

**Taxation as a Public Health Intervention: Assessing Support for a Sugar-Sweetened  
Beverage Tax Among Washington, D.C. Residents**

by

**Annessa L. Bontrager**

Bachelor of Science, Slippery Rock University, 2008

Master of Science, American University, 2015

Submitted to the Graduate Faculty of the  
School of Education in partial fulfillment  
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SCHOOL OF EDUCATION

This dissertation was presented

by

**Annessa L. Bontrager**

It was defended on

July 21, 2020

and approved by

Dr. Wendy Braund, COVID-19 Response Director, Pennsylvania Department of Health

Dr. Kelliann Davis, Associate Professor and Associate Co-Chair, Department of Health &

Human Development

Dissertation Director: Dr. Sharon Ross, Assistant Professor, Department of Health & Human

Development

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Annessa L. Bontrager, EdD, MS, CHES

University of Pittsburgh, 2020

The consumption of sugar-sweetened beverages is strongly linked to obesity, along with a myriad of other negative health consequences. In order to mitigate the obesity epidemic and the negative health consequences associated with it, seven U.S. jurisdictions levy an excise tax on SSBs. In October 2019, legislation was introduced to the Washington, D.C. City Council that would levy a 1.5 cent per ounce excise tax on SSBs. The purpose of this needs assessment was to evaluate the current understanding, beliefs, and practices regarding SSBs and excise SSB taxation among adult residents of Washington, D.C. Participants (n=337) were recruited via email and social media through targeted online outreach facilitated by specific community-based organizations and listservs. Participants voluntarily completed a 10-minute online survey adapted from previous studies. Descriptive statistics were calculated to determine means, standard deviations, and frequencies to summarize participant demographics, knowledge of SSBs, consumption and purchase behavior, perceived behavior change, and the level of support for an excise SSB tax. Data showed that the majority of participants had a general understanding that SSBs negatively affected an individual's health and view SSBs as being very unhealthy. In addition, there was a very high level of support for an excise SSB tax in Washington, D.C. Along with that support, participants also reported that as the excise SSB tax increased, their consumption of taxed sugary drinks would decrease. Recommendations for future research opportunities would

be to conduct a larger study with equal representation across all wards, incorporate focus groups, and validate the study. Findings from this study have implications at the individual, organization, and government level.

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## **Preface**

This project was born out of my passion of exploring strategies to enhance the public's health, particularly through reducing health disparities. I am grateful that social justice was a pillar of this doctoral program from the onset. I would like to thank my dissertation advisor, Dr. Sharon Ross, for helping me focus this research when it seemed too large to tackle. Your constant guidance and motivation were invaluable and are woven throughout this document. To my committee members, Dr. Kelliann Davis and Dr. Wendy Braund, thank you for your encouragement and expertise. To my friends and family, both here and in spirit, your patience and unwavering support were always felt. Lastly, to my Health and Physical Activity colleagues that quickly turned into friends, thank you for making the cross-state journey worth it every time. Completing a dissertation (particularly during a global pandemic) is no small feat and truly could not have accomplished without everyone mentioned. I hope I have made you all proud.

## **1.0 Introduction**

### **1.1 Problem Area**

The National Center for Health Statistics (2017) reports that more than one third (38%) of United States (U.S.) adults have obesity. This number drastically increases to 71% when overweight rates are included. The obesity rate among children and adolescents is 17%, with this number growing to 33% when overweight data is incorporated (Fryar et al., 2016). Excess weight carries a profound health burden because of the numerous comorbidities linked to it. A meta-analysis conducted by Guh et al. (2009) found 18 comorbidities associated with overweight and obesity, including type 2 diabetes, asthma, chronic back pain, osteoarthritis, gallbladder disease, cardiovascular diseases (CVD), and certain cancers.

Poor diets are the leading risk factor for mortality and morbidity in the U.S. (U.S. Burden of Disease Collaborators, 2013). The consumption of sugar-sweetened beverage (SSBs) is strongly linked to obesity, along with a myriad of other negative health consequences (Hu, 2013; Malik, Popkin, Bray, Després, & Hu, 2010; Vartanian et al., 2011). On top of negatively affecting an individual's health, SSB consumption and the unhealthy consequences associated with it are putting a strain on U.S. healthcare costs and resources. Grimes et al. (2013) found that children 2-16 years old who consumed more than one SSB daily were 26% more likely to be overweight or obese. Finkelstein et al. (2014) recommends using an estimate of \$19,000 as the incremental medical cost of an obese 10-year-old child relative to a normal weight child of the same age who maintains normal weight throughout adulthood.

SSBs are no longer the occasional treat; they are the single largest source of added sugars consumed by people living in the U.S. (United States Department of Health and Human Services [USDHHS] & United States Department of Agriculture [USDA], 2015). Data from the National Health and Nutrition Examination Survey (NHANES) showed that 63% of youth and 50% of adults consumed at least one SSB on a given day (Rosinger et al., 2017a; Rosinger et al., 2017b). In this study, both U.S. youth and adults consumed around 150 calories from SSBs a day, which is 7.3% and 6.5% of their daily energy intake, respectively. Rates were highest among Blacks, Mexican Americans, and non-Mexican Hispanics. This aligns with the finding that people of color have less access to healthy food and beverages and consume more sugary drinks than their white peers [Center for Global Policy Solutions (CGPS) & Robert Wood Johnson Foundation (RWJF), 2015]. These populations also experience higher rates of type 2 diabetes, heart disease, and other chronic diseases that are brought on, in part, by consuming SSBs.

While there is currently no federal or state level tax on SSBs, seven U.S. jurisdictions levy a SSB tax, also commonly referred to as a “soda tax” or a “sugary drink tax.” These jurisdictions are Boulder, CO; Philadelphia, PA; Seattle, WA; and four cities in California: Albany, Berkeley, Oakland, and San Francisco. In January 2015, Berkeley, CA was the first U.S. city to enact an excise SSB tax. After several years of implementation, a recent study by Lee et al. (2019) demonstrated that reductions in SSB consumption have been sustained in Berkeley over at least the first three years of implementation relative to comparison cities. Not only did SSB consumption decrease, but water intake increased as determined by participants’ self-reported data during annual beverage frequency questionnaires from 2014-2017 in Berkeley (n=1513) and comparison cities of San Francisco and Oakland (n=3712). In addition to individual benefits associated with reduced SSB consumption, Long et al. (2015) quantified the expected health and economic

benefits of a national SSB excise tax of \$0.01/ounce over 10 years. Their model determined this level of federal taxation would avert 101,000 disability-adjusted life-years, gain 871,000 quality-adjusted life-years, and result in \$23.6 billion in healthcare savings over the 10 years. Excise SSB taxes have not only shown to reduce consumption (Zhong et al., 2018; Falbe et al., 2016), they can also be used to fund obesity prevention and/or health promotion programs. For example, current and future SSB tax revenue allocations in the seven jurisdictions include installation of hydration stations, free nutrition and cooking classes, free exercise classes, school garden programs, community grants for healthy food and water access, school-based nutrition education, recreation centers, and local food banks, to name a few (Healthy Berkeley, n.d., Healthy Food America, 2018a, Healthy Food America, 2018b, Healthy Food America, 2018c, Healthy Food America, 2018d, Healthy Food America, 2018f).

## **1.2 Problem of Practice**

In October 2019, legislation was introduced to the Washington, D.C. City Council that would levy a 1.5 cent per ounce excise tax on SSBs. As other jurisdictions have demonstrated, SSB taxation can improve the public's health through reduced SSB consumption and simultaneously raise local revenue (Wang et al., 2012; Falbe et al., 2016). Because the price of SSBs is inversely associated with consumption (Andreyeva et al., 2010), levying excise taxes on SSBs has become an increasingly more popular strategy to reduce consumption. Several states, including D.C., impose a general sales tax on SSBs as a way to increase tax revenue; however, these taxes are not large enough to cause consumers to reassess their purchase behavior and were not implemented for this purpose (Sturm et al., 2010).

Furthermore, some of the populations at greatest risk for obesity and other negative health outcomes are the same populations most responsive to price changes (Powell & Chaloupka, 2009). Considering this, it is possible that an excise SSB tax in Washington, D.C. could have stronger effects on the populations that are of lower socioeconomic status and have the poorest health outcomes, potentially reducing health disparities. Washington D.C. City Council (by way of a vote) will ultimately decide if an excise SSB tax gets passed and how it is enacted. Given this fact, it is imperative to assess the current level of support that exists for an excise SSB tax among Washington, D.C. residents (the council's constituents) and whether the tax would lead to a perceived behavior change in SSB consumption.

### **1.3 Definitions**

See below for definitions of key terms found throughout the document:

*Added Sugars*: sugars added to foods and beverages during processing including, but not limited to, brown sugar, corn sweetener, corn syrup, dextrose, fructose, glucose, high-fructose corn syrup, honey, lactose, malt syrup, maltose, molasses, raw sugar, and sucrose. (USDHHS & USDA, 2015).

*Excise Tax*: A tax imposed on product manufacturers or distributors that is oftentimes passed down to retailers and ultimately the consumer. If passed on to the consumer, the tax increases the price of products at the shelf. This is in contrast to a sales tax where the tax is added at the register and not included in the sale price the consumer sees before point of sale (Muth et al., 2019). Excise taxes will be the focus of this inquiry.

Health Disparities: Preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations [Centers for Disease Control and Prevention (CDC), 2018].

Preemption: Occurs when a higher level of government (e.g., a state) limits the authority of a lower level (e.g., a city) to enact new policies of a specific topic (Crosbie et al., 2019).

Sugar-Sweetened Beverages (SSBs): Any liquids that are sweetened with various forms of added sugars like brown sugar, corn sweetener, corn syrup, dextrose, fructose, glucose, high-fructose corn syrup, honey, lactose, malt syrup, maltose, molasses, raw sugar, and sucrose (USDHHS & USDA, 2015).

Sugary Drink – This term was messaged tested and is the term used by key stakeholders in Washington, D.C. to describe drinks with sugar added to them. They found this term (sugary drink) resonates more with the target audience than the term sugar-sweetened beverage.

## **2.0 Review of Supporting Scholarship and Professional Knowledge**

### **2.1 Sugar-Sweetened Beverage Consumption Behavior**

Sugar-sweetened beverages (SSBs) often fall into the major categories of soda, fruit drinks, sports drinks, energy drinks, and sweetened waters, coffee, and tea (CDC, 2017). Sugars naturally occurring in beverages, like those found in milk and 100% fruit juices, are not considered added sugars (USDHHS & USDA, 2015). High-intensity sweeteners, such as saccharin, aspartame, acesulfame potassium, and sucralose, are commonly used as sugar substitutes/alternatives because they add sweetness but contribute little to no calories to the product (U.S. Food and Drug Administration, 2017).

Reducing SSB consumption is a focal point of many public health efforts in the United States (U.S.) For the first time, the American Academy of Pediatrics (AAP) and the American Heart Association (AHA) are calling for public policies, such as an excise tax (combined with education) to decrease the consumption of sugary drinks (Muth et al., 2019). Although there is no universally accepted guideline for added sugar consumption, a plethora of research exists on the effects of SSB consumption that reputable health-related organizations and government agencies have used to generate their own recommendations. The 2015-2020 Dietary Guidelines for Americans (DGA) (2015), suggests limiting added sugar intake to less than 10% of overall calories per day, which includes SSBs, and to specifically choose beverages with no added sugars. The DGA states “When added sugars in foods and beverages exceed 10% of calories, a healthy eating pattern may be difficult to achieve” (USDHHS & USDA, 2015, para. 30). This is also the recommendation endorsed by the World Health Organization (WHO) (2015), who highlights

increased benefits of reducing intake to less than 5% of calories. The AHA (2018) suggests limiting consumption to six teaspoons of added sugar per day for women and nine teaspoons for men.

Despite the amount of literature highlighting the detrimental health outcomes of high SSB consumption, levels remain high in the U.S. SSBs are the leading sources of added sugars in the American diet (USDHHS & USDA, 2015). They account for almost half (47%) of all added sugars consumed by the U.S. population. Across all age groups, even those in the lowest decile of added sugar consumption, exceeded the 10% guideline. Evidence from prospective cohort studies and randomized controlled trials have shown that eating patterns that include lower intake of sources of added sugars are associated with reduced risk of cardiovascular disease (CVD), obesity, type 2 diabetes, and some types of cancer in adults.

Applying the recommendations of the DGA and the WHO, a 2,000-calorie diet, which is the benchmark caloric amount on the nutrition facts labels, equates to no more than 200 calories derived from added sugars. Research shows that U.S. youth and adults consume an average of almost 150 calories from SSBs on any given day (Rosinger et al., 2017a; Rosinger et al., 2017b). That allows for less than 50 additional calories per day of added sugars to stay within the recommendation. A typical 12-ounce serving of soda, on average, contains 10 teaspoons of added sugar and fruit punch drinks have 11.5 teaspoons of added sugar (National Heart, Lung, and Blood Institute [NHLBI], n.d.). Furthermore, a 20-ounce serving of soda contains the equivalent of approximately 17 teaspoons of sugar (Wang et al., 2012). This is almost three times greater than AHA's recommendation for daily added sugar consumption for women and nearly twice as much for men. When sugars and syrups are added to beverages, they increase the caloric density without contributing any essential nutrients. This can make it difficult for an individual to meet their nutritional needs while staying within their caloric parameters.

Data from the NHANES showed that 63% of youth and 50% of adults consumed at least one SSB on a given day (Rosinger et al., 2017a; Rosinger et al., 2017b). More specifically, nearly half of children aged 2-5 years old consumed a SSB in a day (Bleich et al., 2018). Overall, both U.S. youth and adults consumed around 150 calories from SSBs a day, which is 7.3% and 6.5% of their daily energy intake, respectively.

## **2.2 Consequences of Sugar-Sweetened Beverage Consumption**

Research has shown that liquid carbohydrates, like SSBs, produce less satiety compared to solid carbohydrates (Pan & Hu, 2011). Individuals consuming SSBs do not compensate by eating less food, the SSBs only add to their overall daily caloric intake. This is concerning when we consider the role that excess calories play in weight gain, particularly with regards to the obesity epidemic. For example, high daily consumption of SSBs early in life for children of color is a significant risk factor for childhood obesity (Taveras et al., 2010). On top of increased caloric intake (Vartanian et al., 2011), frequent SSB consumption is also associated with elevated blood pressure (Malik, Popkin, Bray, Després, Willett, & Hu, 2010), an increased risk of diabetes, metabolic syndrome, weight gain, coronary heart disease (CHD) (Malik & Hu, 2019), kidney disease (Bombback et al., 2010), tooth decay and cavities (Bernabé et al., 2014).

Three meta-analysis help to quantify some of these risk factors. Malik, Popkin, Bray, Després, Willett, & Hu (2010) conducted a meta-analysis of 11 cohort studies and found that people who drank at least one serving of SSBs per day had a 26% higher risk of developing diabetes than those who drink less than one per month. Another meta-analysis of four studies found that consuming one additional SSB per day is associated with 17% higher risk of CHD (Xi et al.,

2015). The third meta-analysis of six cohort studies found that heavy SSB consumers, defined as those drinking at least one serving per day, had a 12% higher risk of developing hypertension compared to individuals who never consumed SSBs (Jayalath et al., 2015).

Building on clinical evidence, there is new evidence from recent studies that SSB consumption is beginning to be associated with mortality. Malik et al. (2019) found that among over 118,000 men and women, intake of SSBs was positively associated with risk of death from any cause in a dose-dependent manner. Compared with consuming SSBs less than once per month, consuming one to four SSBs per month was linked with a 1% higher risk of death. This increased to 6% if consuming two to six SSBs per week, 14% higher if consuming one to two SSBs per day, and 21% higher if consuming two or more SSBs per day. These findings are consistent with a prospective National Health and Nutrition Examination Survey (NHANES) analysis which found a 29% higher risk of CVD mortality when comparing adults who consumed seven or more SSB servings per week to those who consumed one or less serving of SSBs a week (Yang et al., 2014). Additionally, a cohort study of 13,440 adults determined that each additional 12-ounce serving per day of SSBs was associated with an 11% higher all-cause mortality risk (Collin et al., 2019).

In addition to negatively affecting an individual's health, SSB consumption and the unhealthy consequences associated with it puts a strain on healthcare costs and resources. Grimes et al. (2013) found that children 2-16 years old who consumed more than one SSB daily were 26% more likely to be overweight or obese. Finkelstein et al. (2014) recommends using an estimate of \$19,000 as the incremental medical cost of a 10-year-old obese child relative to a normal weight 10-year-old child who maintains normal weight throughout adulthood. The cost of obesity and type 2 diabetes, two health consequences associated with SSB consumption, were recently

estimated at \$2 trillion and \$670 billion, respectively (Dobbs et al., 2014; International Diabetes Foundation, 2017).

### **2.3 Health Disparities and Sugar-Sweetened Beverage Consumption**

SSB consumption is highest among Blacks, Mexican Americans, and non-Mexican Hispanics (Bleich et al., 2018). These populations also experience higher rates of type 2 diabetes, heart disease, and other chronic diseases that are brought on, in part, by consuming SSBs (CGPS & RWJF, 2015). Lower-income neighborhoods and people of color tend to have fewer full-service supermarkets (more likely to offer a variety of healthy products at lower prices) and more convenience stores, drug stores, and bodegas (more likely to serve unhealthy products) (CGPS & RWJF, 2015). In zip codes with a median income below \$25,000, 55% do not have a full-service supermarket (Allcott et al., 2017). Powell et al. (2007) found that predominantly African American neighborhoods only have about half the number of chain supermarkets (52%) as predominantly white neighborhoods. Youth with access to these corner stores located near schools often make purchases on their way to and from school (Salud America!, 2011). These purchases are most commonly energy-dense, low nutrient food and beverage products with each purchase averaging more than 350 calories.

## 2.4 Taxation and Behavior Change

“Sin taxes” are corrective taxes on goods that are thought to be overconsumed (Allcott et al., 2018). These taxes are imposed to discourage activities that are deemed harmful. As the understanding of harm has evolved in terms of health, economic, and social consequences, so has the class of goods associated with these types of taxes. The rationale for a sin tax is simple: as the price the consumer pays increases, consumption decreases. Simultaneously, revenue is also collected that can be allocated to a variety of purposes, including public health initiatives.

Two examples of successful sin taxes in the U.S. are tobacco and alcohol. Similar to the obesity epidemic, tobacco use and excessive drinking contribute to significant health care costs in terms of treating related diseases and productivity loss (Goodchild et al., 2018; Rehm et al., 2009). Research has shown that as tobacco prices increased, cigarette consumption dropped steeply, particularly among youth and people of lower socioeconomic status (Bader et al., 2011). A recent study found that higher cigarette taxes reduced overall mortality and deaths from throat, lung, and other cancers and respiratory diseases (Bowser et al., 2016). Another study found that higher cigarette taxes reduced hospitalizations for heart failure (Ho et al., 2017). With regards to alcohol, a systematic review established that alcoholic beverage prices and taxes are inversely related to drinking and the effects are larger compared to other prevention policies and programs (Wagenaar et al., 2009). Wagenaar et al. (2010) documented that higher taxes had a significant effect on decreasing harms from excessive drinking such as motor vehicle crashes and fatalities; deaths from liver cirrhosis, alcohol dependence, and other diseases caused by excessive drinking, incidence of sexually transmitted diseases, crime and violence, and workplace accidents.

## 2.5 Current Landscape of Sugar-Sweetened Beverage Taxation

Many states, including Washington, D.C., impose a general sales tax on SSBs as a way to increase revenue; however, these taxes are not large enough to cause consumers to reassess their purchase behavior, nor were they implemented for this purpose (Sturm et al., 2010). Sales taxes are charged directly to the consumer at the point of sale and are usually not seen until the product is ‘rung up.’ Another form of tax, an excise tax, is charged to the distributor or wholesaler. The expectation is that much, if not all, of the tax is then passed on to the consumer in the form of higher retail prices. This higher retail price is the price the customer will see before any sales taxes are included. In the case of SSB taxation, when the term SSB tax is used it is referring to an excise tax.

While there is currently no federal or state level excise tax on SSBs, seven U.S. jurisdictions currently levy a SSB tax, also commonly referred to as a “soda tax” or a “sugary drink tax.” These jurisdictions are Boulder, CO; Philadelphia, PA; Seattle, WA; and four cities in California: Albany, Berkeley, Oakland, and San Francisco. In October 2019, legislation was introduced to the Washington, D.C. City Council that would levy a 1.5 cent per ounce excise tax on SSBs (Healthy Beverage Choices Amendment Act of 2019, 2019).

All current excise SSB taxes are based on a drink’s volume. This means that an eight-ounce drink with two teaspoons of sugar (e.g., iced tea) is taxed the same rate as an eight-ounce drink with seven teaspoons of sugar (e.g., soda). This tax is simple and allows distributors to collect a set amount based on sales. It also works well if the primary goal is raising local tax revenue. Tax rates range from one cent per ounce in the four California jurisdictions to two cents per ounce in Boulder, CO (Table 1). For beverage concentrates, like fountain soda, the tax is typically applied to the maximum volume the syrup can produce. Table 1 shows the localities that have an excise

SSB tax (with the noted exception of Washington, D.C.), what the tax rate per ounce is, how much of the tax is passed on to the consumer, how the tax revenue has been/will be spent, the date the tax went into effect, and details on how the tax was passed. Although the distributor is charged 100% of the tax, not all 100% has to be passed on to the consumer. The amount that is passed on to the consumer is known as the pass-through rate. The pass-through rate can vary depending on the type of establishment, the location of the establishment in relation to town borders of untaxed areas, and the type of beverage product. The *Approximate Pass-Through Tax Rate* column shows the approximate percentage of the excise SSB tax that the consumer absorbs. The *Voting Results* column illustrates how and to what extent the excise SSB was passed. ‘Citizen Ballot’ means the legislation was voted on by citizens via a ballot and the percentage of support obtained. ‘City Council’ signifies the localities’ city council voted on the measure and how many council members supported the measure vs. how many did not.

**Table 1: Sugar-Sweetened Beverage Taxation by Locality**

<b>Location</b>	<b>Tax per Ounce (cents)</b>	<b>Pass-Through Rate</b>	<b>Proposed Revenue Allocation</b>	<b>Effective Date</b>	<b>Voting Results<sup>f</sup></b>
Albany, CA	1.00	N/A	Food Access, Nutrition Education, General Health	4/1/2017	72% Support (Citizen Ballot)
Berkeley, CA	1.00	~67% <sup>a</sup>	Food Access, Nutrition Education	1/1/2015	74% Support (Citizen Ballot)
Boulder, CO	2.00	~79% <sup>b</sup>	Food Access, Physical Activity, General Health	7/1/2017	54% Support (Citizen Ballot)
Oakland, CA	1.00	~92% <sup>c</sup>	Food Access, Physical Activity, Parks	7/1/2017	61% Support (Citizen Ballot)
Philadelphia, PA	1.50	~100% <sup>d</sup>	Pre-K, Community Schools, Parks	1/1/2017	13-4 Vote (City Council)
San Francisco, CA	1.00	~100% <sup>c</sup>	Food Access, Physical Activity, General Health	1/1/2018	62% Support (Citizen Ballot)
Seattle, WA	1.75	~89% <sup>e</sup>	Food Access, Early Childhood, Youth Development	1/1/2018	7-1 Vote (City Council)
Washington, DC (proposed 10/2019)	1.50	TBD	TBD	TBD	TBD (City Council)

Data source for all columns, with exception of the *Approximate Pass-Through Tax Rate* column, came from Healthy Food America (n.d.); <sup>a</sup>Silver et al. (2017); <sup>b</sup>Cawley et al. (2018); <sup>c</sup>Falbe et al. (2020); <sup>d</sup>Coary et al. (2019); <sup>e</sup>Saelens et al. (2020); <sup>f</sup>describes if legislation was passed through a citizen’s ballot or city council vote and how much support it had

Every jurisdiction exempts some beverages from the excise SSB tax, including alcoholic beverages, milk, infant formula, and drinks for medical purposes. Sports and energy drinks are not classified as medical purposes; therefore, they are still taxable. Philadelphia is the only jurisdiction that puts an excise tax on any beverage with real or artificial sweeteners, which includes diet drinks. Other jurisdictions only employ a tax if the beverage sweetener adds calories. Furthermore,

in some localities there needs to be a caloric minimum (e.g., at least 2 calories per fluid ounce in San Francisco, CA) in order for the beverage to be taxed.

## **2.6 Effectiveness of Sugar-Sweetened Beverage Taxation**

Evidence suggests taxes on SSBs could substantially reduce consumption and may contribute to a reduction in overweight and obesity (Escobar et al., 2013). When we look at taxation in terms of food and beverage products, Afshin et al. (2017) determined a 10% increase in price, like an excise tax, decreased consumption of unhealthful foods by 6%. Although many SSB taxation policies are still in their early stages of implementation, there is encouraging evidence of the effectiveness of these taxes on reducing SSB consumption and raising local revenue.

There is not adequate data generated and/or infrastructure developed in all seven jurisdictions to be able to fully evaluate the impact of the excise SSB tax. However, evidence from localities that have been evaluated is promising. Cawley et al. (2019) found that following an excise SSB tax in Philadelphia, PA, adults consumed soda 10.4 fewer times per month, or approximately 3%. Another way to view this is that adults in Philadelphia consumed around one regular soda per day before the tax. After the tax was implemented, consumption decreased to roughly one soda every three days. The probability of daily regular soda consumption among Philadelphia adults decreased by nearly 31%. Two months post SSB tax implementation in Philadelphia, Zhong et al. (2018) determined through a survey the likelihood of daily consumption of soda and energy drinks declined by 40% and 64%, respectively, and the likelihood of daily bottled water consumption increased by 58%.

Berkeley, CA has the most robust analysis because it was the first excise SSB tax in the U.S. to be implemented in March 2015. Shortly after implementation, Falbe et al. (2016) applied a repeated cross-sectional design to examine changes in beverage consumption before and after the tax was enacted. The study was specific to lower-income neighborhoods in Berkeley versus comparison cities of Oakland, CA and San Francisco, CA (this was before a tax in each of these localities was enacted). A beverage frequency questionnaire was interviewer administered to participants before the tax and then around four months after implementation to examine relative changes in consumption. This study showed that consumption of SSBs decreased 21% in Berkeley and increased 4% in comparison cities. Additionally, water consumption increased more in Berkeley (+63%) than in comparison cities (+19%). SSB consumption in Berkeley's low-income neighborhoods, which are often the populations that have poorer health outcomes compared to their higher income counterparts, reduced post-implementation. Lee et al. (2019) examined longitudinal changes in SSB and water consumption three years after implementation in Berkeley, relative to comparison neighborhoods without an excise SSB tax. Before the tax, SSBs were consumed 1.25 times per day in Berkeley and 1.27 times per day in comparison neighborhoods. After the tax, SSB consumption in Berkeley declined by 0.55 times per day and increased by 1.02 times per day for water. These changes in consumption were significantly different from the comparison neighborhoods, which saw no significant changes.

## **2.7 Sugar-Sweetened Beverage Taxation Revenue**

Six of the seven localities have allocated or plan to allocate the tax revenue to health-related initiatives (Table 1). In all localities, the revenue is deposited into the city's general fund, which

means the city council has the responsibility to allocate it. However, where noted in the subsequent section, a group has been established to provide recommendations on how to allocate the excise SSB tax revenue.

#### Albany, CA

A Council Study Session has been established and members include the Parks and Recreation Commission, Social and Economic Justice Commission, Albany Unified School District, and experts in public health and programs relating to diabetes, obesity, and sugary drink consumption (Healthy Food America, 2018a). Excise SSB tax revenue has been used for installation of hydration stations at city parks and the community center in coordination with an education campaign, free exercise and nutrition/cooking classes for youth and adults, and a community walking challenge.

#### Berkeley, CA

A Sugar-Sweetened Beverage Product Panel of Experts Commission has been established and members include public health professionals (Healthy Berkeley, n.d.). SSB revenue has already been used on multiple health-related initiatives including, but not limited to, expanding Berkeley Unified School District's Cooking and Gardening program, a prevention of dental caries program, an obesity reduction program, Healthy Options of Point of Sale project, and multiple initiatives that utilize community members to increase awareness of SSB consumption health risks, promote healthy alternatives to SSBs, and promote fruits and vegetables.

#### Boulder, CO

A Health Equity Committee has been established and members include a public health professional, a professor, and a social worker, among others (Healthy Food America, 2018b).

Excise SSB tax revenue has already been used to fund health and nutrition programs for low-income residents, like Boulder's Latinx community, who are the ones who bear the greatest burden of the consequences of SSB consumption. These programs improve access to healthy and affordable food and clean water while simultaneously increase opportunities for physical activity and recreation.

#### Oakland, CA

A Community Advisory Board has been established and members include public health, medical, and dental experts, as well as parents and other residents (Healthy Food America, 2018c). The board has recommended allocating excise SSB tax revenue for installation of hydration stations in Oakland Unified School District, Head Start locations, parks, and libraries; a community education and awareness campaign; as well as community grants for healthy food and water access initiatives and education on SSB consumption.

#### Philadelphia, PA

Philadelphia has focused on using the excise SSB tax revenue on anti-poverty measures, including new slots for pre-kindergarten programs; new community schools with health, behavioral, and social services to improve academic success; and revitalizing neighborhood parks, recreation centers, and libraries (Healthy Food America, 2018d). Since the tax has passed, the beverage industry has continuously and aggressively tried to repeal it. The American Beverage Association (ABA) is trying to pass statewide legislation that would preempt the city's authority to enact the tax. To date, none of the ABA's efforts have been successful.

#### San Francisco, CA

A Sugary Drinks Distributor Tax Advisory Committee has been established to submit an annual report evaluating the impact of the tax on beverage prices and purchasing behavior, along

with providing recommendations on how to allocate the tax revenue (San Francisco Sugary Drinks Distributor Tax Advisory Committee, 2019). Members include health equity advocates, medical professionals, an oral health expert, and youth. Excise SSB tax revenue has been used on a variety of health initiatives including the Black/African American Wellness and Peer Leadership program, healthy eating and active living programming, active transportation and pedestrian safety programs, Peace Parks, and funding for nutritional supports for low-income, disabled, and senior residents.

#### Seattle, WA

A Community Advisory Board has been established and members include food access, public health, early learning, and community representatives (Healthy Food America, 2018f). Excise SSB tax revenue has been used for healthy food access programs such as Fresh Bucks and local food banks, early learning, and education programs.

## **2.8 Objections to Sugar-Sweetened Beverage Taxation**

The main argument against SSB taxation is that the taxes are regressive because families with lower incomes spend more of their income on groceries, specifically SSBs (Finkelstein et al., 2010). One way to mitigate the regressivity could be to target the revenue raised to these lower-income individuals/families by allocating it to programs specifically aimed at lower-income communities. The majority of the localities that currently have an excise SSB tax already employ this strategy, including the options put forward for the Washington, D.C. excise SSB tax. In addition, SSBs are not a necessity. Although they are calorie dense, they are generally nutrient free. Because of this, from a public health perspective, we may not be concerned if lower-income

households reduce their SSB consumption because of the tax as this is the behavior change we are looking for. Because low-income and minority communities are not only the populations that consume more SSBs, but also experience SSB health-related consequences, these households may reap more health benefits of an tax (Falbe et al., 2016).

Some opponents of the tax believe that SSBs are being wrongfully attacked. Because obesity is a complex and multi-faceted disease, the argument is that vilifying one food or beverage product will not solve the problem. It has also been argued that if the primary goal of the tax is improving public health by reducing sugar consumption, governments should consider taxing a beverage's sugar content versus volume (Tax Policy Center, 2016). Taxing a beverage's sugar content could encourage consumers to choose lower-sugar options and possibly encourage manufacturers, distributors, and retailers to stock and market more healthy products. The government could tax each gram of sugar or create a tiered system, similar to the different tax rates on liquor, wine, and beer although this would be more difficult to impose compared to the volume-based taxation jurisdictions currently employ. Another layer to this argument is the concern of what individuals will replace their SSB consumption with, particularly around alcoholic products. However, data supports water replacement of SSBs post SSB tax implementation (Zhong et al., 2018; Falbe et al., 2016; Lee et al., 2019).

Another pushback to a SSB tax, particularly at the local level, is the ease of which an individual could evade the tax by crossing the locality's border and purchasing SSBs in an untaxed jurisdiction (Kolodinsky et al, n.d.). This is called cross-border shopping and studies have used a variety of approaches to try and measure the extent to which this occurs. One way to indirectly examine cross-border shopping is by examining geographical differences in sale prices. This is based off the assumption that stores that are farthest from competitors outside the taxed jurisdiction

may be able to pass more of the tax on to consumers because they may lose less business to cross-border shopping than stores located close to the border. Cawley and Frisvold (2017) found this pattern occurring in Berkeley. The pass-through of the tax was higher in stores farther from untaxed competitors. This was not true for individual servings but was true for 2-liter bottles and cases of cans. Specifically, for each mile from the closest competitor store selling untaxed SSBs, the pass-through rose 33.3% for 2-liter bottles and 25.8% for cases of cans. Another method utilized in Berkeley to examine cross-border shopping was street intercept surveys (Falbe et al., 2016). Consumers were asked where they had primarily bought SSBs during the past year and past month and whether they had switched cities and why. The researchers found that only 2% of residents who primarily bought SSBs in Berkeley pre-tax now switched localities to avoid the tax. This is consistent in finding some cross-border shopping, but the evidence is incomplete.

The beverage industry is the largest and wealthiest opponent of SSB taxation. Because of the rate that excise SSB taxation has been passed across the country, the beverage industry is now using a strategy called preemption to halt any future excise SSB taxation efforts locally (Crosbie et al., 2019). The beverage industry realized it is more cost effective for them to push preemption at a state level versus fighting every tax that was introduced at a local level. Preemption is the same tactic the tobacco industry employed to fight local tobacco regulations. Arizona, California, Michigan, and Washington have already enacted laws preempting any future taxes on SSBs for a set amount of time. In California during 2016 alone, beverage companies spent \$30 million to oppose local excise taxes on SSBs.

## 2.9 Summary

SSBs are no longer an occasional treat. They are the single largest source of added sugars consumed by people living in the U.S. (USDHHS & USDA, 2015). Research demonstrates a statistically significant association between SSB consumption and excess weight with a 1.18-fold increased the risk of overall overweight and obesity (Ruanpeng et al., 2017). Frequent SSB consumption has also been associated with elevated blood pressure (Malik, Popkin, Bray, Després, Willett, & Hu, 2010), an increased risk of diabetes, metabolic syndrome, CHD (Malik & Hu, 2019), kidney disease (Bombback et al., 2010), tooth decay, and cavities (Bernabé et al., 2014). Consumption of SSBs is highest among Blacks, Mexican Americans, and non-Mexican Hispanics (Bleich et al., 2018). These populations also experience health disparities and poorer health outcomes (CGPS & RWJF, 2015). Currently, reducing SSB consumption is a focal point of many public health efforts in the U.S., including the seven jurisdictions that already levy an excise SSB tax. While there are objections to taxing SSBs, preliminary data shows these excise taxes reduce SSB consumption and increase water consumption (Zhong et al., 2018; Falbe et al., 2016; Lee et al., 2019), and raise local revenue that can be used on health-related initiatives.

## **3.0 Methodology**

### **3.1 Inquiry Questions**

To assess the current understanding, beliefs, and practices of Washington, D.C. residents regarding sugar-sweetened beverages (SSBs) and excise SSB taxation, the following inquiry questions were posed:

- 1.) What is the current knowledge of SSBs among Washington, D.C. residents?
- 2.) Is there support for an excise SSB tax among Washington, D.C. residents?
  - 2a.) Would support of an excise SSB tax among Washington, D.C. residents differ depending on how the tax revenue was allocated?
- 3.) To what extent, if any, do residents believe an excise SSB tax in Washington, D.C. would change their SSB purchasing and consumption behavior?

### **3.2 Inquiry Design**

The inquiry design for this research study was a needs assessment via an online survey to evaluate the knowledge, beliefs, and practices of residents in regard to an excise SSB tax in Washington, D.C.

### **3.3 Setting**

Along with being the nation's capital, the 61 square miles of Washington, D.C. is home to an estimated 702,455 individuals (United States Census Bureau, 2018). Washington, D.C. is comprised of eight wards, with each ward having strikingly different demographics. For example, in Ward 3 82% of the population is white and the median income is \$136,832, whereas in Ward 8, 4% of the population is white and the median income is \$34,824 (D.C. Health Matters, 2019). In Ward 3, less than 2% of families live below poverty where in Ward 8, 31% of families do. In Ward 3, 92% of residents live within one mile of a major grocery store; this statistic drops to 56% of residents in Ward 8. In 2017, Ward 8 had only one grocery store to service its 83,100 residents (Urban Institute, 2018). There are also documented health disparities by wards. Ward 8 is where a higher percentage of poor health outcomes can be found, including higher rates of Chronic Obstructive Pulmonary Disease (COPD), Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS), obesity, asthma, diabetes, depression, arthritis, stroke, and infant mortality (The District of Columbia Department of Health, 2017).

### **3.4 Participants**

Participants were eligible to participate in this research study if they were 18 years or older and a current resident of Washington, D.C. during the time of completing the survey. Children were not included in this study due to their lack of overall purchasing power and understanding of surveys. In addition, participants must have been able to complete the survey in English. Questions regarding inclusion criteria were asked in the beginning of the survey in order to

determine eligibility to participate. If an individual answered *no* to the age or residency question, they were informed they would not be able to complete the survey. Participants had the option to terminate the survey at any time or skip over any question(s) they did not wish to answer.

A convenience sample of participants were recruited via targeted online outreach, via email and social media, facilitated by specific community-based organizations and listservs garnered through the researcher's personal and professional network. The organizations and listservs all served individuals in their respective communities and/or wards. While participants were recruited via convenience sampling, a concerted effort was made for the sampling to be diverse and have representation from all eight wards of Washington, D.C.

### **3.5 Key Stakeholder Interviews**

Key stakeholder interviews were conducted with four stakeholders between July and August 2019 to inform the current inquiry and survey design. Key stakeholders included individuals holding senior-level positions from the American Heart Association (AHA), Center for Science in the Public Interest (CSPI), and The Milken Institute School of Public Health at George Washington University (GWU), along with a faculty member of GWU. All these individuals were extremely engrained in the SSB landscape and taxation efforts within Washington, D.C. The purpose of the interviews was to learn about the current SSB taxation landscape in Washington, D.C., understand who the key players were, and discuss how this inquiry could help inform future excise SSB tax efforts. It was during these key stakeholder interviews where I learned there were conversations already occurring behind the scenes to introduce an excise SSB tax in Washington, D.C. during Fall 2019. Interviews were conducted in-person using

a semi-structured interview guide and lasted approximately 60 minutes. The semi-structured interview guide can be found in Appendix B. Findings from the key stakeholder interviews, along with previous research studies, helped to inform this needs assessment survey.

### **3.6 Instrumentation**

The survey for this needs assessment was adapted from two previous studies, Rivard et al. (2012) and Richardson et al. (2018). The current inquiry was designed from these two surveys with additional questions added based on information ascertained from key stakeholder interviews. For ease of comprehension, the survey averaged a 7<sup>th</sup> grade reading level as determined by the Flesch-Kincaid Grade Level (6.5) and the SMOG Index (7.3) tests, with the number of polysyllabic words kept to 18%. The adapted survey was comprised of 32 questions that assessed demographic information, knowledge of SSBs, consumption behavior, purchase behavior, perceived behavior change, and the level of support for an excise SSB tax among Washington, D.C. residents. Response options included multiple choice, true/false, yes/no, a 5-point Likert scale, and open-ended.

The online survey was piloted with five individuals (>18 years; n=3 female, n=2 male; education level of bachelor's degree or less) prior to data collection. Comprehension was analyzed by having the individuals complete the survey, recording the amount of time it took to complete, and then verbally or in writing debriefing with each test participant to assess how they interpreted the items and responses. On average, the survey took test participants nine minutes to complete. This was aligned with the researcher's intention of the survey taking 10 minutes or less to complete. Modifications were made to the survey items and responses to enhance comprehension

based on individual's in the test group's feedback. For example, including an option of "*I do not drink sugary drinks*" as a response and changing the response option of "*Don't Know*" to "*Maybe*."

### Demographics

Five items were asked related to gender (male, female, prefer to self-identify), race/ethnicity (African American, American Indian or Alaska Native, Asian, Hispanic or Latino/a, Pacific Islander, White, other), age (in years), highest level of education completed (high school or GED, Associate degree, Bachelor's degree, Advanced degree), and current residence (Ward 1, Ward 2, Ward 3, Ward 4, Ward 5, Ward 6, Ward 7, Ward 8).

### Knowledge of Sugar-Sweetened Beverages

Six items were asked to ascertain participants' knowledge surrounding SSBs. One item included six true/false statements such as "*Drinking a lot of sugary drinks raises your risk of gaining weight*," two multiple choice items such as "*When you hear the term 'sugary drink', what drinks do you think this includes*" where participants can choose all responses that apply, two open-ended items such as, "*How many teaspoons of sugar do you think are in one 12 oz can of soda/pop*," and one item utilizing a 5-point Likert scale that asked, "*Do you think sugary drinks are...*" with response options of very healthy, healthy, neither healthy nor unhealthy, unhealthy, very unhealthy.

### Consumption Behavior

Five items were asked about how often (2 or more times a day, once a day, several times a week, once a week, several times a month, once a month, I do not drink sugary drinks), how much (less than one 12 oz can, one 12 oz can, two 12 oz cans, one 20 oz bottle, two 20 oz bottles, one 2-liter bottle or more, I do not drink sugary drinks), where (home, work or school, restaurants, social events, while commuting or traveling, other, I do not drink sugary drinks), and why (low

cost, easy to get, taste, thirst, other, I do not drink sugary drinks) participants consume SSBs. One item adapted from previous studies (Rivard et al., 2012; Richardson et. al., 2018) asked participants, “*Have you drank at least one sugary drink in the past 24 hours?*” with response options of yes or no.

### Purchase Behavior

Three items concerning purchase behavior assessed how much a SSB tax would affect purchasing behavior of residents of Washington, D.C. These items included, “*Where do you buy sugary drinks most often*” (restaurants, corner stores, grocery stores, vending machines, I do not buy sugary drinks), “*About how many sugary drinks do you buy at a grocery store and/or corner store*” (one 20 oz bottle, one 2-liter bottle, one 12 pack of cans, one 24 pack of cans, more than one 24 pack of cans, other, I do not buy sugary drinks), and an open-ended item asking, “*About how much money do you spend each time you buy sugary drinks?*”

### Perceived Behavior Change

Six items were included to determine if an excise SSB tax may change the participants’ consumption or purchase behaviors. Four items included the statements: “*If a sugary drink tax was passed in D.C. and a 20 oz sugary drink now costs \$2.49 instead of \$2.19, I would drink less of the taxed sugary drinks*”; “*If a sugary drink tax was passed in D.C. and a 20 oz sugary drink now costs \$2.19 instead of \$2.49, I would drink more drinks that were not taxed*”; “*If a sugary drink tax was passed in D.C. and a 2-liter sugary drink now costs \$3.39 instead of \$2.39, I would drink less of the taxed sugary drinks*”; and “*If a sugary drink tax was passed in D.C. and a 2-liter sugary drink now costs \$3.39 instead of \$2.39, I would drink more drinks that were not taxed.*” Response options for these items utilized a 5-point Likert scale of strongly agree, agree, maybe, disagree, strongly disagree. The other two items revolved around whether participants would view SSBs as

more or less healthy if a SSB tax was passed in Washington, D.C (more healthy, less healthy, my view would not change) and what they would drink instead of taxed sugary drinks. Only participants who answered strongly agree, agree, or maybe to the question of *“If a sugary drink tax was passed in D.C. and a 2-liter sugary drink now costs \$3.39 instead of \$2.39, I would drink more drinks that were not taxed”* were shown the question asking what untaxed drinks they would replace the taxed products with. Answers included untaxed drinks such as diet drinks, water, milk, tea, and fruit juice with an “Other” option where participants could write in a response.

#### Support for a Sugar-Sweetened Beverage Tax

Four items were asked to analyze the level of support that exists for a SSB tax among residents of Washington, D.C. The first item stated, *“I think D.C. should have a tax on sugary drinks”* with response options utilizing a 5-point Likert-type scale of strongly agree, agree, maybe, disagree, strongly disagree. Similar to previous research (Schmitt et al., 2014), the neutral response option (maybe) was grouped with the “disagree/strongly disagree” category because the preferred outcome, from the public health perspective, is support not neutrality. The survey also asked if participants thought an excise SSB tax in Washington D.C. could help mitigate health issues among residents (strongly agree, agree, maybe, disagree, strongly disagree) and if support for an excise SSB tax is dependent on how the tax revenue is spent (strongly agree, agree, maybe, disagree, strongly disagree), with examples specific to how the tax revenue in Washington, D.C. may be allocated (e.g., school meals, early childhood education, vouchers for free produce to low-income residents, outdoor recreation).

### **3.7 Data Collection**

Survey data was collected online through the University of Pittsburgh's Qualtrics system over the span of January 13, 2020 through March 28, 2020. Participants were able to start and complete the survey any time up until the survey closed, which included starting the survey and completing it at a different time. Participants who answered all of the questions had the option to provide their email address to be entered for a chance to win one of ten \$25 electronic Target gift cards. Responses were then exported into a password protected Microsoft Excel spreadsheet and coded. After the ten winners for the \$25 electronic Target gift cards were chosen by use of a random number generator, the email addresses of participants were deleted from the Excel spreadsheet for privacy reasons. The University of Pittsburgh's Institutional Review Board (IRB) reviewed and approved all protocols prior to the initiation of the research study.

### **3.8 Statistical Analysis**

Both quantitative and qualitative data (open-ended survey questions) were analyzed in Microsoft Excel 2020. Participant demographics, knowledge of SSBs, consumption behavior, purchasing behavior, perceived behavior change, and level of support for an excise SSB tax were summarized using descriptive statistics, including frequencies and means with standard deviations. In regard to the item asking how many teaspoons of sugar are in a 12 oz can of sugary drink, if the participant provided a range (e.g., wrote in 8-10), the lesser teaspoon amount was used in the mean calculation. Similarly, the question asking how much money is spent on SSBs, if the participant provided a range (e.g., wrote in \$4-\$6), the lesser dollar amount was used in the mean calculation.

## **4.0 Results**

### **4.1 Demographics**

Table 2 displays the demographic characteristics of participants. There was a total of 362 survey participants; however, 36 were excluded because they either did not meet the inclusion criteria or did not provide answers to any questions past question 2. This provided a final sample of n=337 participants. The majority of participants identified as female (83%) and White (75%). The average age of participants was  $42 \pm 16$  years old and 93% obtained a four-year degree or higher. Ward 3 had the highest participation at 35%, followed by Ward 5 at 18%.

**Table 2: Demographic Characteristics of Washington, D.C. Adult Residents (n=337)**

<b>Characteristic</b>	<b>Response Options</b>	<b>% or Mean (SD)</b>	<b>n</b>
<b>Gender</b> (n=326)	Female	82.8	270
	Male	16.9	55
	Non-binary	0.3	1
<b>Race</b> (n=322)	African American	8.1	26
	Asian	7.1	33
	Hispanic or Latino/a	3.4	11
	White	75.8	244
	2 or more races	5.6	18
<b>Age, years</b>		43.0 (16)	317
<b>Education</b> (n=325)	High school/GED	4.3	14
	Associate degree	3.1	10
	Bachelor's degree	28.3	92
	Advanced degree	64.3	209
<b>Ward</b> (n=326)	1	8.9	29
	2	8.9	29
	3	34.7	113
	4	13.2	43
	5	18.1	59
	6	11.3	37
	7	2.1	7
	8	2.8	9

## **4.2 Knowledge of Sugar-Sweetened Beverages**

Table 3 describes participants' knowledge of sugar-sweetened beverages (SSBs) and their related health consequences. Participants estimated the average number of teaspoons of sugar in a 12 oz can of soda/pop to be  $10 \pm 14$ , with a range of 0.5–200; n=11 participants responded qualitatively stating, “*too many*” or “*I don't know.*” The majority of participants (94%) viewed sugary drinks as unhealthy or very unhealthy. Of the n=301 participants who answered all the

true/false questions regarding the health-related consequences of SSBs, 74% answered them all correctly. In addition to the quantitative data, qualitative word clouds were generated to visually summarize data regarding what participants usually call drinks with added sugar in them (Figure 1) and their biggest health concern surrounding sugary drinks (Figure 2).

**Table 3: Participants' Knowledge of Sugary Drinks and Health-Related Consequences**

<b>Question</b>	<b>Response Options</b>	<b>% or Mean (SD)</b>	<b>n</b>
<b>How many teaspoons of sugar do you think are in a 12 oz can of soda/pop?<sup>a</sup></b>		10 (14)	301
<b>Do you think sugary drinks are...</b> (n=306)	very unhealthy	59.2	181
	unhealthy	34.3	105
	neither healthy nor unhealthy	5.6	17
	healthy	0.0	0
	very healthy	1.0	3
<b>Drinking a lot of sugary drinks raises your risk of...</b> <b>% correct</b> (n=301-305)	gaining weight	97.7	298
	high blood sugar	96.7	294
	heart disease	90.1	274
	kidney disease	83.4	251
	high blood pressure	82.6	251
	cavities	98.0	298
	% of participants who answered all items correctly	73.8	222

<sup>a</sup>for responses that listed a range (e.g., 8-10), the lesser amount was used for this calculation



### **4.3 Consumption Behavior**

Table 4 shows participants' responses around sugary drink consumption. Approximately one quarter of participants (22%) reported drinking a sugary drink within the past 24 hours. The percentage of participants drinking at least one sugary drink at least once a week was 31%, while an additional 30% stated they did not drink sugary drinks. The most common reason provided for why participants consume sugary drinks was taste (54%). Participants reported consuming sugary drinks most often at social events (30%), restaurants (27%), or home (24%).

**Table 4: Participants' Consumption Behavior of Sugary Drinks**

<b>Question</b>	<b>Response Options</b>	<b>%</b>	<b>n</b>
<b>Have you drank at least one sugary drink in the past 24 hours?</b> (n=316)	Yes	22.2	70
	No	77.8	246
<b>About how often do you drink at least one sugary drink?</b> (n=316)	2 or more times/day	1.3	4
	Once/day	6.6	21
	Several times/week	9.5	30
	Once/week	13.6	43
	Several times/month	13.3	42
	Once/month	25.6	81
	I do not drink sugary drinks	30.1	95
<b>Why do you drink sugary drinks?</b> (n=316)	Low cost	4.4	14
	Easy to get	9.2	29
	Taste	53.5	169
	Thirst	10.8	34
	Other	15.5	49
	I do not drink sugary drinks	29.7	94
<b>Where do you drink sugary drinks most often?</b> (n=315)	Home	23.8	75
	Work/School	16.8	53
	Restaurants	26.7	84
	Social Events	29.5	93
	While commuting/traveling	14.0	44
	Other	2.5	8
	I do not drink sugary drinks	28.9	91

#### **4.4 Purchase Behavior**

Table 5 presents participants' responses around purchasing behavior specific to sugary drinks. Participants reported they spend an average of at least  $\$3.33 \pm \$15.53$  when they buy sugary drinks. Of the participants who reported purchasing sugary drinks (n=213), the most popular locations were restaurants (31%) and grocery stores (30%). The majority of participants stated

they do not buy sugary drinks (52%), however, those that do usually purchase one 20 oz bottle (18%) or one 12 pack of cans (10%).

**Table 5: Participants' Purchase Behavior of Sugary Drinks**

<b>Question</b>	<b>Response Options</b>	<b>% or Mean (SD)</b>	<b>n</b>
<b>Where do you buy sugary drinks most often?</b> (n=314)	Restaurants	30.9	97
	Corner stores	17.5	55
	Grocery stores	30.3	95
	Vending machines	8.9	28
	Other	8.6	27
	I do not buy sugary drinks	32.2	101
<b>About how many sugary drinks do you buy at a grocery store and/or corner store?</b> (n=315)	One 20 oz bottle	18.2	57
	One 2-liter bottle	4.2	13
	One 12 pack of cans	9.6	30
	One 24 pack of cans	1.9	6
	More than one 24 pack of cans	0.3	1
	Other	14.1	44
	I do not buy sugary drinks	52.1	163
<b>About how much money do you spend each time you buy sugary drinks?<sup>a</sup></b> (n=194)		\$3.33 (\$15.53)	194

<sup>a</sup>for responses that listed a range (e.g., \$4-\$6), the lesser amount was used in this calculation

#### **4.5 Perceived Behavior Change**

Table 6 includes participants' responses to questions about their perceived behavior change as it relates to an excise sugary drink tax being enacted in Washington, D.C. If a sugary drink tax was passed in Washington, D.C., the majority of participants (87%) reported their view of sugary drinks would not change, while 14% said they would view them as less healthy, and 2% would view them as more healthy. In terms of perceived behavior change with a \$0.30 increase on a 20 oz bottle, 33% responded they agree/strongly agree that they would drink less taxed sugary drinks while 67% responded maybe/disagree/strongly disagree. Additionally, 29% responded they

agree/strongly agree that they would drink more untaxed drinks while 71% responded maybe/disagree/strongly disagree. With a \$1.00 increase on a 2-liter bottle, 48% responded they agree/strongly agree that they would drink less taxed sugary drinks while 52% responded maybe/disagree/strongly disagree. Additionally, 41% responded that they would drink more untaxed drinks while 60% responded maybe/disagree/agree. Of the participants that answered they agree/strongly agree that they would drink more untaxed drinks if the price of a 2-liter bottle increased by \$1.00 (n=186), the majority (80%) chose plain water (still or carbonated) as the product they would drink instead of taxed sugary drinks.

**Table 6: Participants’ Perceived Behavior Change around a Sugary Drink Tax**

<b>Question</b>	<b>Response Options</b>	<b>%</b>	<b>n</b>
<b>If a sugary drink tax was passed in DC, I would view sugary drinks as...</b> (n=305)	more healthy	1.6	5
	less healthy	14.1	43
	my view would not change	84.3	257
<b>If a sugary drink tax was passed in DC and a 20 oz sugary drink now costs \$2.49 instead of \$2.19, I would drink less of the taxed sugary drinks.</b> (n=299)	Strongly agree	21.7	65
	Agree	11.4	34
	Maybe	29.1	87
	Disagree	20.4	61
	Strongly disagree	17.4	52
<b>If a sugary drink tax was passed in DC and a 20 oz sugary drink now costs \$2.49 instead of \$2.19, I would drink more drinks that were not taxed.</b> (n=300)	Strongly agree	13.7	41
	Agree	15.7	47
	Maybe	28.0	84
	Disagree	20.3	61
	Strongly disagree	22.3	67
<b>If a sugary drink tax was passed in DC and a 2-liter sugary drink now costs \$3.39 instead of \$2.39, I would drink less of the taxed sugary drinks.</b> (n=300)	Strongly agree	28.0	84
	Agree	19.7	59
	Maybe	21.3	64
	Disagree	15.3	46
	Strongly disagree	15.7	47
<b>If a sugary drink tax was passed in DC and a 2-liter sugary drink now costs \$3.39 instead of \$2.39, I would drink more drinks that were not taxed.</b> (n=298)	Strongly agree	19.8	59
	Agree	20.8	62
	Maybe	23.2	69
	Disagree	16.8	50
	Strongly disagree	19.5	58

**Table 6 (continued)**

<b>Which drink would you be most likely to drink instead of taxed sugary drinks?</b> (n=186)	Diet drinks	13.4	25
	Plain coffee	33.3	62
	Plain water <sup>a</sup>	80.1	149
	Flavored water with no calories <sup>a</sup>	32.8	61
	Plain milk	7.5	14
	Flavored milk	1.1	2
	Plain tea	30.6	57
	Flavored tea with no calories	9.7	18
	100% fruit juice	12.9	24
	Other	5.4	10

<sup>a</sup>water included still or carbonated

#### **4.6 Support for a Sugar-Sweetened Beverage Tax**

Table 7 demonstrates the level of participants' support for an excise SSB tax in Washington, D.C. Nearly 70% of participants agree/strongly agree that Washington, D.C. should have an excise tax on sugary drinks. An even larger majority (86%) think the Washington, D.C. government needs to do more to fix health issues that affect its residents. In addition, over half (56%) feel an excise sugary drink tax could help fix said health issues. Table 9 presents results for participants' level of support for an excise sugary drink tax by tax revenue spending options. The strongest level of support (84%) was for vouchers for free produce to low-income residents. The lowest level of support (69%) was for outdoor recreation.

Table 7: Participants' Level of Support for a Sugary Drink Tax

Question	Response Options	%	n
<b>I think DC's government needs to do more to fix health issues that affect its residents.</b> (n=301)	Strongly agree	55.1	166
	Agree	30.9	93
	Maybe	11.0	33
	Disagree	2.3	7
	Strongly Disagree	0.7	2
<b>I think a tax on sugary drinks in DC could help fix health issues that affect its residents.</b> (n=300)	Strongly agree	27.3	82
	Agree	28.3	85
	Maybe	28.0	84
	Disagree	9.3	28
	Strongly Disagree	7.0	21
<b>I think DC should have a tax on sugary drinks.</b> (n=300)	Strongly agree	39.3	118
	Agree	29.7	89
	Maybe	14.3	43
	Disagree	7.0	21
	Strongly Disagree	9.7	29

Table 8: Participants' Level of Support for a Sugary Drink Tax by Revenue Spending Options (n=299)

<b>I would support a tax on sugary drinks in DC if the tax money was spent on...</b>	Response Options	%	n
<b>school meals</b>	Strongly Agree	59.2	177
	Agree	21.4	64
	Maybe	9.4	28
	Disagree	4.7	14
	Strongly Disagree	5.4	16
<b>early childhood education</b>	Strongly Agree	60.9	182
	Agree	21.7	65
	Maybe	9.0	27
	Disagree	3.7	11
	Strongly Disagree	4.7	14
<b>vouchers for free produce to low-income residents</b>	Strongly Agree	62.2	186
	Agree	22.1	66
	Maybe	7.4	22
	Disagree	2.7	8
	Strongly Disagree	5.7	17
<b>outdoor recreation</b>	Strongly Agree	41.5	124
	Agree	27.4	82
	Maybe	18.4	55
	Disagree	6.7	20
	Strongly Disagree	6.0	18

## **5.0 Discussion**

This needs assessment with adult Washington, D.C. residents had three overarching aims: (1) understand their current level of knowledge around sugar-sweetened beverages (SSBs), (2) determine their current level of support for an excise SSB tax, and (3) analyze their perceived behavior change following an excise SSB tax. Participants had a general understanding that SSBs negatively affected an individual's health, however, the level of that understanding varied by the associated health condition. Overall, the majority of participants supported an excise SSB tax in Washington, D.C. and reported that as the tax increased, their consumption of taxed sugary drinks would decrease.

### **5.1 Inquiry Question #1: Knowledge of Sugar-Sweetened Beverages**

While the majority of participants had a general understanding of the health consequences related to SSB consumption, the depth of that understanding varied by the health condition. A smaller proportion of participants in the current inquiry answered correctly that SSB consumption increased an individual's risk of high blood pressure, kidney disease, and heart disease. This varied level of understanding is aligned with Rivard et al.'s (2012) research which found, similar to this inquiry, a higher number of participants were aware of the link between SSB consumption and obesity, high blood sugar, and cavities, but not with other health consequences. The emphasis on weight, high blood sugar, and cavities was reiterated in the open-ended question asking participant's what their biggest health concern was related to SSBs. Some of the most common

words used were diabetes, empty, calories, fat, blood sugar, obesity, dental decay, weight gain, and health. Research has shown that knowledge about the adverse effects of SSB consumption is significantly negatively associated with intake levels among adults (Park et al, 2014). This suggests that health education could be an effective strategy to reduce SSB consumption and should be considered in excise SSB taxation efforts.

Nearly all participants reported SSBs were very unhealthy or unhealthy. The only wards where participants stated SSBs were very healthy (n=3) were in Wards 3, 6, and 7. Two of these three participants reported they were 18 years old with a high school/GED education. Although these 3 participants reported SSBs were very healthy, all three also reported that they strongly agreed that Washington, D.C. should have a tax on SSBs. Regarding participant knowledge of the amount of sugar in a 12 oz can of soda, answers varied greatly (between 0.5-200 teaspoons). While the average amount reported was  $10 \pm 14$  teaspoons, which is the correct answer (NHLBI, n.d.), only 13% of participants stated the exact correct answer in their response (results not reported). The large range of responses provided by participant's indicates the lack of overall knowledge to this question. Another reason this is of concern is because the sugar content in SSBs is directly related to the caloric amount. Bleich et al. (2014) found that when participants were aware of the caloric information of SSBs, the likelihood of purchasing SSBs were significantly reduced.

## **5.2 Inquiry Question #2: Support for an Excise Sugar-Sweetened Beverage Tax**

The majority (69%) of participants reported positively that they would support an excise SSB tax in Washington, D.C. This percentage was considerably larger than the 36% support reported in a study by Rivard et al. (2012) across the United States (U.S.) and the 50% reported by

another study by Donaldson et al. (2015) with registered voters in a Mid-Atlantic U.S. state. In the current inquiry, an even larger majority felt that the Washington, D.C. government needs to do more to fix health issues that affect its residents, and over half of participants felt that an excise SSB tax could help fix said health issues. While survey participants in the current inquiry may not be representative of all D.C. residents, the fact that the majority of participants supported an excise SSB tax, suggests that such a tax in Washington, D.C. could be well received. It is also possible that even those participants who did not support an excise SSB tax could be swayed if the tax revenue was allocated to their preference. This would also meet the desire among the majority of participants for the Washington, D.C. government to do more to fix the health issues of residents.

In regard to how tax revenue would be allocated, the most support existed around food access, specifically allocating the money to vouchers for free produce to low-income residents. It is noteworthy that other allocation options were closely ranked, including allocating revenue in early childhood education, school meals, and outdoor recreation. Food access is also how six of the seven localities that currently have an excise SSB tax allocate, at least part of, the funds (Healthy Food America, n.d.). The survey response options were initially put forth by the Washington, D.C. City Council as options where the tax revenue may be spent. It is possible that there are other options to where residents would prefer the tax revenue to be allocated, but that is currently unknown.

In response to the coronavirus pandemic, some cities have begun using the revenue acquired through excise SSB taxation to provide relief during these unprecedented times, especially for low-income residents. San Francisco is using \$1.65 million from excise SSB taxation to bolster local feeding programs that serve marginalized populations (Phillips, 2020). In Seattle, 6,250 families will receive \$800 from excise SSB tax revenue (Despres, 2020). One voucher for

\$400 was sent to families in March and another \$400 was sent in April. The vouchers can be spent at Safeway stores. This is an important advantage of excise SSB taxation revenue, to apply the revenue to initiatives that increase residents' health, while remaining nimble enough to allow for flexibility like San Francisco and Seattle have demonstrated.

### **5.3 Inquiry Question #3: Perceived Behavior Change**

In order to analyze perceived behavior change among participants, participants were asked if they would reduce their consumption of taxed SSBs if the price of these products increased. Results from this inquiry suggested that as the price of the product increased by volume, the number of participants reporting they would drink less taxed SSBs increased. Participants were also asked if they would increase their consumption of untaxed beverages to replace the taxed SSBs. Similarly, the data showed that as the price of the taxed product increased by volume, the number of participants reporting they would drink more untaxed beverages also increased. Research has shown that as little as a 10% increase in SSBs could reduce consumption by 8-10% (Andreyeva et al., 2011). Overwhelmingly in this needs assessment, plain water (still or carbonated) was the main untaxed product reported by participants that would replace taxed SSBs, followed by flavored water (still or carbonated), plain coffee, and plain tea. Water being perceived as the main replacement for taxed SSBs is in line with results from three other studies. For example, in Philadelphia, PA 2 months post excise SSB tax implementation the odds of daily consumption of bottled water was 58% higher than a comparison city as measured through participant self-reported survey data (Zhong et al., 2018). In Berkeley, CA immediately after excise SSB tax implementation participants reported water consumption increased by 63% (Falbe

et al., 2016) and was still 25% higher three years post implementation as comparator cities (Lee et al., 2019).

#### **5.4 Strengths and Limitations**

This is the first study to examine knowledge, support, and behavior change of Washington, D.C. residents related to SSBs and excise SSB taxation. While a major strength of this inquiry was the ability to gather robust, descriptive data, participants were recruited by convenience sampling and were primarily white, educated women living in Wards 3 and 5. As completed surveys began to accumulate, the researcher became aware there was a disproportionately lower representation from Wards 7 and 8. A plan was put in place to garner more representation from these wards before the survey was scheduled to close, however, that plan was interrupted by the coronavirus pandemic and never came to fruition because partner organizations assisting with recruitment efforts began to close and/or work from home due to the virus. Because of the lack of variability in participant demographics, the results are not generalizable to all Washington, D.C. residents and should not be interpreted as such. It is important to note, however, that the goal of this study was not to produce generalizable results, but rather to collect descriptive data to help inform current excise SSB taxation efforts in Washington, D.C. Further, the framework of this needs assessment may be reproducible in other geographical locations to inform additional excise SSB taxation efforts.

An inherent limitation in the methodology of self-reported data, such as a survey, is the risk of social desirability response bias. Measures were taken to minimize this such as the utilization of a confidential online survey system and the use of community-based organizations that are trusted and respected in their communities, were intended to make participants feel

comfortable answering honestly. Furthermore, participants completed the survey on a volunteer basis, so those who did participate may have done so because of their interest and/or strong opinion on the subject.

Another limitation was that the survey was only made available in the English language and had to be completed electronically. This adds restrictions to the diversity of perspectives and behaviors and the overall response rate from some wards. Finally, because the data collected was cross-sectional, causality and directionality of relationships cannot be determined.

### **5.5 Recommendations for Future Research**

The current needs assessment has laid the groundwork for future research inquiries. In addition to the current survey questions about knowledge, support, and perceived behavior change, it may be useful to supplement with additional questions. Such questions, including participants' knowledge of daily sugar recommendations or children's consumption behavior, could provide a more holistic understanding of the potential impact of an excise SSB tax.

A second recommendation for future research is to conduct a larger study with greater representation among all wards. This would produce a more diverse sample of participants since the wards that had the lowest representation in this study are the wards with the largest percentage of minoritized populations. A larger, more representative sample would also allow for comparison of this study to see if knowledge, support, and/or behavior change differed across wards and/or demographics.

One next step for future research would be to conduct focus groups with Washington, D.C. residents in order to garner more nuanced and detailed data. Specifically, this would allow

researchers to dig deeper into the knowledge, support, and behavior change questions introduced in the survey. Future inquiries in other localities could opt to employ focus groups in substitution of the survey while still utilizing the framework of this needs assessment to guide a semi-structured methodology of the focus groups. The final recommendation for future research is to validate this survey for use in future studies. Because neither the current survey, nor the two it was adapted from, have been validated, the reliability and strength of the data could be increased.

## **5.6 Implications for Practice**

The results of this needs assessment have implications for potential positive change at the individual, organization, and governmental level and can directly inform the excise SSB taxation effort currently taking place in Washington, D.C. At the individual level, the data garnered from this needs assessment, specifically the questions around knowledge of SSBs, could be used by advocates (e.g., individuals, community organizations, coalition groups) to educate residents on the health consequences of SSBs with the ultimate goal of behavior change through a reduction in SSB consumption (Park et al., 2014). Fifty-four percent of participants reported that taste was the main reason why they drink SSBs. Along with education of the health consequences and SSB consumption reduction, it would be prudent to educate residents of healthy beverage alternatives that taste good and are widely available. This education could be done through community nutrition/education programming and taste tests. Another chief strategy for education should be how to fit SSBs into a healthy dietary pattern during celebrations and/or as an occasional treat. This is especially important considering the highest percentage of participants (30%) who reported consuming SSBs did so at social events. Considering the negative health outcomes associated with

SSB consumption, a greater understanding of this has the potential to positively affect an individual's overall health. When multiple changes occur at the individual level, this feeds into the community level. Because the group that are more likely to consume SSBs are also more likely to experience health disparities by race, education, and income, additional related programming, resources, and funding should be allocated to those communities.

At the organization level, advocates can use the collected data for campaign messaging and share highlights with decisionmakers. A summary document should include the desire of participants for the local government to do more to address health concerns of residents, the level of support that currently exists for an excise SSB tax, support by tax revenue allocation, health concerns of residents, where and why residents consume SSBs, and the reported behavior change of participants if an excise SSB tax were enacted. Additionally, because participants reported purchasing most SSBs from restaurants and grocery/corner stores, advocates should target and engage these local stakeholders to increase buy-in. Because participants anticipated replacing taxed SSBs products with other beverages (e.g., plain or flavored water, coffee, tea), businesses should consider offering such healthy alternatives so that business/money would simply be replaced, not lost.

At the government level, because the excise SSB tax measure in Washington, D.C. is still under review of the council, it is still malleable. Because of this, responses to the questions such as *"I would support a tax on sugary drinks in DC if the tax money was spent on..."* could prove valuable to council members as they look to add amendments to the measure. Because participants showed the most support for tax revenue being used on vouchers for free produce to low-income residents, if the Washington, D.C. City Council is looking to garner the most support, they should consider this as the main program to allocate the revenue. This would allow council members to

support the excise SSB tax measure while also ensuring as much support as possible from their constituents as well. While the measure is still under review of city council, this survey showed overwhelming support for an excise SSB tax from those surveyed (69%). Advocates and decisionmakers should use that to feel confident moving forward with the measure, especially considering it is aligned with participants reporting that they feel an excise SSB tax could help fix health issues that affect residents (56%).

### **5.7 Conclusion**

Through this needs assessment of adult Washington, D.C. residents, data showed that the majority of participants had a general understanding that SSBs negatively affected an individual's health and view SSBs as being very unhealthy. In addition, there was a very high level of support for an excise SSB tax in Washington, D.C. Along with that support, participants also reported that as the excise SSB tax increased, their consumption of taxed sugary drinks would decrease. Recommendations for future research opportunities would be to conduct a larger study with equal representation across all wards, incorporate focus groups, and validate the study. Findings from this study have implications at the individual, organization, and government level.

## Appendix A Inquiry Survey

1. Are you at least 18 years old?
  - a. Yes
  - b. No

*If yes – move to question 2*

*If no – end survey*

2. Do you currently live in Washington, D.C.
  - a. Yes
  - b. No

*If yes – move to survey questions*

*If no – end survey*

3. What is your sex?
  - a. Male
  - b. Female
  - c. Prefer to self-identify (please describe):
4. Which would you say your race/ethnicity is? (choose all that apply)
  - a. African American
  - b. American Indian or Alaska Native
  - c. Asian
  - d. Hispanic or Latino/a
  - e. Pacific Islander
  - f. White
  - g. Other (please describe):
5. What is your age?
6. What is the highest level of school you have finished?
  - a. Elementary/middle school
  - b. High school or GED
  - c. Associate degree
  - d. Bachelor's degree
  - e. Advanced degree
7. In which ward of D.C. do you live?
  - a. Ward 1
  - b. Ward 2
  - c. Ward 3

- d. Ward 4
  - e. Ward 5
  - f. Ward 6
  - g. Ward 7
  - h. Ward 8
8. What do you usually call drinks that have added sugar in them? (choose all that apply)
- a. Pop
  - b. Soda
  - c. Soft drinks
  - d. Sugary drinks
  - e. Sugar-sweetened beverages
  - f. Other (please describe):
9. When you hear the term ‘sugary drink,’ what drinks do you think this includes? (choose all that apply)
- a. Soda/pop
  - b. Diet drinks
  - c. Plain coffee
  - d. Coffee drinks (flavored latte, Frappuccino)
  - e. Energy drinks
  - f. Sports drinks
  - g. Plain water (still or carbonated)
  - h. Flavored water (still or carbonated) with no calories
  - i. Flavored water (still or carbonated) with calories
  - j. Plain milk
  - k. Flavored milk
  - l. Plain tea
  - m. Flavored tea with no calories
  - n. Flavored tea with calories
  - o. 100% fruit juice
  - p. Juice drinks (Kool-Aid, Capri Sun)
  - q. Other (please describe):
10. How many teaspoons of sugar do you think are in one 12 oz can of soda/pop?

For the rest of the survey we will call drinks that have sugar added to them **sugary drinks**. **Sugary drinks** are drinks that are sweetened with any form of sugar that adds calories.

11. Have you drank at least one sugary drink in the past 24 hours?
- a. Yes
  - b. No
12. About how often do you drink at least one sugary drink?
- a. 2 or more times a day
  - b. Once a day

- c. Several times a week
  - d. Once a week
  - e. Several times a month
  - f. Once a month
  - g. I do not drink sugary drinks
13. When you drink a sugary drink, about how much do you drink in one day?
- a. Less than one 12 oz can
  - b. One 12 oz can
  - c. Two 12 oz cans
  - d. One 20 oz bottle
  - e. Two 20 oz bottles
  - f. One 2-liter bottle or more
  - g. I do not drink sugary drinks
14. Why do you drink sugary drinks? (choose all that apply)
- a. Low cost
  - b. Easy to get
  - c. Taste
  - d. Thirst
  - e. Other (please describe):
  - f. I do not drink sugary drinks
15. Where do you drink sugary drinks most often? (choose all that apply)
- a. Home
  - b. Work or school
  - c. Restaurants
  - d. Social events
  - e. While commuting or traveling
  - f. Other (please describe):
  - g. I do not drink sugary drinks
16. Where do you buy sugary drinks most often? (choose all that apply)
- a. Restaurants
  - b. Corner stores
  - c. Grocery stores
  - d. Vending machines
  - e. Other (please describe):
  - f. I do not buy sugary drinks
17. About how many sugary drinks do you buy at a grocery store and/or corner store?
- a. One 20 oz bottle
  - b. One 2-liter bottle
  - c. One 12 pack of cans
  - d. One 24 pack of cans
  - e. More than one 24 pack of cans

- f. Other (please describe):
  - g. I do not buy sugary drinks
18. About how much money do you spend each time you buy sugary drinks?
19. Do you think sugary drinks are...
- a. Very healthy
  - b. Healthy
  - c. Neither healthy nor unhealthy
  - d. Unhealthy
  - e. Very unhealthy
20. What is your biggest health concern about sugary drinks?
- 21a. Drinking a lot of sugary drinks raises your risk of gaining weight.
- a. True
  - b. False
- 21b. Drinking a lot of sugary drinks raises your risk of high blood sugar.
- a. True
  - b. False
- 21c. Drinking a lot of sugary drinks raises your risk of heart disease.
- a. True
  - b. False
- 21d. Drinking a lot of sugary drinks raises your risk of kidney disease.
- a. True
  - b. False
- 21e. Drinking a lot of sugary drinks raises your risk of high blood pressure.
- a. True
  - b. False
- 21f. Drinking a lot of sugary drinks raises your risk of cavities.
- a. True
  - b. False
22. If a sugary drink tax was passed in D.C., I would view sugary drinks as...
- c. More healthy
  - d. Less healthy
  - e. My view would not change
23. If a sugary drink tax was passed in D.C. and a 20 oz sugary drink now costs \$2.49 instead of \$2.19, I would drink less of the taxed sugary drinks.
- a. Strongly agree

- b. Agree
  - c. Maybe
  - d. Disagree
  - e. Strongly disagree
24. If a sugary drink tax was passed in D.C. and a 20 oz sugary drink now costs \$2.49 instead of \$2.19, I would drink more drinks that were not taxed.
- a. Strongly agree
  - b. Agree
  - c. Maybe
  - d. Disagree
  - e. Strongly disagree
25. If a sugary drink tax was passed in D.C. and a 2-liter sugary drink now costs \$3.39 instead of \$2.39, I would drink less of the taxed sugary drinks.
- a. Strongly agree
  - b. Agree
  - c. Maybe
  - d. Disagree
  - e. Strongly disagree
26. If a sugary drink tax was passed in D.C. and a 2-liter sugary drink now costs \$3.39 instead of \$2.39, I would drink more drinks that were not taxed.
- a. Strongly agree
  - b. Agree
  - c. Maybe
  - d. Disagree
  - e. Strongly disagree

*If answered A, B, or C – move to question 27*

*If answered D or E – move to question 28*

27. Which drinks would you be most likely to drink instead of taxed sugary drinks? (choose all that apply)
- a. Diet drinks
  - b. Plain coffee
  - c. Plain water (still or carbonated)
  - d. Flavored water (still or carbonated) with no calories
  - e. Plain milk
  - f. Flavored milk
  - g. Plain tea
  - h. Flavored tea with no calories
  - i. 100% fruit juice
  - j. Other (please describe):

28. I think D.C.'s government needs to do more to fix health issues that affect its residents.
- Strongly agree
  - Agree
  - Maybe
  - Disagree
  - Strongly disagree
29. I think a tax on sugary drinks in D.C. could help fix health issues that affect its residents.
- Strongly agree
  - Agree
  - Maybe
  - Disagree
  - Strongly disagree
30. I think D.C. should have a tax on sugary drinks.
- Strongly agree
  - Agree
  - Maybe
  - Disagree
  - Strongly disagree
- 31a. I would support a tax on sugary drinks in D.C. if the tax money was spent on D.C. school meals.
- Strongly agree
  - Agree
  - Maybe
  - Disagree
  - Strongly disagree
- 31b. I would support a tax on sugary drinks in D.C. if the tax money was spent on early childhood education.
- Strongly agree
  - Agree
  - Maybe
  - Disagree
  - Strongly disagree
- 31c. I would support a tax on sugary drinks in D.C. if the tax money was spent on vouchers for free produce to low-income residents.
- Strongly agree
  - Agree
  - Maybe
  - Disagree
  - Strongly disagree

31d. I would support a tax on sugary drinks in D.C. if the tax money was spent on outdoor recreation.

- a. Strongly agree
- b. Agree
- c. Maybe
- d. Disagree
- e. Strongly disagree

32. If you would like to be entered for a chance to win one of multiple \$20 Target gift cards, please enter your email address. If not, just leave the space blank.

## **Appendix B Key Stakeholder Interview Guide**

Thank you for lending your time and expertise to this conversation, it is very much appreciated. As a reminder, the purpose of this key stakeholder interview is to gain a better understanding of the current landscape of SSB taxation efforts in Washington, DC and to learn what information would be useful for policymakers and advocates as these efforts move forward. The information discussed in this interview will be integral in helping develop the framework of questions for my dissertation inquiry study.

### **To learn more about you...**

Can you tell me more about your background?

What is your current role?

How did you and/or your organization become a part of the SSB taxation conversation?

Probe: Did someone come to you for expertise?

Probe: Why is it important for you to be at the table for this conversation?

Probe: Why are you and/or your organization invested in SSB taxation?

### **To gain a baseline of what the current landscape looks like...**

In general, what is the current conversation around SSB taxation?

Probe: Are conversations still moving forward?

Probe: Has the conversation become stagnant?

How would an excise SSB tax differ from the current budget increase of 1% to fund nutrition programs?

Probe: Do you feel this would make it easier or more difficult to advocate for an excise SSB tax?

**In order to gain a fuller picture of the stakeholders in this conversation, can you share...**

Who the key policymakers in this space are?

Who the key advocates in this space are?

**I'd like to learn more about the information informing the current SSB taxation conversations...**

What are the main drivers of the SSB taxation initiative?

What would be useful information for policymakers and/or advocates to have?

**We've come to the last question and I just want to be sure we've covered everything that would allow me to have the best understanding of the current landscape and how to move forward with my research project...**

Is there anything I did not ask that you feel would be important to talk about?

Probe: Do you have any additional information or comments you'd like to share?

Probe: Who else do you think would be beneficial to speak to on this topic?

**In summary...**

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