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Edition 61 – Harmonization of State E-cigarette and Cigarette Excise Taxes: Association with U.S. State Tobacco Control Interventions - HPHR Journal

By Jessica Liu, MPH; Ruslan V. Nikitin, PhD; Karen Emmons, PhD; Vaughan W. Rees, PhD

Citation

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Abstract

Introduction

Excise taxes have proved to be a powerful mechanism to lower demand for tobacco products. The purpose of this study was to summarize current combusted and e-cigarette excise taxes by state, and assess whether harmonization of combusted cigarette and e-cigarette excise taxes is more likely to occur in states with comprehensive tobacco control approaches.

Methods

We compiled excise tax data on e-liquids (whether the state had any e-cigarette excise taxes) and cigarettes (percent of excise tax of total price in dollars per pack of 20) as of September 2022 for all states and the District of Columbia. We derived an index of combusted cigarette/e-cigarette harmonization by classifying excise tax proportion for cigarettes by median split (1/0), and whether a state had any e-cigarette excise tax (1/0). Harmonization was observed when the top (1/1) or bottom (0/0) matched. We used analysis of variance to determine whether the harmonization of cigarette/e-liquid excise taxes differed according to states' adoption of tobacco control policies and expenditure on tobacco prevention.

Results

Twenty states did not apply any excise tax on e-liquids. States with harmonized, high excise taxes had the highest mean sum of tobacco control laws (M=4.4, SD=1.2) and the highest mean percent spending on prevention of the CDC recommendation (26.4%). We observed significant differences in the total number of laws (p=0.001), but not percent of tobacco prevention spending, across harmonization categories.

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Discussion

The adoption of harmonized, high excise tax rates for combusted cigarettes and e-cigarettes is consistent with best-practice approaches for state-level tobacco control policy. However, few states have implemented high, harmonized tobacco product excise taxes, highlighting a substantial opportunity in tobacco control policy.

Conclusion

These findings may inform the development of U.S. federal policy on e-cigarette excise taxes, as well as support bills that aim to equalize tax rates and address cost across tobacco products to help reduce tobacco use disparities.

Introduction

Comprehensive approaches to tobacco control, in which multiple policy and programmatic strategies are applied to achieve a synergistic effect, are considered "best practice" to prevent initiation, lower consumption, and encourage cessation of tobacco product use.[1,2] Successful state-level tobacco control programs typically provide restrictions on retail access, anti-tobacco media campaigns, advertising and marketing bans, health communications, and smoke-free policies in work and public places.[3] Among comprehensive tobacco control programs, high excise tax rates are associated with reducing or limiting increases in tobacco product use among youth[4,5] and adults.[6,7] Globally, the Tobacconomics Cigarette Tax Scorecard has been used to score cigarette tax policy performance across 170 countries and provides policymakers with an actionable assessment of their country's cigarette tax policy.[8] The goal of the Scorecard was to bring awareness to the need for more effective tobacco tax policies and encourage countries to raise prices on tobacco products to ultimately reduce global tobacco use.[8] A similar approach may be adopted within the U.S. to look at the performance of cigarette and e-cigarette tax policies across states and encourage states to adopt more robust tax policies.

Evidence has shown a strong link between large tax increases and a reduction in the prevalence of combustible tobacco use.[6,7] In the U.S., every 10% increase in the real price of cigarettes is associated with an approximate 3 to 5% reduction in overall smoking, including nearly 2% among adults, 3.5% among young adults (ages 18-25), and 6 to 7% among youth (ages 13-17).[9,10] State excise taxes on e-cigarettes have not been applied uniformly or according to best practices, with 22 states yet to implement a state-wide e-cigarette tax.[11] A better understanding of the extent to which states set similar excise tax rates across tobacco products is needed, particularly as new products enter the tobacco market previously dominated by combustible cigarettes.

Tax harmonization is a strategy used to ensure standardization of tax rates across neighboring jurisdictions and to minimize potential price differences, which would otherwise undermine the policy impact of higher taxes in the jurisdiction that is implementing them.[12] Tax harmonization between different types of tobacco products within a single jurisdiction has been highlighted as a strategy to close a loophole in tax policies that occur when low excise taxes are applied to certain types of tobacco products (e.g. cigars/cigarillos) compared to, for example, combusted cigarettes.[13] The European Commission has sought to close the price gap between manufactured cigarettes and roll-your-own tobacco by setting minimum tobacco tax rates.[14] Thus, harmonization of tax policies with respect to *types* of tobacco products may help to achieve the optimal demand-reducing impact of tobacco excise taxes.[15] Harmonization should aim to drive greater demand reductions in the more harmful products, such as combusted tobacco compared with e-cigarettes,[16] meaning that a graduated tax approach may be warranted. Even so, taxes should remain sufficiently high so as to minimize demand among youth with no history of tobacco product use. This policy strategy is especially important because price is a critical factor that determines access to tobacco products, particularly for youth and racial/ethnic minority groups who are more sensitive to price changes of tobacco products.[17–20]

Substantial research is needed to identify optimal tobacco product harmonization approaches to protect the health of different populations, including youth, adults who smoke, and marginalized groups, who have disproportionately higher rates of smoking than the general population of people who smoke. However, in the absence of such research, documentation of the tax policy landscape across e-cigarettes and combustible cigarettes may serve as a formative step towards a robust tax policy that supports broader efforts to reduce tobacco-related harm and aligns with states' specific tobacco control efforts. For example, the Tobacconomics Cigarette Tax Scorecard has been used globally to assess a country's cigarette tax policy,[8] and could be a strategy for harmonizing both cigarette and e-cigarette taxes.

The aims of this study are: (1) to describe the current level of state excise taxes applied to e-cigarettes and combustible cigarettes for all U.S. states and the District of Columbia (D.C.); and (2) to identify differences in tobacco control policies and spending based on

harmonization category. For the purposes of this descriptive paper, we adopt a working definition of tax "harmonization" as the cohesion or similarity of taxes being applied across different types of tobacco products (e.g., e-cigarettes and combustible cigarettes), as a formative effort to advance further investigation in aligning taxes across products. We selected tobacco control policies based on prior research indicating that retail access,[21] appealing packaging,[22] and lack of clean indoor air policies[4] are independently associated with tobacco product use. We hypothesize that the states with a greater number of tobacco control policies and greater spending on tobacco prevention will be more likely to have implemented harmonized, high e-cigarette and combustible cigarette excise taxes, compared with states with less comprehensive tobacco control measures. The study findings will play a key role in informing public health efforts to help reduce disparities in tobacco use among certain sociodemographic and racial/ethnic minority groups by encouraging a more harmonized tax policy across different tobacco products.

Methods

Data Sources

Excise tax rate data for e-cigarettes and combustible cigarettes were obtained from the Campaign for Tobacco Free Kids,[11,23] and data for tobacco control measures were obtained from Public Health Law Center,[24] American Nonsmokers' Rights Foundation,[25] Centers for Disease and Control and Prevention State Tobacco Activities Tracking and Evaluation (STATE) System,[26] and Campaign for Tobacco Free Kids.[27] Data were last downloaded on September 2022 for all 50 U.S. states and the District of Columbia.

Categorization of Excise Tax Rates

A range of standards are used across states to calculate excise tax level for e-cigarette products. We therefore assembled data that included percentage of wholesale price, percentage of manufacturing price, and cents per mL of e-cigarette cartridge or pod liquid. To identify harmonization between tobacco product types, we adopted a binary measure to represent e-cigarette excise tax based on whether states applied an e-cigarette excise tax or not. Excise tax on combustible cigarettes was assigned based on the published rate for each state per pack of 20 cigarettes (as of September 2022).[23] We then calculated the tax share, or the proportion of the excise tax of the total pack price.[8]

Operationalizing Excise Tax Harmonization

We derived an index of combusted cigarette/e-cigarette harmonization by classifying excise tax proportion for cigarettes by median split (1 or 0), and whether a state applied excise taxes on e-cigarettes (1 or 0). Harmonization was observed when our nominated tax categories matched, i.e. 1/1 or 0/0. All other states (1/0 or 0/1) were categorized as "Mixed."

Operationalizing Tobacco Control within States

We compiled data on tobacco control policies, including whether: (1) the state has raised the age of purchase of tobacco products to 21;[28] (2) there are state laws on e-cigarette product packaging requirements;[29] (3) there are state laws requiring licenses for retail sales of e-cigarettes;[24] (4) there are state-level smoke-free laws including workplaces, restaurants, and bars;[30] and (5) the state provides comprehensive Medicaid coverage for cessation treatment.[26] We did not include state laws on tobacco advertising because the most impactful restrictions on advertising have been implemented at the federal level.[31] We assigned a binary (0 or 1) code to each state to indicate the presence or absence of each nominated policy strategy. We then created a summary score for each state based on the number of policies observed, ranging from 0 to 5. For state spending on tobacco prevention, we used the Campaign for Tobacco-Free Kids' report of states by percentage of expenditure on tobacco prevention based on the amount recommended by the Centers for Disease Control and Prevention (CDC).[30]

Data Analysis

We first computed tax and tobacco control measures, and then ran descriptive statistics using R software (version 1.1.456).[32] We conducted one-way analyses of variance (ANOVA) to assess differences in i) means of summed laws and ii) percent of CDC-recommended tobacco prevention spending, by each harmonization category. We then determined which harmonization category means were significantly different from one another with regard to the sum of laws and percent of CDC-recommended tobacco prevention spending using the Dunnett's test.

Results

Table 1: E-cigarette/E-liquid Tax and Cigarette Excise Tax by state

	Cigarette excise tax per pack (cents)	Cigarette pack price before sales tax (cents)	% of tax on total price	E-cigarette tax
Alabama	67.5	661	10.21%	NA
Alaska	200	1046	19.12%	NA
Arizona	200	810	24.69%	NA
Arkansas	115	698	16.48%	NA
California	287	890	32.25%	61.74% of wholesale; 12.5% of retail
Colorado	194	776	25.00%	35% of manufacturing price
Connecticut	435	1091	39.87%	10% of wholesale price
DC	450	728	61.81%	$0.05 per mL
Delaware	210	1176	17.86%	80% of wholesale
Florida	133.9	720	18.60%	NA
Georgia	37	610	6.07%	7% wholesale + $0.05 per mL
Hawaii	320	1001	31.97%	NA
Idaho	57	641	8.89%	NA
Illinois	298	956	31.17%	15% wholesale
Indiana	99.5	665	14.96%	15% retail
Iowa	136	701	19.40%	NA
Kansas	129	703	18.35%	$0.05 per mL
Kentucky	110	654	16.82%	15% wholesale, $1.50 per cartridge
Louisiana	108	670	16.12%	$0.05 per mL
Maine	200	813	24.60%	43% of wholesale
Maryland	375	968	38.74%	12% retail (60% if less than 5mL)
Massachusetts	351	1046	33.56%	75% of wholesale
Michigan	200	780	25.64%	NA
Minnesota	304	983	30.93%	95% of wholesale
Mississippi	68	634	10.73%	NA
Missouri	17	585	2.91%	NA
Montana	170	777	21.88%	NA
Nebraska	64	648	9.88%	NA
Nevada	180	774	23.26%	30% of wholesale
New Hampshire	178	773	23.03%	8% of wholesale, $0.30 per mL
New Jersey	270	865	31.21%	$0.10 per mL
New Mexico	200	803	24.91%	12.5% wholesale; $0.50 per cartridge
New York	435	1150	37.83%	20% retail
North Carolina	45	616	7.31%	$0.05 per mL
North Dakota	44	624	7.05%	NA
Ohio	160	745	21.48%	$0.10 per mL
Oklahoma	203	793	25.60%	NA
Oregon	333	937	35.54%	65% of wholesale
Pennsylvania	260	900	28.89%	40% of wholesale
Rhode Island	425	1094	38.85%	NA
South Carolina	57	643	8.86%	NA

South Dakota	153	765	20.00%	NA
Tennessee	62	640	9.69%	NA
Texas	141	717	19.67%	NA
Utah	170	785	21.66%	56% of wholesale
Vermont	308	955	32.25%	92% of wholesale
Virginia	60	687	8.73%	$0.066 per mL
Washington	302.5	952	31.78%	$0.09 per mL open; $0.027 per mL closed
West Virginia	120	691	17.37%	$0.075 per mL
Wisconsin	252	843	29.89%	$0.05 per mL
Wyoming	60	659	9.10%	15% of wholesale

Excise tax rates for combusted cigarettes and e-cigarettes varied substantially across the U.S. states and D.C. (see Table 1 for complete tax information by state). State excise tax on combusted cigarettes ranged from $0.17 to $4.50 per pack, with a median proportion of 21.5% tax of total price. States applied a variety of types of taxes for e-cigarettes, including percent wholesale, percent retail, by volume (e.g., cents per mL), or a combination of types. Almost half of states (n=20) did not apply an excise tax on e-liquids.

Based on our definition, we identified a majority of states (n=20) as having harmonized, high taxes; fourteen states had harmonized, low taxes; and seventeen states had mixed tax levels, by product (see Supplementary Table 1 for complete harmonization information by state).

Table 2: Summary statistics of harmonization categories and states' tobacco control policies and prevention spending

	Harmonized/High Taxes	Mixed	Harmonized/Low Taxes
States (N, %)	20 (39.2%)	17 (33.3%)	14 (27.5%)
States Included (abbrev.)	CA, CO, CT, DC, IL, ME, MD, MA, MN, NV, NH, NJ, NM, NY, OR, PA, UT, VT, WA, WI	AZ, DE, GA, HI, IN, KS, KY, LA, MI, MT, NC, OH, OK, RI, VA, WV, WY	AL, AK, AR, FL, ID, IA, MS, MO, ND, NE, SC, SD, TN, TX
Number of TC laws (M, SD)	4.0 (1.2)[a]	2.4 (1.4)[a]	2.6 (0.9)
Tobacco Prevention Spending (M, SD)	24.9% (25.1)	18.0% (20.1)	24.2% (25.2)

Notes. Means sharing the same superscript are significantly different at the alpha=0.05 with the Dunnett's test.

Table 2 summarizes differences between tax harmonization, states' tobacco control policies and prevention spending. As hypothesized, harmonized, high tax states had the highest mean sum of tobacco control laws (M=4.0, SD=1.2), while mixed tax states had the lowest mean sum of tobacco control laws (M=2.4, SD=1.4). There was a statistically significant overall difference between the means for states' sum of tobacco control laws across the three harmonization categories ($p<0.001$). Harmonized, high tax states had a significantly greater number of tobacco control laws compared with mixed tax states ($p<0.001$).
Harmonized, high tax states had the highest mean percent spending on prevention of the CDC recommendation (24.9%), whereas mixed tax states had the lowest (18.0%). However, there was no overall difference in states' spending on tobacco prevention across the three harmonization categories ($p=0.645$).

Discussion

States with harmonized, high taxes were found to have a greater number of tobacco control laws, relative to those with low and mixed tax harmonization. This may reflect a tendency for states with comprehensive tobacco control strategies to allocate more resources and funding towards tobacco prevention.[33] As predicted, harmonized, low tax states had fewer tobacco control laws. These findings are consistent with the general consensus among tobacco control experts that higher excise taxes are a necessary component of a comprehensive tobacco control strategy.[6,34]

While the mean sum of laws differed significantly according to harmonization of state tax, the percent of states' spending on tobacco prevention did not. This could be a function of two differing goals that inform a given state's approach to tobacco tax policy: tobacco control objectives versus revenue generation. States enacting taxes for tobacco control purposes tend to spend more on tobacco control efforts, whereas the states whose primary goal is to raise tax revenue tend to spend less (per capita) on tobacco prevention.[33]

To our knowledge, this is the first study to examine the issue of harmonization of state excise tax rates between e-cigarettes and combustible cigarettes. We also note that relatively few states have adopted this approach of harmonization to date. It is important to consider the level of enforcement of policies at the state-level, rather than the mere existence of these laws, particularly with state-level clean indoor air laws.[35] Further research, especially with longitudinal study designs and using prevalence outcomes for both youth and adults, is needed to assess the likely impact of harmonization of tax levels of cigarette and e-cigarette products. Robust statistical strategies, including agent-based modeling, may provide deeper insight into the likely impact of tailored tax policies in the context of broader tobacco control efforts. Future research should also assess whether harmonization and its correlate of tobacco control efforts varies significantly between states that grow tobacco and those that do not.[36] There is also a need to integrate e-cigarettes into the Tobacconomics Cigarette Tax Scorecard as a means to compare the multiple methods (e.g., by volume vs. percent of price) of e-cigarette tax policies that differ between U.S. states and better assess a state's e-cigarette tax policy.[8]

The U.S. states may implement a version of the Tobacconomics Tax Scorecard for both cigarettes and e-cigarettes to rate tax systems across the U.S., while developing an effective tax harmonization strategy as a means to address tobacco-related morbidity and health disparities. Prior research found that raising taxes on tobacco products may reduce consumption for all racial/ethnic groups.[17] Similarly, international cost-effectiveness research in Mexico has found that raising tobacco taxes can improve the life expectancy of the individuals in lower income quintiles.[37] Thus, harmonized, high taxes for both cigarettes and e-cigarettes may provide an equitable strategy to reduce tobacco-related disparities in the U.S.[38]

This descriptive analysis imposes certain limitations. Given the cross-sectional study design, we are not able to make causal inferences with respect to tax rate harmonization and other tobacco control strategies. We also used arbitrary cutoffs in defining the high versus low categorization for the taxes. However, there is currently no evidence-based standard in categorizing tax rates of tobacco products. To date, adoption of taxes on e-cigarettes in the U.S. has been limited, and most of these taxes have only been recently implemented, which restricts our ability to examine time trends. While the tobacco control policies we focused on in this paper are important, they are not an exhaustive list. We also did not control for any state-level characteristics, which would likely confound the associations. For example, economic and political ideology may influence tax rates.[39]

Conclusion

Our findings support deeper consideration of the purpose and intended impact of harmonization in tobacco product tax policy across different product types, both within states as well as cross-state harmonization of tax rates.[40] Thus, these findings may inform the development of U.S. federal policy on e-cigarette excise taxes currently under consideration,[41] as well as support bills that aim to equalize tax rates across tobacco products.[42] As new tobacco products proliferate, posing varying health risks to different population groups, a more robust framework will be needed to guide the development of tax policies. Future policies need to be grounded in evidence-based, standardized approaches to tax policy across all types of tobacco products that consider health equity for racial/ethnic minority and other highly-impacted groups. These tax policies should not only lower the demand for tobacco products among youth and minority groups, but ensure that reduced risk, non-combustible nicotine delivery products, including e-cigarettes, present a viable alternative for adults who smoke but seek to reduce their health risks.

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Disclosure

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About the Author

Jessica Liu, MPH

Jessica Liu is a 4th year Population Health Sciences doctoral candidate in the Department of Social and Behavioral Sciences. Prior to her studies at Harvard T.H. Chan School of Public Health, Jessica completed her Master's in Public Health at Yale School of Public Health, where she developed her research interests around adolescent and young adult health and risk behaviors. Jessica is passionate about teaching and mentoring and hopes to pursue a career in academia.

Ruslan V. Nikitin, PhD

Ruslan V. Nikitin, was a health policy analyst at Harvard Catalyst's Community Engagement Program (Harvard Medical School), leading the strategy and implementation of policy and evidence translation work. He was also a steering committee member of the Harvard T.H. Chan School of Public Health's Initiative on Health and Homelessness. He completed his PhD at Brandeis University.

Karen Emmons, PhD

Karen Emmons is a Professor of Social and Behavioral Science at the Harvard T.H. Chan School of Public Health. She is behavioral scientist with a strong track record of funded research in community-based approaches to cancer prevention in a variety of settings that serve under-resourced communities, including low income housing and community health centers. Her work targets a range of cancer risk factors, including nutrition, tobacco and second-hand smoke exposure, and cancer screening.

Vaughan Rees, PhD

Vaughan Rees is Director of the Center for Global Tobacco Control, whose mission is to reduce the burden of tobacco-related death and disease through the translation of science into public health policies and programs. He directs the Tobacco Research Laboratory at the Harvard Chan School, where the design and potential for dependence of tobacco products are assessed. Findings have been used to inform tobacco control policy and develop resources for communicating risks of tobacco products.