigarettes make up the greatest proportion of flavoured products, available in over 400 unique flavours.
- ▶ Following policy implementation, availability of flavoured tobacco products decreased city-wide in youth-accessible retailers, accompanied by a reduction in flavoured product advertisements and consumer demand.
- ▶ Primary barriers to retailer compliance include difficulties selling down stock and not knowing if a product was considered flavoured or not. Retailers cited educational tools, such as a flavoured product guidance list, as most helpful for compliance.

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Contributors LK assisted in study design, creation of data collection instruments, data analysis and led the development and writing of the manuscript. CS supported study design, analysis design and provided manuscript edits. JP conducted primary data analysis and provided manuscript edits. WS supported analysis design and provided manuscript edits. GS assisted in study design, survey instrument development, data collection logistics and critical review of the manuscript. JR assisted in study design, survey instrument development and data collection logistics. NH contributed significant background text. All authors contributed ideas used in the manuscript, and helped to review and revise.

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