

Sugar-Sweetened Beverage Taxes

Emerging Evidence on a New Public Health Policy

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Some cities in the United States and countries around the world are adopting taxes on sugar-sweetened beverages as part of efforts to address the global epidemic of obesity and noncommunicable diseases and to raise revenues to address societal needs. There is compelling rationale for taxing sugar-sweetened beverages to help confront diet-related factors that contribute to the high prevalence of obesity. Sugar-sweetened beverages represent the single largest source of added dietary sugars in the United States and are associated with diabetes and other chronic health conditions.¹ Disproportionate exposure to and consumption of sugar-sweetened beverages in low-income communities and people of color,² driven by financial disparities and targeted advertising,^{3,4} contribute to poorer health outcomes in these groups.

As outlined in a recent *JAMA* Viewpoint,⁵ the nutritional and health effects of sugar-sweetened beverage excise taxes, which are imposed on the distributor, depend on the extent to which the tax is passed through to higher beverage shelf-prices, as well as the degree to which these higher prices subsequently affect consumer purchases and consumption. The report by Roberto et al⁶ in this issue of *JAMA* adds to a growing body of evidence assessing each step in the causal chain of the effects of a sugar-sweetened beverage tax, from increasing prices to decreasing consumption to effects on health and health equity.

Roberto et al compared changes in beverage prices and sales that occurred following the implementation of a beverage excise tax (1.5 cents per ounce on sugar-sweetened and artificially sweetened beverages) in Philadelphia, Pennsylvania, in January 2017. The authors used a difference-in-differences approach and analyzed objective sales data from large chain retailers (including 54 supermarkets, 20 mass merchandise stores, and 217 pharmacies) to compare changes between January 1, 2016 (pretax) and December 31, 2017 (posttax). Differences by store type, beverage sweetener status (sugar-sweetened, artificially sweetened, or unsweetened), and beverage size (individual or family size) were examined and were compared with beverage sales data from Baltimore, Maryland, which served as a control city without a beverage tax. The authors also assessed changes in sales data in zip codes immediately across the city border to assess the degree to which any cross-border shopping may have offset any observed decreases in sales in Philadelphia.

The findings by Roberto et al contribute important data on changes in prices and purchasing related to Philadelphia's tax

of 1.5 cents per ounce. Following implementation of the tax, prices of taxed beverages in Philadelphia increased by 0.7 cents per ounce in supermarkets, 0.9 cents per ounce in mass merchandisers, and 1.6 cents per ounce in pharmacies, relative to price changes in the comparison city of Baltimore (averaged over the first year of the tax), indicating that 43% to 104% of the tax was passed through to consumers. Prior studies of sugar-sweetened beverage taxes have shown variable pass-through. For example, a 93% pass-through rate was previously documented at Philadelphia's airport.⁷ In Mexico, the national beverage tax was fully passed through,⁸ whereas in Berkeley, California, the pass-through rate across all beverages was 67% in 2 chain groceries.⁹ Thus, the collective evidence indicates significant pass-through across tax sites, although longer-term studies are needed to determine whether and how pass-through rates may change over time.

Roberto et al also demonstrated significant changes in sugar-sweetened beverage sales. There was a 51% reduction in the total volume of sales of taxed beverages in Philadelphia (a decrease of 1.261 billion oz; from 2.475 billion oz to 1.214 billion oz), compared with a 2.3% reduction in Baltimore (from 589 million oz to 576 million oz). The reduction within Philadelphia city borders was partially offset by increased purchases in stores just outside the city, resulting in a net reduction in beverage sales volume of 38%. This change is larger than changes in taxed-beverage sales observed in Mexico and Berkeley. Based on household purchasing data from Mexico, sugar-sweetened beverage sales declined by 9.7% by the end of the second year of its tax of 1 peso per liter (equivalent to a 10% price increase), with the largest decline among households in the lowest third of socioeconomic status stratum.¹⁰ Notably, households with the highest sugar-sweetened beverage purchases at baseline had a larger decline than other households.¹¹ In 2 large grocery chains in Berkeley, sugar-sweetened beverage sales similarly declined by 9.6% after 1 year of its tax of 1 cent per ounce.⁹ While purchases declined across the 3 taxed jurisdictions (Mexico, Berkeley, and Philadelphia), the larger decreases observed in Philadelphia could reflect the higher level of the tax, higher baseline consumption, or a less affluent population.

The evidence regarding tax effects on actual beverage consumption are more complex and evolving. A recent study found a 51% decline in self-reported sugar-sweetened beverage consumption in low-income neighborhoods over the first 3 years of Berkeley's tax,¹² and another report from Philadelphia showed a 26% decline in consumption after

2 months.¹³ However, Silver et al⁹ reported no decline in sugar-sweetened beverage intake among Berkeley residents approximately 1 year after the tax.

A major goal of sugar-sweetened beverage taxes is to improve health. However, while economic models have suggested that sugar-sweetened beverage taxes are highly cost-effective,^{12,14} it is still unclear if these taxes improve health outcomes. Health effects will depend on consumption changing among those disproportionately affected by sugar-sweetened beverages. Studies identifying changes in consumption, overall dietary quality and, ultimately, health outcomes are needed among multiple segments of the population. However, because communities are responding to the complex and multifactorial problems of obesity and diabetes with varied strategies, it will likely be difficult to demonstrate the specific contribution of sugar-sweetened beverage taxes to changes in health outcomes.

A second goal of sugar-sweetened beverage tax policy is to generate revenues to address important community needs. Early experience suggests that sugar-sweetened beverage taxes may be doing so. The 7 US cities with sugar-sweetened beverage taxes are raising more than \$133 million per year.¹⁵ The allocation of tax revenues varies in relation to the unique contexts and priorities of each city. In Philadelphia, expanding free access to quality prekindergarten care and education; helping community schools offer medical services and job training; and making overdue improvements in parks, recreation centers, and libraries are funding priorities.¹⁶ Seattle is increasing access to healthy foods through subsidizing fruit and vegetable purchases and expanding child care subsidies and programs supporting early childhood development.¹⁷ The many tax-supported activities in Berkeley include nutrition programming in schools and Head Start, expansion of access to oral health services, and diabetes prevention. These programs are focused on the very same communities that are most affected by exposure to sugar-sweetened beverages and health inequities.¹⁸ Most cities have community advisory boards that make recommendations on how to spend revenues on activities that reflect community priorities and cultures and align with best practices and the scientific evidence of what works. Assessing the potential for such community-driven investments to beneficially affect health beyond sugar-sweetened beverage consumption is of interest.

Taxes may have unintended consequences, although objective evidence of such effects is lacking. Empirical data

from Mexico and Philadelphia have suggested no negative effect on employment.^{19,20} Robust economic research on tobacco taxes consistently shows no overall loss of jobs, despite significant reductions in smoking.²¹ The effect of taxes on overall store revenues is unknown and merits further study. For instance, Roberto et al reported a decline of 8.1% in the combined sales of beverages, food, and household products in Philadelphia, while Silver et al⁹ found that store revenue declined less in Berkeley than in comparison cities. Cross-border purchasing, which has been documented in Philadelphia and Berkeley, has raised concerns that businesses within taxed jurisdictions could lose sales to competitors across the border.^{6,9} While chain stores may make up for such losses in stores not subject to the tax, economic effects on nonchain businesses will be important to track. Taxes covering larger geographies would mitigate cross-border purchasing. It will be important to develop more objective evidence on unintended consequences so that tax policies can address any that do emerge.

The beverage industry opposes sugar-sweetened beverage taxes and is increasingly using tactics honed by the tobacco industry²² to block diffusion of public health policy, including preemption, and creating doubt about the science supporting sugar-sweetened beverage taxes.²³ State preemption laws that prohibit local jurisdictions from passing sugar-sweetened beverage taxes²³ are of particular concern because they undermine local democracy and prevent communities from making policy that reflects local values and priorities. Building multisector coalitions to counter preemption across issues and educating advocates, policy makers, and the public about the harms of preemption are potential strategies to help ensure that communities remain free to implement effective policies.

In conclusion, current evidence suggests that sugar-sweetened beverage taxes are associated with increased prices of taxed beverages and reduced sales and purchases. Taxes are raising substantial revenues that are being invested in programs that focus on community needs and address health inequities. More information is needed about the potential effects of beverage excise taxes on sugar-sweetened beverage consumption, overall diet quality, health and equity outcomes, and employment and business revenues, as well as the community benefits of programs funded by tax revenues. Despite these needs, current evidence is already sufficient to move forward with adoption of taxes while continuing to monitor outcomes.

ARTICLE INFORMATION

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