



## Retailer perspectives on sugar-sweetened beverage taxes in the California Bay Area

Julian Ponce<sup>a,1</sup>, Haoxuan Yuan<sup>b,1</sup>, Dean Schillinger<sup>b</sup>, Hina Mahmood<sup>a</sup>, Matthew Lee<sup>a</sup>, Jen Falbe<sup>c</sup>, Ryane Daniels<sup>b</sup>, Kristine A. Madsen<sup>a,\*</sup>

<sup>a</sup> University of California, Berkeley, School of Public Health, United States

<sup>b</sup> University of California, San Francisco, Division of General Internal Medicine and Center for Vulnerable Populations, Zuckerberg San Francisco General Hospital, United States

<sup>c</sup> University of California, Davis, Human Development and Family Studies Program, Department of Human Ecology, United States

### ARTICLE INFO

#### Keywords:

Policy  
Public health  
Sugar-sweetened beverages  
Primary prevention

### ABSTRACT

The sugar-sweetened beverage (SSB) industry has claimed that food and beverage retailers are opposed to SSB taxes. In 2018 and 2019, we formally evaluated retailers' perceptions of SSB taxes using semi-structured interviews (including open- and closed-ended questions) with 103 randomly selected retailers (50 corner and liquor stores; 28 chain convenience, drug, and mass-merchandise stores; 18 chain supermarkets and discount supermarkets; and 7 independent supermarkets) across 3 cities with SSB taxes (Berkeley, Oakland, and San Francisco); interviews occurred in 2018 and 2019 (approximately 3 years, 1 year and 6 months post tax-implementation, respectively). A majority of both small and large retailers reported the tax had only a minimal effect on their business (70%). About half of retailers believed that other cities should adopt SSB taxes (53%), and were supportive of a statewide SSB tax (53%), noting it would level the playing field and better support health in their communities. Retailers' responses did not differ based on neighborhood income, and only 2 responses differed significantly between large and small retailers. Only 2 of 103 retailers reported raising the price of a non-beverage product in response to the tax, specifically raising the price of snack foods of low nutritional quality and alcoholic beverages. A majority of retailers in 3 California cities with SSB taxes have no concerns regarding the tax, endorse the health goals of SSB taxes and support statewide expansion of SSB tax policies.

### 1. Introduction

Sugar-sweetened beverages (SSBs) have been at the forefront of recent health-related policy debates because of strong evidence that SSBs increase the risk of obesity, diabetes, heart disease, and dental caries (Hu, 2013; Malik et al., 2019). As of 2010, worldwide, more than 180,000 deaths per year can be attributed to SSB consumption alone (Singh et al., 2015). As a result, public health officials have called for interventions to reduce consumption of SSBs (Brownell and Frieden, 2009).

Excise taxes on SSBs are one approach to reducing SSB consumption. Drawing on the successes of tobacco tax regulation (Chaloupka et al., 2019); SSB taxation aims to improve health outcomes and reduce health-related costs by limiting the demand for harmful goods through price-related measures and generating revenues municipalities can

invest in local priorities (Andreyeva et al., 2011). Excise taxes on SSBs are paid by distributors; however, multiple studies demonstrate that SSB excise taxes lead to higher shelf prices (Falbe et al., 2015; Roberto et al., 2019; Silver et al., 2017). In 2014, the city of Berkeley, California became the first US jurisdiction to enact a penny-per-ounce SSB tax by voter initiative. In 2016, Oakland and San Francisco followed suit, with implementation occurring in July 2017 and January 2018, respectively. Berkeley demonstrated a 53% reduction in SSB consumption in low-income neighborhoods over three years, compared to neighboring, untaxed cities (Lee et al., 2019); other jurisdictions have demonstrated significant reductions in SSB purchasing (Madsen et al., 2019).

Empirical evidence has not revealed declines in employment subsequent to the implementation of SSB taxes (Guerrero-Lopez et al., 2017; Lawman et al., 2019). Nonetheless, concerns continue to be raised, largely by the beverage industry (Niederdeppe et al., 2013), that

\* Corresponding author at: 2121 Berkeley Way West, Room 6140, Berkeley, CA 94720-7360, United States.

E-mail address: [madsenk@berkeley.edu](mailto:madsenk@berkeley.edu) (K.A. Madsen).

<sup>1</sup> Co-first authors.

SSB taxes will hurt local economies. The beverage industry's communications also suggest that SSB taxes would be spread across food products, leading to a so-called "grocery tax"; and that SSB taxes represent an unfair (regressive) tax. To our knowledge, no research has assessed food and beverage retailers' perspectives on SSB taxation. The business community is an important stakeholder and constituent to engage in the SSB taxation policy debate. This is especially important for states considering SSB taxation measures, and for states where industry lobbying efforts have led to, or are attempting to pass, SSB tax preemption laws (Crosbie et al., 2019).

It is important to examine perspectives from both large retail establishments and small stores, and from businesses in higher- and lower-income neighborhoods, where business impacts could differ substantially. Large stores may rely less on sales from SSBs than smaller corner and liquor stores, where SSBs could make up a substantial portion of sales. Similarly, if consumers in taxed cities choose to shop in another city to avoid the tax, chain stores could make up for such losses in their own stores in adjacent cities that are not subject to the tax.

In the current study, we conducted interviews with diverse food and beverage retailers in Berkeley, Oakland, and San Francisco, to formally evaluate retailers' perceptions of and experiences with SSB taxes across a number of domains, including impact on overall business, attitudes towards the SSB tax, and opinions about expanding SSB taxes, taking store size into account.

## 2. Methods

### 2.1. Sample

In this cross-sectional study, we used stratified random sampling to select a representative sample of retailers across store type and neighborhood median-income from the 3 cities. A list of beverage retailers was compiled from Reference USA (Morland et al., 2002). Within each city, stores were randomly sampled by retailer type, adapted from the North American Industry Classification System codes (Morland et al., 2002): 1 store from each drugstore and mass-merchandise chain and 1 from each of the top 5 convenience chains; 2 stores (1 from the highest tertile of census tract median income and 1 from the lowest) from each major supermarket and discount supermarket chains; 5 corner or small grocery stores and 1 to 2 liquor stores from each tertile of census tract median income; and 2 independent supermarkets from the top and bottom tertile of the census-tract median income. This study was approved by the University of California Berkeley's Committee for the Protection of Human Subjects.

### 2.2. Interviews

Interviews were conducted in person in 2018 and 2019, more than 3 years post tax-implementation in Berkeley, and approximately 1 year post-implementation in Oakland and 6 months post-implementation in San Francisco. Researchers asked to interview the owner or manager of the establishment. If no owner or manager was present, the person running the store at that moment was invited to participate. The semi-structured interviews took approximately 20 min; the researcher recorded the interview if the retailer agreed ( $n = 10$ ) or took detailed field notes. A small incentive (\$5 gift card) was provided upon completion.

### 2.3. Questionnaire

The interview script was developed based on our prior interactions with retailers when collecting data on retail prices (Falbe et al., 2015); and with the intent to assess retailer attitudes towards the tax, and potential unintended consequences of SSB taxes, such as effects on businesses (see Supplemental Materials for questions). Closed-ended (yes/no) questions asked about: communication from beverage

distributors; changes in prices from distributors (not asked in Berkeley because over 3 years had passed since Berkeley's tax was implemented, which could affect recall accuracy) and customer purchases after the tax; concerns about the tax; perceptions of benefits; and support for additional taxes being passed. Closed-ended questions were followed with the question, "Why or why not?" Researchers also asked if, because of the tax, retailers charged more for any non-beverage items or had increased the price of any of beverages from a list of both taxed and untaxed beverages (Table 3); researchers did not specify which beverages were subject to the tax. Across the 3 cities, SSB taxes applied to all non-dairy and non-alcoholic beverages with more than 25 kcal per 12 fl oz, which would include regular soda, sports drinks, energy drinks, sweetened tea, sweetened coffee, fruit-flavored drinks [not 100% juice], and most Kombucha products. We also asked open-ended questions about how the tax affected retailers' business and how retailers think tax revenues should be used.

### 2.4. Analysis

Pearson chi-squared tests (or Fisher's exact tests if expected frequencies less than 5) examined differences between small (corner and liquor stores) and large (chain stores and independent supermarkets) retailer responses to closed-ended questions. (Sensitivity analyses comparing non-chain stores – corner and liquor stores and independent supermarkets – to chain stores yielded similar results [eTable 1].) To address income effects, we compared responses across tertile of the median household income in each store's census tract. Because opinions might shift with longer exposure to a tax, we also compared responses for retailers in Berkeley (with over 3 years of tax exposure) to those in Oakland and San Francisco (exposed for a year or less). Missing responses for closed-ended items (mean 3.9%; range 0% to 7%) were excluded from proportions in Table 2.

Thematic analysis was applied to "why or why not" and open-ended questions. Two researchers read all transcripts and field notes and developed a preliminary codebook. After separately coding a subset of the transcripts, they refined the codebook, identifying three main themes (SSB tax benefits and uses of revenue, equity and business). Each researcher coded half of the remaining interviews.

Responses to the question, "How has the soda tax affected your business?" were reviewed and categorized into a "no or minimal impact" or a "some impact" category. Responses mentioning 'no effect,' 'no impact,' 'minimal,' 'no difference,' 'no change,' 'not much,' 'not really,' 'same,' and 'a little,' were categorized into the "no or minimal impact" category. All other responses were categorized as "some impact."

## 3. Results

Of 127 retailers approached, 103 (81%) agreed to be interviewed, of whom 75% were store owners or managers and 25% were clerks or cashiers (similar for small and large retailers). Table 1 lists the types of stores surveyed across cities, with small stores ( $N = 50$ ) comprising 49% of the sample. Overall, small and large retailers had similar responses to the tax; any areas where responses differed are clearly noted below.

### 3.1. Impacts on business

Small retailers tended to report receiving communications from distributors about the tax (50%) more frequently than large retailers (31%,  $p = 0.052$ ; Table 2). A greater proportion of small retailers (93%) reported that their beverage distributors increased SSB prices after the tax than did large retailers (69%;  $p = 0.015$ ). Among 80 interviewees who had seen invoices from distributors after the tax, the majority (63%) reported seeing a soda or sugar tax charge on invoices. Only 16% of retailers reported receiving additional incentives from

**Table 1**  
Types of Retailers Interviewed in Oakland, San Francisco, and Berkeley.

Retailer Types	Total (N = 103)	By City			By Tertile of Household Median Income <sup>A</sup>		
		Berkeley (N = 34)	Oakland (N = 34)	SF (N = 35)	Lowest (N = 40)	Middle (N = 32)	Highest (N = 26)
Large retailers (N = 53)		(N = 15)	(N = 18)	(N = 20)	(N = 24)	(N = 14)	(N = 12)
Chain Convenience	15	6	4	5	6	5	2
Chain Supermarket	13	2	7	4	5	5	3
Chain Drugstore	8	3	3	2	4	1	2
Chain Discount Supermarket	5	0	2	3	3	2	0
Chain Mass Merchandiser	5	1	1	3	2	1	1
Independent Supermarket	7	3	1	3	4	0	3
Small retailers (N = 50)		(N = 19)	(N = 16)	(N = 15)	(N = 16)	(N = 18)	(N = 14)
Corner Store/Market	38	13	12	13	14	15	9
Liquor Store	12	6	4	2	2	3	5

Interviews conducted in 2018 and 2019. SF: San Francisco.

<sup>A</sup> Within each city, all census tracts were assigned to income tertiles based on the tract’s median household income from the US CensusAmerican Community Survey 2017 5-year estimates. Each store was classified according to the census tract in which it was located.

distributors post-tax, most of which were lower prices for buying in bulk.

Table 3 presents beverages for which retailers reported raising prices as a result of the tax. Among the 87 retailers (84%) who reported raising prices, all increased the price of regular soda, followed by energy drinks (72%), sweetened tea (69%), sports drinks (65%) and kombucha (22%). Retailers were not always certain which drinks were taxed and expressed confusion about kombucha frequently, which is subject to the tax. As a manager of a chain supermarket in Berkeley asked: “Where do they draw the line? Why isn’t [Kombucha] considered an added sugar drink?”

Twenty-eight percent of retailers reported raising the price for at least one untaxed beverage, most frequently diet soda (19%) and 100% fruit juice (17%). Less than 5% of retailers reported raising the price of water or milk. One manager of an independent supermarket in Berkeley

who chose to raise the price of diet soda noted: “From the distributor, diet is cheaper than regular soda, but we make it the same price.” Only 2 stores reported raising prices on non-beverage items: a corner store, whose clerk said they raised the price of chips, and a chain supermarket, whose manager noted that they increased the price of both alcohol and chips.

Nearly half of retailers (47%) reported that customers were buying fewer sugary drinks than before the SSB tax (Table 2). As a manager of a liquor store in Oakland said: “People cannot afford to buy soda anymore; they either drink less or go to another city that does not have the tax.” However, when asked “How has the soda tax affected your business overall?”, 70% of retailers (68 out of 97 responding) reported the tax had a minimal effect on their business and only 24% of retailers reported having any concerns about the tax (Table 2).

Table 4 demonstrates that retailers’ level of concern about the tax

**Table 2**  
Retailer responses to questions about the sugar-sweetened beverage taxes, by store size and by tertile of household median income for store’s census-tract location (% responding “Yes”).

	All Stores (N = 103)	By Store Size <sup>C</sup>			By Tertile of Census-Tract Household Median Income <sup>D</sup>			
		Small Stores (N = 50)	Large Stores (N = 53)	P value	Lowest (N = 40)	Middle (N = 34)	Highest (N = 29)	P value
1. Have beverage distributors talked to you about the soda tax?	40%	50%	31%	0.052	49%	42%	39%	0.97
2. Are beverage distributors charging you more for sugary beverages since the soda tax? <sup>A</sup>	80%	93%	69%	0.015	77%	86%	78%	0.68
3. Have beverage distributors offered you more incentives or promotions because of the soda tax?	16%	13%	20%	0.294	16%	16%	18%	0.97
4. Are customers buying less soda or sugary drinks than before the soda tax?	47%	50%	44%	0.548	41%	62%	37%	0.10
5. Do you have any concerns about the soda tax?	24%	21%	27%	0.476	23%	28%	21%	0.80
6. How has the soda tax affected your business? (% responding “Minimally or no effect”) <sup>B</sup>	70%	65%	76%	0.240	69%	63%	81%	0.32
7. Have you heard anything about how revenues from the soda tax will be used?	9%	8%	11%	0.732	5%	12%	11%	0.62
8. Would you like other information from the city about the soda tax?	25%	22%	27%	0.603	28%	19%	28%	0.64
9. Are there good things about the soda tax?	56%	44%	67%	0.018	60%	56%	50%	0.72
10. Does the SSB tax benefit anybody?	69%	60%	77%	0.075	68%	66%	75%	0.71
11. Should other cities adopt a SSB tax?	53%	53%	53%	0.990	57%	47%	56%	0.68
12. Should there be a statewide SSB tax?	54%	55%	52%	0.743	56%	52%	52%	0.90

Interviews conducted in Berkeley, San Francisco, and Oakland in 2018 and 2019. For all questions except #6, values are % of retailers responding “Yes.” Denominator for each question excludes retailers that did not respond to that question (mean missing 3.9%; range 0 to 6.8%). P-values for chi-squared test or Fisher exact test if expected cell size less than 5.

<sup>A</sup> Only asked in Oakland and San Francisco.

<sup>B</sup> Open-ended question was reviewed by 2 researchers and coded as “Minimally or no effect” or “more than minimally.”

<sup>C</sup> Small stores: corner and liquor stores; Large stores: drug, convenience, and mass merchandiser store chains, supermarket and discount supermarket chains, and independent supermarkets.

<sup>D</sup> Within each city, all census tracts were assigned to income tertiles based on the tract’s median household income from the US CensusAmerican Community Survey 2017 5-year estimates. Each store was classified according to the census tract in which it was located.

**Table 3**  
Percent of retailers who reported charging more for various products because of the sugar-sweetened beverage tax, by corner and liquor stores vs. larger retailers.

Product	All Stores (N = 103)	Corner & Liquor Stores (N = 50)	All Other Stores (N = 53)	P value
<b>Taxed Products</b>				
Soda	84%	81%	86%	0.506
Energy Drinks	72%	72%	73%	0.973
Sweetened Tea	69%	68%	70%	0.843
Sports Drinks	65%	64%	66%	0.828
Fruit Flavored Drinks	55%	56%	55%	0.896
Sweetened Coffee	55%	58%	53%	0.598
Kombucha	22%	28%	17%	0.180
<b>Untaxed Products</b>				
Diet Soda	19%	22%	17%	0.520
100% Juice	17%	12%	21%	0.232
Bottled Water	4%	2%	6%	0.618 <sup>B</sup>
Milk	1%	0%	2%	1.000 <sup>B</sup>
Non-beverage item <sup>A</sup>	2%	2%	2%	1.000 <sup>B</sup>

Interviews conducted in Berkeley, San Francisco, and Oakland in 2018 and 2019.

<sup>A</sup> The 2 stores that reported raising prices on non-beverage items noted the non-beverage products were chips and alcohol.

<sup>B</sup> Fisher exact test; expected cell size less than 5.

differed based on product mix, chain status, and store location. With respect to product mix, retailers for whom SSBs comprised only a small part of their business saw minimal or no effect on their business. In contrast, interviews with some liquor and corner store personnel yielded greater concerns. The disadvantage of being located at the border of a taxed city, where customers could easily cross over to an untaxed store, was noted in a few interviews, as was the advantage that chain stores have, with additional stores in untaxed locations.

### 3.2. Retailer attitudes towards SSB taxes

One issue noted by many retailers were customer complaints immediately after the tax went into effect (Table 4, *Interactions with Customers*). A few retailers added signage stating that higher prices were due to the SSB tax to avoid conflict. However, most retailers noted that customer complaints subsequently declined or stopped.

Only 9% of retailers reported hearing how tax revenues would be used (Table 2). When asked if they'd like additional information from their city about the SSB tax, 25% of retailers said they would (Table 2), most frequently citing information on the use of tax revenues. When asked how they thought soda tax revenues should be used, retailers (N = 88) most frequently mentioned: supporting schools or children (N = 28, 32%); health care (N = 23, 26%); health education (N = 16, 18%); or reinvesting in city infrastructure including streets, parks, and highways (N = 15, 17%). An additional 14 retailers (16%) suggested revenues go towards alleviating homelessness.

Two-thirds (67%) of large retailers and just under half (44%) of small retailers (p = 0.018 for the difference in proportions) thought the tax was good, and 77% of large and 60% of small retailers (p = 0.075) thought that the tax would benefit some people (Table 2). Among the 69 retailers who thought the tax had benefits, 37 (54%) mentioned health and an additional 14 retailers (20%) mentioned the potential for other public benefit (Table 4, *Benefits of SSB Taxes*). Thirteen retailers among those who thought that some people benefited from the tax said that benefits only accrued to the city or to government, largely because there was mistrust about how revenues would be used (Table 4).

### 3.3. Opinions about expanding SSB taxes

Fifty-one of 96 retailers (53%) responded that other cities should

**Table 4**  
Retailer open-ended responses to questions regarding concerns about and benefits of SSB taxes.

Concerns about SSB Taxes	
"Soda makes up a small part of our business and as a small grocery, the tax has had no effect on our business." (Corner store, Berkeley; Lowest neighborhood-income tertile)	
"It's a drop in the bucket, because soda is not a big portion of our sales." (Independent supermarket, San Francisco; Lowest neighborhood-income tertile)	
"People buy less SSBs which affects us because, as a liquor store, we only sell SSBs, liquor and candy. The tax is not good for small business." (Liquor store, Berkeley; Middle neighborhood-income tertile)	
"Business is not like it used to be. Soda is everything here." (Corner store, Oakland; Middle neighborhood-income tertile)	
"We don't pay more because corporate absorbs the tax." (Chain drugstore, Oakland; Highest neighborhood-income tertile)	
"We might see a drop in sales, but it does not affect us [chain retailers]. It has more effect on corner stores and small stores." (Chain convenience store, Berkeley; Lowest neighborhood-income tertile)	
"My main concern is customers are going to buy beverages in other cities" (Chain supermarket, Oakland; Lowest neighborhood-income tertile)	
"Customers are no longer coming into my store. They go to big stores and buy in bulk. My sales have gone down by half." (Liquor store, Berkeley; Highest neighborhood-income tertile)	
<b>Interactions with Customers</b>	
"At the beginning we had arguments with customers. They did not know about the tax and thought it was just our store charging more, and it got confrontational." (Corner store, Berkeley; Lowest neighborhood-income tertile)	
"I had to post information for employees on the soda tax so they could inform the customers because the customers would complain." (Chain supermarket, San Francisco; Lowest neighborhood-income tertile)	
"We had a lot of complaints from customers at the beginning [of the tax], but now they are used to it." (Chain convenience store, Berkeley; Lowest neighborhood-income tertile)	
"It would be helpful if the city told stores how the soda tax is being used so that if customers had concerns about the price increase, our management could explain why the soda tax exists and what it is being used for." (Chain drugstore, Berkeley; Lowest neighborhood-income tertile)	
<b>Benefits of the SSB Tax</b>	
"The tax is good because it prevents diabetes among children." (Liquor store, Oakland; Lowest neighborhood-income tertile)	
"It discourages consumption of unhealthy beverages." (Chain convenience store, San Francisco; Middle neighborhood-income tertile)	
"Hopefully it goes back to schools to teach kids about nutrition. That should be the purpose – to give back to the community." (Corner store, Oakland; Middle neighborhood-income tertile)	
"Governments can use the money for food stamps and retirement." (Corner store, Berkeley; Lowest neighborhood-income tertile)	
"It's good for health, but I do not trust politicians. Where is the money going?" (Corner store, Oakland; Middle neighborhood-income tertile)	
"The tax only benefits the government as the money goes to a general fund. The tax is only good if the money actually goes to childhood obesity, education, and health education." (Corner store, Berkeley; Lowest neighborhood-income tertile)	
<b>Expanding SSB taxes</b>	
"The tax should be expanded because cities should think about the future health of people." (Liquor store, Oakland; Lowest neighborhood-income tertile)	
"I would support a statewide tax if the revenue is used to fund public schools." (Independent supermarket, Berkeley; Middle neighborhood-income tertile)	
"Yes to a state wide tax, If cities adopt it, it will even the playing field and help my store." (Supermarket, Oakland; Lowest neighborhood-income tertile)	
"A statewide tax would work because it would prevent people from going elsewhere to buy cheaper options." (Chain convenience store, Berkeley; Lowest neighborhood-income tertile)	
"It is a waste a time, and all the politicians get the money anyway. Nobody else benefits." (Corner store, San Francisco; Highest neighborhood-income tertile)	
"It will just increase the tax for low-income customers who are still going to buy [soda]; education would be better." (Corner store, San Francisco; Lowest neighborhood-income tertile)	
"No, because people are going to buy [soda]. They are going to buy it regardless of the price, just like cigarettes." (Independent supermarket, Berkeley; Highest neighborhood-income tertile)	
"I like sugar taxes, but I just do not like their effect on small businesses." (Liquor store, Berkeley; Highest neighborhood-income tertile)	

Interviews conducted in Berkeley, San Francisco, and Oakland in 2018 and 2019.

adopt an SSB tax, and 53% also supported expanding the SSB tax statewide (Table 2). Among the 59 total retailers who supported a city tax and/or a state tax, 30 (51%) mentioned equity as a reason they supported a state-wide tax, as all retailers would be similarly affected; 26 (44%) felt that taxes promote health; and 7 (12%) mentioned other public benefits (Table 4, *Expanding SSB Taxes*).

Among the 55 distributors who opposed either a city tax (N = 45) or a statewide tax (N = 45), the primary reasons they cited were: general opposition to taxes (N = 13, 24%); concerns that it makes beverages more expensive for customers (N = 11, 20%); concerns that it will harm businesses (N = 8, 15%); and believing that taxes are not effective at reducing consumption (N = 5, 9%). Illustrative comments are provided in (Table 4, *Expanding SSB Taxes*).

### 3.4. Effects of neighborhood household income and tax duration

Retailers' closed-ended responses did not differ based on tertile of median household income for the census tract in which their store was located (Table 2). Despite differences in the time elapsed since implementation of the tax, key outcomes did not differ between retailers in Berkeley and those in Oakland and San Francisco (eTable 2, *Supplemental Materials*).

## 4. Discussion

This study is the first to assess retailer perspectives on SSB taxation in the United States. We found that a majority of randomly selected retailers in Bay Area cities with taxes reported minimal impacts on overall business and perceived benefits of SSB taxes, and about half would support expansion of SSB taxes to additional jurisdictions. Our findings further suggest that any price increases in response to SSB taxes are limited to beverages, and that effects are similar by store type and neighborhood SES, contrary to three of the major communications strategies that the beverage industry has employed in attempts to prevent SSB taxation: 1) potential impacts on businesses, 2) spillover to essential groceries, and 3) regressivity.

In direct contrast to industry-sponsored messaging, 70% of retailers reported minimal or no effects of the tax on overall business, with no difference between small and large retailers, and just over half believed other cities should adopt an SSB tax and supported expansion of SSB taxes statewide. During soda tax campaigns, the soda industry created or funded local anti-tax groups to warn of losses in profits that retailers could incur, job loss, and even closure of locally-owned small businesses and convenience stores, especially in low-income communities (Nixon et al., 2015). These claims gained traction: recent studies have shown that the most frequent opposing argument in news coverage of public debates over SSB taxes is how such taxes would hurt the economy and retailers (Niederdeppe et al., 2013; Crosbie et al., 2019). Similar to findings from the present study, empirical data from Mexico and Philadelphia found no impact of taxes on employment (Guerrero-Lopez et al., 2017; Lawman et al., 2019); contradicting industry claims. Evidence from tobacco taxes similarly demonstrates no impact on local economies despite significant declines in smoking (Chaloupka et al., 2019). In the present study, among the minority of retailers who said the tax did affect their business, many noted that they lost business because customers could cross the border and shop in stores in untaxed cities. This concern would be obviated by taxes covering larger geographies, as would the advantage that chain stores have when customers can go to an untaxed city but buy from the same chain.

Another key strategy of industry has been use of the term "grocery tax" when referring to SSB taxes; our study suggests this term is highly misleading. Only 2 of over 100 retailers reported increasing the price of non-beverage products, and the only products for which prices were raised were chips and alcoholic beverages. As such, there is no evidence that any essential groceries are affected by SSB taxes. The food and beverage industry needs to engage in, not undermine, efforts to educate

the public about which products are healthy and which are harmful. Use of false messaging to suggest SSB taxes affect the price of essential foods is counterproductive given the urgent need to stem the tide of obesity and diabetes, and is intentionally confusing to consumers (Wilce, 2019). Local health departments could reduce confusion and educate retailers and the public by producing materials about the purpose of taxes and the use of revenues.

Our study further demonstrates that retailers responded to SSB taxes by increasing the price of SSBs relative to non-taxed beverages. In our sample, 84% of retailers reported raising the price of soda as a result of the SSB tax, and less than 5% of retailers increased the price of water or milk. This is consistent with recently published empirical data demonstrating significant increases in the price of almost all SSBs in Oakland and San Francisco after SSB tax-implementation (relative to untaxed control cities), and no increase in the price of water, milk, or 100% fruit juice (Falbe et al., *in press*). A prior study in Berkeley also demonstrated significant increases in the price of SSBs and no relative price increases for nontaxed beverages (Falbe et al., 2015).

With respect to arguments about SSB taxes being regressive, we found no differences in retailer responses to closed-ended questions based on neighborhood SES, and only small differences for corner stores vs. larger stores. While some retailers noted that SSB sales were an important source of revenue for their business, relying heavily on products that reduce customers' life expectancy (Malik et al., 2019) should not be viewed as a sustainable strategy, even for small businesses. Interventions that reduce SSB consumption are desperately needed to reduce the historically high prevalence of obesity and diabetes in the U.S., particularly in low-income communities, and evidence to date consistently demonstrates that SSB taxes are a highly effective intervention (Madsen et al., 2019). In the present study, half of retailers noted that customers were buying fewer SSBs, which is a uniformly positive finding.

While the beverage industry's communication strategy is predicated on misinformation (Wilce, 2019; Jou et al., 2014); public health is not producing effective counter-messaging. Public health professionals need to communicate how revenues from SSB taxes can improve health equity. Only 9% of the retailers we interviewed in the present study had heard how revenues were being used, with no difference by duration of exposure to the tax; many of the retailers with concerns about the tax or who opposed tax expansion wondered where the money went, and some believed that it was going to "politicians." In fact, the vast majority of revenues from existing SSB taxes are being invested in community health and education, with an explicit focus on equity (Madsen et al., 2019). Public health professionals should track and disseminate how SSB tax revenues are being used in order to demonstrate how they can bolster low-income communities and support local organizations.

It is also important that the public health community reframe the way in which SSB taxes are discussed—particularly the use of the term "pass-through." All of the recently enacted taxes are excise taxes, which are paid directly by the distributor. While increased prices of SSBs are an important mechanism by which consumption declines, saying that the tax is "passed on" to consumers misstates the intent of the tax and leads to misunderstanding whereby customers believe they are paying the tax directly. SSB taxes have been successfully passed because communities understand that SSBs are unhealthy and that the medical costs associated with overconsumption amount to billions of dollars (American Diabetes, 2018; Imamura et al., 2015). In the absence of excise taxes, the beverage industry bears no responsibility for any of those costs; they are borne by society. When a producer or distributor pays an excise tax, they are sharing in the external costs associated with their product. The higher price they subsequently charge is a better reflection of the true cost of SSBs to society and encourages reduced consumption, counterbalancing billions of dollars the beverage industry spends to promote increased consumption (PepsiCo Inc Form 10-K, 2018; The Coca-Cola Company Form 10-K, 2018).

This study has several limitations. Although the response rate was

81%, retailers who agreed to participate in our study may not be representative of all retailers. Additionally, clerks, who represented 25% of the sample, may not have had the same knowledge as store managers or owners, which could decrease the accuracy of their responses. We had no objective measures of business or sales impacts.

## 5. Conclusion

Our research with food and beverage retailers, which suggests that the SSB industry has mischaracterized retailer attitudes towards SSB taxation, can be used to counter future industry-sponsored anti-SSB misinformation campaigns in localities where SSB taxes are being considered. The implications of our findings are especially urgent. Currently, the SSB industry is methodically eliminating local jurisdictions' ability to enact innovative policies that can improve the health of their communities. As the tobacco industry did in opposition to tobacco control policies, the beverage industry has recently orchestrated the passage of state-level preemption laws that preclude cities and counties from passing SSB tax policies and is carrying out similar policies globally (Crosbie et al., 2019). Our research provides evidence to support local jurisdictions' ability to decide on the best strategies to improve population health in their communities.

## Funding

This work was supported by the National Institutes of Health [NIDDK R01DK116852, NIDDK P30DK092924 and NIDDK K01DK113068] and The California Endowment (Oakland, CA). None of the results presented represent the opinions of the study funders.

## CRedit authorship contribution statement

**Julian Ponce:** Investigation, Data curation, Formal analysis, Project administration, Writing - original draft. **Haoxuan Yuan:** Investigation, Formal analysis, Writing - original draft. **Dean Schillinger:** Funding acquisition, Investigation, Supervision, Writing - review & editing. **Hina Mahmood:** Investigation, Formal analysis, Writing - original draft. **Matthew Lee:** Data curation, Formal analysis, Methodology, Writing - review & editing. **Jen Falbe:** Investigation, Methodology, Project administration, Writing - review & editing. **Ryane Daniels:** Project administration, Writing - review & editing. **Kristine A. Madsen:** Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Supervision, Writing - review & editing.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pmedr.2020.101129>.

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