

Yinger 735 - Memo

Beverage Taxes in Philadelphia, Pennsylvania and Seattle, Washington

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## **Introduction**

Over the last five years, several municipalities in the United States have instituted excise taxes on sodas. This memorandum will review and analyze the beverage taxes within Philadelphia, Pennsylvania, and Seattle, Washington. We note what products are taxed in each city, how tax revenues are spent. We consider the idea of any city instituting or continuing its own soda tax. We find that while soda taxes successfully generate enough revenue to fund new public programs, these excise taxes are vertically inequitable and regressive. When structured specifically to discourage the consumption of sugary beverages, the taxes are effective at curbing soda purchases. Ultimately, a city should decide if the public health benefits and source of new revenues outweigh the disproportionate tax burden on low-income households.

## **What is an Excise/“Sin” Tax**

City officials in both Philadelphia and Seattle imposed a tax on distributors who sell “sweetened beverages.” Taxes on specific goods are classified as excise taxes. Some excise taxes are further nicknamed “sin taxes” if they are intended to discourage certain behaviors. “Sin taxes are taxes on products that are thought to have not only benefits to the people who use them but also significant negative externalities for society” (Yinger, Lecture 11: Sin Taxes).

Some public officials hope to discourage consumers from buying unhealthy beverages by instituting a sin tax on sweetened beverages. Beverage sales taxes are mostly passed along to consumers, because of the inelasticity of demand for soft drinks. Consumers experience price increases on sodas and consequently limit soda consumption habits. The logic follows that, with less sugar consumption in peoples’ diets, society will experience public health benefits. Such as lower consumer healthcare costs, reduced rates of disease, prolonged lifespans, and a reduced reliance on public health resources.

Regardless of whether an excise tax is intended to distort consumer behaviors, excise taxes can become reliable revenue streams for state and local governments. States and localities charge a fuel tax on each gallon of gasoline to contribute to highway and road maintenance. Many municipalities institute resort taxes on hotel rooms to generate revenues from visitors to help fund public services and promote economic development. In both Philadelphia and Seattle, respective beverage taxes were sold to constituents in part with the promise of allocating revenues to public education and health programs.

To decipher whether a soda tax is indeed a “sin tax” aiming to dissuade certain consumer behaviors, or merely a new revenue source intended to raise as much funding as possible for

new programs, one should evaluate the context, financial history, and economic effects of the tax. The next two sections of this memo will consider the specific structures and contexts to the two cities' taxes. In general, Philadelphia's broader beverage tax fits a "revenue raising" model to fund new public programs, while Seattle's focus on sugar sweetened soft drinks qualifies more traditionally as a "sin tax" to curb sugar consumption.

### **Philadelphia Beverage Tax**

Philadelphia Mayor Jim Kenney proposed a three-cent-per-ounce tax on sweetened sodas early in 2016. The proposal aimed to allocate the funds collected from the tax to early childhood education and economic development projects in the city. The tax initially applied to non-alcoholic beverages with sugar-based sweeteners, including (regular) sweetened sodas, sports drinks, and some fruit juices. To lessen the tax burden on individual purchases, and to address concerns that taxing sugary beverages would disproportionately affect low-income individuals, the Philadelphia City Council restructured the tax to levy a 1.5 cents per fluid ounce. This tax was implemented on naturally and artificially sweetened beverages, including diet sodas (Kane and Malik, 42). Initial estimates suggested the tax would raise more than \$90 million per year, however actual revenues totaled \$70-77 million annually from 2018 to 2020 (City of Philadelphia).

Beverage tax revenues in Philadelphia primarily fund PHLpreK, a free universal pre-kindergarten program for Philadelphia city residents that operates during the traditional school year. The tax provides nearly \$30 million per year to the program, representing about 40% of annual revenues (Lahr, Yao, Fei, and Lee, 2). For the 2021-22 school year, the city enrolls 4,000 children in PHLpreK (City of Philadelphia). Based on the most recent census data, this accounts for less than 10% of the city's population of three and four year olds (U.S. Census Bureau). As of early 2019, \$6 million (5%) was allocated to community schools, \$1 million (0.8%) went to parks, and the remainder (54%) added to the city's general and debt service funds (CBS Philly).

### **Seattle Sweetened Beverage Tax**

Beginning in 2018, Seattle decided to implement a tax on sugar-sweetened beverage products. This tax was meant to try and reduce the sale and consumption of sugar beverages by Seattle residents, and to improve overall health. Products that were taxed from this, included: "regular sodas, fruit drinks, energy and sports drinks, sweetened waters, sweetened coffees and teas, and syrups and concentrates" (City of Seattle). The tax that was imposed made distributors pay 1.75 cents per ounce on sugar sweetened beverages. An estimated 97% of tax is passed on to consumers via price increases (City of Seattle). Multiple program areas benefit from this tax being implemented. These include expanding access to healthy food options, increasing child health and early learning, and a small portion of the revenue is put towards tax administration.

The money generated from this tax has been reinvested back into Seattle's economy. The largest benefactors from this tax, receiving 53% of the revenue, are programs that expand food access for community members (City of Seattle). The revenue expands food banks and programs that increase healthier food options in schools, after school programs, child care programs, and preschools. Community based meal programs are also being improved from this tax revenue. They are providing healthier and constant meal options for lower income families in the City of Seattle. 43% of the revenue generated from the Sweetened Beverage Tax goes towards children's health and improving early learning opportunities. These programs support child care subsidies for working families, as well as providing services for children with developmental delays (City of Seattle). The remaining 4% of the tax revenue is allocated to tax administration and conducting a five-year evaluation of the effects that the tax has on the economy and overall outcomes.

In FY 2019 Seattle generated \$18.3 million from the Sweetened Beverage Tax. In a study done by Krieger, Magee, Hennings, Schoof and Madsen, "How sugar-sweetened beverage tax revenues are being used in the United States," Seattle was among two of the cities studied that provided in its ordinance how the revenue was going to be used. They found that 88% of the time the allocated revenue was consistent with the ordinance's stated intent (Krieger, Magee, Hennings, Schoof and Madsen, 2). While this study was conducted for Seattle's FY 2018, the revenue generated and its impact on the overall economy are shown in Figure 1. In a population where 12% of the people are in poverty and 65% are Non-Hispanic White, the tax revenues support lower income segments of the population. 79% of the tax revenue (\$15,628,000) from 2018 was invested into low income communities of color.

## **Public Health**

A large emphasis for Seattle is the current public health situation for their residents. As of 2018, 50% of Seattle adults have excess body weight, and 5% live with diabetes (Seattle SBT 2018 Annual Report, 7). In another study completed in 2018 by Powell, Pipito, Isgor, Parks and Zenk, found that sugar sweetened beverage consumption makes up 44% of daily sugar intake for Seattle adults. On average, Seattle adults consume 18.2 tsp of added sugar. 8 tsp out of the 18.2 tsp, come from the intake of sugar sweetened beverages. The study finds that 21.6% of Non-Hispanic Black adults consume greater than or equal to two sugar sweetened beverages per day, per month. It also found that 22.7% of individuals with a high school degree or less, said that they consumed at least two sugar sweetened beverages per day, per month. In contrast, of adults with some college education, only 14.2% said they drank at least two beverages a day (Powell, Pipito, Isgor, Parks and Zenk, 2). A specific goal of the Sweetened Beverage Tax is to decrease the consumption of added sugars for Seattle residents, overall leading to a healthier community.

## **How do Excise Taxes Affect Consumer Behavior**

In general, researchers observe decreases in soda purchases after the creation of a sweetened beverage tax, yet often without statistically significant results, due in part to small sample

sizes and varying time frames. Nonetheless, observational data begin to suggest the extent to which soda excise taxes change consumer behavior.

A survey conducted on the short-term effects of Philadelphia's beverage tax concluded that the odds of an individual consuming a sugary soda or energy drink on any given day decreased by 40% and 64% respectively, while the odds of an individual consuming a bottle of water increased by 58% (Zhong, Auchincloss, Lee, and Kanter, 31). Another study from *Journal of Health Economics* finds small yet not statistically significant reductions in the daily sugar consumption of Philadelphia adults and children (Cawley, Frisvold, Hill, and Jones, 13-15). The study notes, however, that consumers were no more likely to travel outside city limits to avoid the beverage tax, and that individuals who pre-associated sugary sodas with unhealthy behaviors, were more likely to reduce their consumption habits.

The implications of Seattle's tax are noted by Powell and Leider in "The impact of Seattle's Sweetened Beverage Tax on beverage prices and volume sold." This study compares soda consumption in Seattle and nearby Portland, Oregon, who did not implement a tax on sweetened beverages. This study was conducted over FY 2017 and 2018, initially testing the cities for a year before the tax was implemented. As noted in Figure 2, there was a large drop off between volume sold (oz) of taxed beverages from 2017 to 2018 in Seattle. The volume of tax beverage products sold fell from a mean of 222,818 oz to 154,879 oz, representing an unadjusted decrease of 30% (Powell, Leider, 5).

It is also noted from the Seattle study that on average, in the first year that the tax was implemented, the price of beverages rose by 1.03 cents per oz, showing a pass-through tax of 59% of the increased tax of 1.75 cents per oz. The lowest pass through observed was on juice drinks, which only increased price by 0.75 cents per oz. The highest was for energy drinks which saw an increase of price by 1.34 cents per oz (Powell, Leider, 5). The overall findings from this study show that the prices increased by 20% for sweetened beverages leading to a decrease of volume sold beverages by 22%, equivalent to an elasticity of demand of -1.1 (Powell, Leider, 9). With an elasticity of demand over one, consumers change preferences and find substitutes for sweetened beverages.

### **Are Soda Taxes Regressive, and Should they Continue?**

Households with lower incomes and less accumulated wealth are more likely to consume sugary sodas on a regular basis (Zagorsky and Smith, 5-9). Consequently, low-income households spend a greater share of their income on soda, relative to other households. To place a tax on soda, then, disproportionately affects low income households, meaning sweetened beverage or soda taxes exhibit vertical inequities and regressivity.

Notably, Philadelphia and Seattle use beverage tax revenues to subsidize health and education programs that predominantly assist low income residents. Yet inequity concerns remain at the counter-intuition of taxing the neediest, in order to assist the neediest. In the case of Philadelphia, public officials had tried and failed to institute other new taxes to fund

universal pre-kindergarten programs. City leaders found the narrative of a sweetened beverage tax to be more palatable with voters than parking, occupancy, property, or use taxes, perhaps in part because of the opportunity to sell the tax on its public health merits (Kane and Malik, 41). Since sodas are optional to consume, devoid of nutrition, and in large quantities detrimental to health, they are a good candidate for a new “sin” tax. As evidenced by the revenue raising potential in both Philadelphia and Seattle, however, beverage taxes have become reliable sources of public revenue. Public officials cannot deter consumption too strongly with much higher tax rates, lest their public programs go under-funded.

A question remains whether the benefits from the new programs offset the tax burden on low-income households. In Philadelphia, where tax revenues support pre-kindergarten education, only 4,000 out of more than 42,000 eligible three and four-year olds are enrolled. We do not find the total social benefit to be greater than the total social cost for low-income households.

A peculiar circular logic emerges with sweetened beverage taxes. A tax is instituted, perhaps with a high enough rate to distort consumer behavior and deter the drinking of sugary sodas. If consumer habits are barely distorted, public officials relish in being able to create and finance public programs with a new, consistent revenue stream. Paradoxically to the contrary, if buyers curb their soda consumption, the tax is still deemed a success, as “sinful” behaviors are reduced.

## **Conclusion**

When evaluating if beverage taxes are successful, one must clarify the intentions of the tax. If the goal is to raise revenues to fund new health and education programs, both Philadelphia’s and Seattle’s taxes are successful. If the aim is to reduce the consumption of sweetened beverages, evidence is mixed about how much sugar intake decreases from a per-ounce excise tax, as well as to whether any observed reductions are statistically significant, and if populations modify their consumption habits similarly. Seattle’s tax, which targets sugar sweetened beverages alone, appears more adept at encouraging consumers to substitute for healthier behaviors. Finally, if the goal is to distribute the tax burden to fund new public services equitably, soda taxes are highly ineffective, as lower-income households pay proportionately greater shares of the tax.

Beverage taxes prove to be reliable and consistent sources of revenue for municipalities and counties. Those revenues can effectively be applied to innovating and funding necessary public programs. In general, we find that as a revenue generating source, due to the regressive nature of soda taxes, and the circular logical fallacies to justify their successes and failures, localities should look away from beverage taxes as new sources of revenue. Further, we find that soda taxes are best used to discourage sugar consumption, and that such taxes are best structured when revenues earned adequately account for the tax burden on low-income populations.

# Appendix

Figure 1: Tax revenue allocations and impacted communities

**Table 1**  
Description of U.S. sweetened beverage excise taxes implemented as of 2020, tax revenue allocations, and allocations supporting impacted communities, by city.

	Albany	Berkeley	Boulder	Oakland	Philadelphia	San Francisco	Seattle	All Cities
<b>Cents per ounce</b>	1	1	2	1	1.5	1	1.75	–
<b>Month and year tax began</b>	Apr-17	Mar-15	Jul-17	Jul-17	Jan-17	Jan-18	Jan-18	–
<b>City Demographics</b>								
Population, 000's	20	121	106	433	1,584	882	754	–
% Non-Hispanic White	46%	54%	80%	28%	35%	41%	65%	–
% of People in Poverty	9%	20%	21%	18%	25%	11%	12%	–
<b>Fiscal year studied</b>	2019–2020	2020–2021	2019	2019–2020	2020–2021	2019–2020	2018	–
<b>Average annual tax revenue, \$000's<sup>a</sup></b>	\$273	\$1,615	\$4,957	\$10,155	\$77,687	\$16,098	\$23,112	\$133,897
<b>Allocations in fiscal year studied, \$000's<sup>b</sup></b>	\$305	\$1,900	\$4,649	\$17,910	\$77,050	\$11,530	\$19,884	\$133,228
<b>Allocations serving impacted communities, \$000's (%)<sup>c</sup></b>								
People with low incomes or people of color	\$0 (0%)	\$1,164 (61%)	\$4,259 (92%)	\$8,503 (47%)	\$74,343 (96%)	\$9,015 (78%)	\$15,628 (79%)	\$112,912 (85%)
People with low incomes	\$0 (0%)	\$786 (41%)	\$4,232 (91%)	\$6,547 (37%)	\$74,343 (96%)	\$6,965 (60%)	\$14,247 (72%)	\$107,120 (80%)
People of color	\$0 (0%)	\$626 (33%)	\$2,180 (47%)	\$7,279 (41%)	\$57,585 (75%)	\$5,167 (45%)	\$10,496 (53%)	\$83,334 (63%)
Youth	\$160 (52%)	\$1,396 (73%)	\$2,098 (45%)	\$5,724 (32%)	\$55,369 (72%)	\$5,268 (46%)	\$9,759 (49%)	\$79,773 (60%)

Figure 2: Beverage prices in Seattle before and after tax imposed

**Table 1**  
Summary Statistics for Beverage Prices and Volume Sold in Seattle, WA, and Portland, OR, 2017-2018.

	Seattle, WA		Portland, OR	
	2017 Mean (95% CI)	2018 Mean (95% CI)	2017 Mean (95% CI)	2018 Mean (95% CI)
<b>Price (cents per oz) inside Seattle/Portland</b>				
Taxed Beverages (N = 6400)	5.22 (4.75,5.68)	6.37 (5.89,6.85)	4.90 (4.46,5.34)	5.02 (4.57,5.47)
Soda (N = 1992)	3.90 (3.47,4.33)	5.11 (4.66,5.56)	3.70 (3.29,4.12)	3.83 (3.39,4.26)
Individual (N = 924)	8.33 (7.87,8.78)	9.80 (9.30,10.29)	7.96 (7.51,8.41)	8.27 (7.77,8.77)
Family (N = 1068)	2.98 (2.83,3.13)	4.14 (3.96,4.31)	2.82 (2.67,2.97)	2.91 (2.75,3.07)
Sports Drinks (N = 600)	4.42 (4.05,4.79)	5.70 (5.26,6.14)	3.98 (3.65,4.32)	4.14 (3.82,4.46)
Individual (N = 420)	4.70 (4.20,5.20)	6.08 (5.49,6.68)	4.18 (3.72,4.63)	4.36 (3.92,4.80)
Family (N = 180)	IS	IS	IS	IS
Energy (N = 576)	14.62 (12.48,16.76)	16.17 (14.01,18.33)	13.68 (11.43,15.93)	13.89 (11.73,16.05)
Individual (N = 480)	14.56 (12.24,16.88)	16.16 (13.81,18.51)	13.53 (11.09,15.97)	13.77 (11.42,16.12)
Family (N = 96)	IS	IS	IS	IS
Tea/Coffee (N = 1444)	7.67 (6.28,9.05)	8.71 (7.26,10.16)	7.38 (6.01,8.74)	7.51 (6.14,8.88)
Individual (N = 1032)	11.22 (8.84,13.59)	12.48 (10.01,14.95)	10.74 (8.39,13.09)	10.93 (8.59,13.26)
Family (N = 412)	4.55 (3.64,5.47)	5.41 (4.46,6.36)	4.43 (3.50,5.35)	4.52 (3.59,5.46)
Juice Drinks (N = 1788)	4.84 (4.42,5.25)	5.64 (5.23,6.06)	4.49 (4.08,4.90)	4.54 (4.11,4.97)
Individual (N = 1056)	8.35 (7.15,9.56)	9.36 (8.21,10.52)	7.70 (6.52,8.89)	8.03 (6.81,9.24)
Family (N = 732)	3.93 (3.63,4.24)	4.69 (4.37,5.01)	3.66 (3.34,3.98)	3.65 (3.33,3.97)
<b>Volume Sold (oz) of Taxed Beverages inside Seattle/Portland</b>				
Taxed Beverages (N = 6400)	222818 (194131,251505)	154879 (135543,174215)	305406 (267084,343728)	273365 (236760,309969)
Soda (N = 1992)	324108 (243922,404295)	218555 (165465,271645)	467828 (361893,573763)	442634 (338833,546436)
Sports Drinks (N = 600)	418283 (335502,501064)	298233 (236403,360063)	558050 (450470,665631)	481391 (386454,576329)
Energy (N = 576)	175048 (117002,233094)	147265 (96698,197833)	239452 (139198,339706)	230321 (132502,328140)
Tea/Coffee (N = 1444)	109768 (87657,131879)	83386 (67060,99711)	136282 (106683,165882)	120297 (94174,146421)
Juice Drinks (N = 1788)	151069 (122668,179470)	96023 (79455,112592)	197504 (161726,233282)	152459 (125996,178922)
<b>Volume Sold (oz) of Taxed Beverages in 2-mile border area of Seattle/Portland</b>				
Taxed Beverages (N = 6648)	163606 (139976,187237)	154039 (129112,178965)	338065 (291631,384499)	318537 (272428,364646)
Soda (N = 1972)	262052 (190181,333923)	265308 (187048,343569)	561873 (422344,701402)	567596 (425859,709332)
Sports Drinks (N = 648)	269063 (216645,321481)	256314 (205076,307552)	551678 (438605,664751)	486213 (387814,584611)
Energy (N = 544)	112448 (73330,151567)	108723 (70867,146579)	255369 (152956,357782)	254716 (151598,357833)
Tea/Coffee (N = 1420)	70688 (54198,87178)	63685 (48666,78704)	154952 (117577,192326)	135627 (104180,167073)
Juice Drinks (N = 2064)	113851 (93234,134467)	89725 (74968,104482)	204945 (169860,240029)	170598 (142873,198322)
<b>Volume Sold (oz) of Untaxed Beverages inside Seattle/Portland</b>				
Untaxed Beverages (N = 8812)	516217 (424594,607841)	494736 (410759,578714)	514507 (401905,627110)	473542 (370994,576090)
Water (N = 1964)	1006312 (717728,1294897)	1010073 (747291,1272855)	910322 (647876,1172767)	861555 (630370,1092741)
Milk (N = 1384)	1003078 (614311,1391844)	963113 (607128,1319098)	1131270 (534239,1728300)	1063991 (514316,1613666)
Unsweetened Juice (N = 2672)	153839 (129457,178221)	127459 (107911,147006)	158099 (131814,184385)	129459 (108087,150831)
Juice Drink (N = 700)	149598 (118911,180285)	138697 (107669,169725)	131295 (102453,160136)	116930 (90085,143775)
Soda (N = 892)	540759 (399789,681730)	473077 (340241,605912)	536201 (419339,653064)	450751 (341515,559988)
Sports Drink (N = 304)	227123 (161314,292931)	232995 (162702,303287)	212493 (153144,271842)	205980 (146705,265255)
Energy Drink (N = 404)	146747 (97823,195672)	146383 (96112,196654)	163483 (101382,225583)	166724 (104218,229230)
Tea/Coffee (N = 492)	117451 (81710,153193)	108278 (70541,146016)	115866 (76119,155613)	98338 (62905,133770)

Total volume sold and average price per ounce (oz) (equal to total dollar amount of sales divided by total volume sold) computed for each universal product code (UPC) within each site/time period combination. Estimated means across UPCs shown with 95% confidence intervals in parentheses for months 2–9 of the tax (2/4/2018–9/29/2018) and the same period one year prior (2/5/2017–9/30/2017). Statistics for price are weighted based on volume sold in Seattle, Portland, and the 2-mile buffers surrounding both sites in 10/2/2016–9/30/2017. Sample sizes for mean estimation across the two sites and two time periods, equal to four times the number of UPCs included, are shown in the first column. IS: Insufficient sample size (fewer than 50 UPCs per site per time period).

Table 1  
Philadelphia Beverage Tax Revenues, Budgeted v. Actual, 2017–2020  
(Thousands of dollars)

	2017	2018	2019	2020
Budgeted	46,183	92,412	78,038	75,881
Actual	39,525	77,421	76,855	69,921

## References

Cawley, John, David Frisvold, Anna Hill, and David Jones, “The impact of the Philadelphia beverage tax on purchases and consumption by adults and children.” *Journal of Health Economics* (2019, v. 7). 1-16.

This is a peer-reviewed journal article. We discuss the results of the study, paying careful attention to methods and statistical significance.

Kane, Ryan M. and Vasanti S. Malik, “Understanding beverage taxation: Perspective on the Philadelphia Beverage Tax’s novel approach.” *Journal of Public Health Research* (2019, v 8:1). 40-45.

This is a peer-reviewed article in a reputable journal. We use this to provide some of the political background on Philadelphia’s tax.

Krieger, James, Magee, Kiran, Hennings, Tayler, Schoof, John, and Madsen, Kristine A. “How sugar-sweetened beverage tax revenues are being used in the United States. *Preventive Medicine Reports*. April 2021.

This peer-reviewed study was performed by scholars at the University of Washington, Department of Health Services and Department of Epidemiology, School of Public Health, University of California and the Berkeley Food Institute and Division of Community Health Sciences at the School of Public Health, University of California, Berkeley USA. This study was used to discuss the impact of Seattle’s tax on different proportions of the population and demographic implications.

Lahr, Michael L., Ye Yao, Da Fei, and Annie Lee, “The Total Economic Impacts of Philadelphia’s Beverage Tax.” National Institute for Early Education Research. Rutgers University. September 2021.

This is a study produced by a think tank at a university. All of the authors are Ph.D’s or candidates, so we think the authors are reputable. We use the article to discuss the background on Philadelphia’s tax and its effects.

“Philadelphia Celebrates 5th Year of PHLpreK and 10,000 Students Served.” City of Philadelphia. June 14, 2021.

This is a press release from Philadelphia’s city government. We use it to pull the number of enrolled children in the pre-kindergarten program, to help evaluate if the program is largely successful.

“Philadelphia city, Pennsylvania QuickFacts.” United States Census Bureau. 2021.

This is a listing of population demographics from the U.S. Census Bureau. We use this to calculate the population of children eligible for early-childhood education programs, to understand if the current PHLpreK enrollment numbers are sufficient to the program’s intent.

“Philadelphia Soda Tax Helps Send Thousands of Kids to Pre-K in its First 2 Years.” CBS Philly. March 8, 2019.



This is a local news source. We did not rely on the source for commentary, only for background information on how local tax revenues were spent.

Powell, Lisa M. and Leider Julien, “The impact of Seattle’s Sweetened Beverage Tax on beverage prices and volume sold.” *Economics and Human Biology*. September, 2019. This is a peer-reviewed study that has been done by scholars at the School of Public Health and Institute of Health and Research Policy at the University of Illinois at Chicago, IL. This study was used to discuss consumer preferences and impact of the tax on prices and consumption.

Powell, Lisa M., Pipito, Andrea A., Isgor, Zeynep., Parks, Courtney A., and Zenk, Shannon N. “Intake of Sugar Sweetened Beverages among Adults in Seattle, WA, 2017.” *Illinois Prevention Research Center University of Illinois at Chicago. Chicago, IL*. November, 2018. This study was conducted by scholars at University of Illinois Chicago to study the different demographics and make-up of adults consuming sugar sweetened beverages. This study was used to compare different groups that consumed sweetened beverages.

“Sweetened Beverage Tax Fact Sheet.” City of Seattle. 2019. This is a fact sheet from the city government in Seattle. We used it for background and precise language on the tax.

“Seattle’s Sweetened Beverage Tax 2018, Annual Report” City of Seattle. 2018 This report has been produced by the city of Seattle analyzing and advising the current progress of the Sugar Sweetened Beverage tax. Used for information regarding the public health situation of residents.

Yinger, John M., “Lecture 11: Sin Taxes.” Syracuse University. March 9, 2022. This is a lecture from a reputable public finance scholar. We use it for background knowledge and exposition that helps frame our argument.

Zagorsky, Jay L. and Patricia K. Smith, “Who drinks soda pop? Economic status and adult consumption of sugar-sweetened beverages.” *Economics and Human Biology* (2020, v. 38). 1-12. This is a peer-reviewed journal article. We use it to discuss the regressivity of soda excise taxes.

Zhong, Yichen, Amy H. Auchincloss, Brian K. Lee, Genevieve P. Kanter, “The Short-term Impacts of the Philadelphia Beverage Tax on Beverage Consumption.” *American Journal of Preventative Medicine* (2018, v 55:1). 26-34. This is a peer-reviewed journal article. We discuss the results of the study, paying careful attention to methods and statistical significance.