



STATE TOBACCO TAX INCREASES: EXPLANATIONS AND SOURCES FOR PROJECTIONS OF NEW REVENUES & BENEFITS

The economic model developed jointly by the Campaign for Tobacco-Free Kids (TFK), the American Cancer Society Cancer Action Network (ACS CAN), and Tobacconomics¹ (a program of the University of Illinois at Chicago) projects the increase in state revenues, public health benefits, and health care cost savings resulting from increases in state cigarette tax rates. The projections are updated annually. Calculations are based on economic modeling by Frank Chaloupka, Ph.D., and John Tauras, Ph.D., at the Institute for Health Research and Policy at the University of Illinois at Chicago, and Jidong Huang, Ph.D., and Michael Pesko, Ph.D., at Georgia State University.²

The projections indicate that cigarette tax increases boost state tax revenues and reduce smoking. That is because a significant cigarette tax increase more than offsets any revenue lost from the decline in pack sales caused by the price increase. Projections are based, in part, on research findings that nationally, a 10 percent cigarette price increase, if maintained against inflation, reduces youth smoking rates by 6.5 percent or more, young adult (18-24 years old) smoking rates by about 3.25 percent, adult smoking rates by 2 percent, and total consumption by 4 percent.^{3 4 5 6} The model incorporates findings from recent analyses showing that changes in consumption and prevalence are dependent on the starting pack price, so states that have a higher starting pack price will actually see a larger percentage decline in smoking rates compared to states with lower starting pack prices.

The projections are fiscally conservative, including generous adjustments for lost state pack sales and the corresponding loss of state revenue caused by tax avoidance and tax evasion. For the purposes of our modeling, tax avoidance refers to legal efforts by individual smokers to avoid paying taxes. This includes obtaining lower-taxed or untaxed cigarettes either across state lines, from internet retailers, from tribal vendors not subject to state taxes, or from other sources. Tax evasion refers to illegal

¹ Tobacconomics, <https://tobacconomics.org/>.

² Listed researchers work with Tobacconomics program at the Institute for Health Research and Policy at the University of Illinois at Chicago, <https://tobacconomics.org/>.

³ Chaloupka, FJ, "Macro-Social Influences: The Effects of Prices and Tobacco Control Policies on the Demand for Tobacco Products," *Nicotine & Tobacco Research*, 1999, and other price studies at <http://www.ihrp.uic.edu/researcher/frank-j-chaloupka-phd> and <https://tobacconomics.org/>.

⁴ Tauras, J, et al., "Effects of Price and Access Laws on Teenage Smoking Initiation: A National Longitudinal Analysis," Bridging the Gap Research, ImpacTeen, April 24, 2001, <https://www.thecommunityguide.org/findings/tobacco-use-and-secondhand-smoke-exposure-interventions-increase-unit-price-tobacco#tab-wtfff>.

⁵ Chaloupka, FJ & Pacula, R, "The Impact of Price on Youth Tobacco Use," Chapter 12 in National Cancer Institute, Smoking and Tobacco Control Monograph 14, *Changing Adolescent Smoking Prevalence*, November 2001; International Agency for Research on Cancer (IARC), *Effectiveness of Tax and Price Policies for Tobacco Control*, IARC Handbooks of Cancer Prevention in Tobacco Control, Volume 14, 2011.

⁶ Community Preventive Services Task Force, "Tobacco Use and Secondhand Smoke Exposure: Interventions to Increase the Unit Price for Tobacco Products," November 2012, <https://www.thecommunityguide.org/findings/tobacco-use-and-secondhand-smoke-exposure-interventions-increase-unit-price-tobacco#tab-wtfff>.

methods of circumventing tobacco taxes, including organized criminal smuggling activity.⁷ Despite such practices, cigarette tax increases still generate new revenue and reduce smoking rates, which in turn, reduce smoking-caused disease, deaths, and related economic costs. These projections consider factors such as interstate excise tax differences and population distribution, compacts or agreements with tribal groups, and high-tech tax stamps in our calculations.

Economic studies indicate that cigarettes and other tobacco products (OTPs), such as roll-your-own tobacco, smokeless tobacco, cigars, and e-cigarettes, can be substitutes for one another, meaning if cigarette taxes (or prices) are increased while OTP taxes (or prices) remain unchanged, some of the reductions in cigarette smoking could be offset by increases in the use of OTPs.⁸ In the majority of states where OTPs are taxed at a lower rate than cigarettes, equalizing the tax rates on the range of OTPs to that of cigarettes would reduce this potential substitution. Tax equalization would also reduce the use of OTPs, while at the same time generating additional revenue. Parallel OTP tax rates are calculated as a state's cigarette tax rate as a percentage of the national wholesale price, which is based on adjusting the base wholesale price from the USDA Economic Research Service with tobacco companies' list price increases throughout the past year.⁹ A national wholesale price is used because state-specific wholesale price data are not available.

These projections incorporate the impact of annual background declines of 3.5 percent for adult and future youth smoking prevalence and 3.5 percent for pack sales, as well as changes in pack prices. The background decline is the annual reduction in cigarette use that would be expected to occur without any changes in the tax rate due to other tobacco control policies, changing social norms, and a changing tobacco product landscape. Smoking and pack sale declines in any particular state will vary depending on its existing smoking rates; pack prices; other tobacco prevention, cessation, and industry activities; and changes in population. Projections are not adjusted for projected changes in state population or population demographics. However, projections are conservative in controlling for other factors and to be even more careful, the projected amounts have also been rounded down.

Despite all of these generous adjustments to avoid over-estimates, the projections still show that large state cigarette tax increases will both significantly reduce smoking levels and substantially increase state revenues. The increased tax per pack will still bring in more new state revenue than is lost from the decrease in the number of packs sold caused by consumption declines, tax avoidance, and smuggling resulting from the tax increase. Tax avoidance or evasion through tribal sales – purchasing tobacco products on tribal lands – is also included in the calculation, based on analysis of data from the 2010/2011 Tobacco Use Supplement to the Current Population Survey (most recent available) by researchers with Tobacconomics. In those states that apply their sales tax percentage to the total retail price of a pack of cigarettes (including the state cigarette tax amount), a cigarette tax increase

⁷ National Research Council (NRC) & Institute of Medicine (IOM), *Understanding the U.S. Illicit Tobacco Market: Characteristics, Policy Context, and Lessons from International Experiences*, Committee on the Illicit Tobacco Market: Collection and Analysis of the International Experience, P. Reuter and M. Majmundar, Eds. Committee on Law and Justice, Division of Behavioral and Social Sciences and Education. Board on Population Health and Public Health Practice, Institute of Medicine. Washington, DC: The National Academies Press, 2015, <https://www.nap.edu/catalog/19016/understanding-the-us-illicit-tobacco-market-characteristics-policy-context-and>.

⁸ Chaloupka, FJ & Warner, KE, "The Economics of Smoking," in Culyer, AJ & Newhouse, JP, eds., *Handbook of Health Economics*, Amsterdam: North-Holland, 2000.

⁹ Media reports or industry analyst reports.

will raise state sales tax revenues per pack, which will offset sales tax revenue losses from fewer packs being sold. In addition, smokers who quit or cut back will likely spend the money they previously spent on cigarettes largely on other goods on which state taxes may be collected, which could further increase state revenues.¹⁰

These projections assume that the tax increase is fully passed on to the consumer in higher prices, and keeps up with inflation over time, which is consistent with economic research on the usual impact of cigarette taxes on cigarette prices.^{11 12 13} However, because of industry or retailer pricing strategies or changes in consumer purchasing behavior, some customers may not experience a price increase of the full amount of the tax increase.¹⁴ This can happen particularly if the amount of the increase is small enough to be minimized or completely cancelled out by industry price promotions, resulting in few, if any, public health benefits. If a tax increase is not fully passed on in the form of higher prices, then the reductions in smoking and its consequences in response to the tax increase will be smaller, while the revenues generated from the tax increase will be larger. Alternatively, if cigarette companies use the tax increase as an opportunity to raise net-of-tax prices and the tax increase is more than passed on, then the reductions in smoking and its consequences will be larger, while the increase in revenues will be smaller.

The starting price per pack (before the proposed cigarette tax increase) used in these projections includes all federal and state excise and sales taxes and, where applicable, local taxes (e.g., New York City's \$1.50 per pack tax is factored into the overall New York State price per pack). The prices are based on data from *The Tax Burden on Tobacco*;¹⁵ reports of state and local cigarette tax increases; media reports on tobacco company price changes; the USDA Economic Research Service; the U.S. Bureau of Labor Statistics (for inflation adjustments); the U.S. Federal Trade Commission's *Cigarette Report for 2016*¹⁶ (the most recent available) to adjust prices for retailer-based discounts, promotions, and coupons; and local tobacco pricing laws (i.e., New York City and Providence's prohibition on coupon redemption and product discounts).

The projections assume that the state will follow standard practice and apply the cigarette tax increase to all previously tax-stamped or otherwise tax-paid cigarettes held in inventory by wholesalers or retailers on the effective date of the increase. Failing to tax such cigarettes held in inventory would open the door to massive pre-increase stockpiling by retailers and wholesalers to evade the increase, delaying and reducing the amount of new state revenues.

¹⁰ Campaign for Tobacco-Free Kids, Counter Tobacco, & American Heart Association, *Deadly Alliance Update: How Tobacco Companies and Convenience Stores Partner to Market Tobacco Products and Fight Life-Saving Policies*, December 15, 2016, <https://www.tobaccofreekids.org/what-we-do/industry-watch/deadly-alliance>.

¹¹ U.S. Department of Health and Human Services (HHS), *Reducing Tobacco Use: A Report of the Surgeon General*, Atlanta: HHS, CDC, National Center for Chronic Disease Prevention & Health Promotion, Office on Smoking and Health, 2000.

¹² Chaloupka, et al., 2000.

¹³ HHS, *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*, Atlanta: HHS, CDC, National Center for Chronic Disease Prevention & Health Promotion, Office on Smoking and Health, 2012.

¹⁴ Harding, M, Leibtag, E, & Lovenheim, M, *The Heterogeneous Geographic and Socioeconomic Incidence of Cigarette Taxes: Evidence from Nielsen Homescan Data*, May 2010, http://www.bus.umich.edu/ConferenceFiles/MTAXI/Lovenheim_Rev.pdf.

¹⁵ Orzechowski and Walker, *The Tax Burden on Tobacco, 2017*, 52, Arlington, VA: Orzechowski and Walker, 2018.

¹⁶ Federal Trade Commission, *Cigarette Report for 2016*, March 2018. Available at https://www.ftc.gov/system/files/documents/reports/federal-trade-commission-cigarette-report-2016-federal-trade-commission-smokeless-tobacco-report/ftc_cigarette_report_for_2016_0.pdf.

For some states, projections for new revenues generated from an OTP tax increase are included, based on the most recent revenue data available, the products that are currently covered, and declines in use due to the price increase. As with cigarette tax revenue projections, these revenue projections assume the tax increases are fully passed onto consumers and that the state will apply an inventory tax to OTPs in stock when the tax increase goes into effect. These projections are also rounded to be more fiscally conservative.

The projected adult, young adult, and youth smoking and smoking-harmed birth declines, and related mortality reductions are calculated by applying the above findings regarding the effects of tax and price increases to the number of current adult smokers in each state and to estimates of the number of youth (under 18 years old) alive today in each state who will become adult smokers and the number projected to die from smoking.^{17 18 19 20} Adult prevalence rates overall and broken down by relevant demographics are from the U.S. Centers for Disease Control and Prevention's Behavioral Risk Surveillance System (BRFSS).

The projected five-year savings from fewer smoking-caused heart attacks and strokes, fewer smoking-affected pregnancies and related birth complications, and fewer lung cancer cases show just some of the many substantial savings from the smoking reductions prompted by a tax increase that begin to accrue immediately. The projected five-year lung cancer cost savings as a result of adult smokers quitting due to the tax increase takes into account the relative risk of developing lung cancer among quitters and the number of lung cancer deaths attributable to smoking.^{21 22} These savings will increase steadily in subsequent years. The projected five-year smoking-affected pregnancy and birth savings accrue from declines in smoking among pregnant women and corresponding reductions in smoking-caused birth complications and related health care costs for their children in their first year or life.²³ The five-year heart attack and stroke savings projections show the estimated reductions in smoking-caused health care expenditures from reduced smoking-caused heart attacks within the first five years after the tax increase.^{24 25}

Because of research and data limitations, it is not yet possible to estimate total health care cost savings in each year following a cigarette tax increase, or even to provide reasonable estimates of the total

¹⁷ CDC, "Cigarette Smoking During Pregnancy: United States, 2016," *NCHS Data Brief*, 305, February 2018, <https://www.cdc.gov/nchs/data/databriefs/db305.pdf>.

¹⁸ CDC, "Annual Smoking-Attributable Mortality, Years of Potential Life Lost, and Economic Costs—United States 1995-1999," *MMWR* 51(14):300-03, April 11, 2002, www.cdc.gov/mmwr/preview/mmwrhtml/mm5114a2.htm.

¹⁹ CDC, "Annual Smoking-Attributable Mortality, Years of Potential Life Lost, and Economic Costs—United States 2000-2004," *MMWR* 57(45):1226-1228, November 14, 2008, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5745a3.htm>.

²⁰ CDC, "Projected Smoking-Related Deaths Among Youth—United States," *MMWR* 45(44):971-974, November 11, 1996, <http://www.cdc.gov/mmwr/preview/mmwrhtml/00044348.htm>, for data on relative death risks of smokers, nonsmokers, and former smokers.

²¹ Chang, S, et al., "Estimating the cost of cancer: results on the basis of claims data analyses for cancer patients diagnosed with seven types of cancer during 1999 to 2000," *Journal of Clinical Oncology* 22(17):3524-30, September 2004.

²² Khuder, SA & Mutgi, AB, "Effect of smoking cessation on major histologic types of lung cancer," *Chest* 120(5):1577-83, November 2001.

²³ Miller, D, et al., "Birth and First-Year Costs for Mothers and Infants Attributable to Maternal Smoking," *Nicotine & Tobacco Research* 3:25-35, 2001; and state pregnancy-smoking and birth data.

²⁴ Lightwood & Glantz, "Short-Term Economic and Health Benefits of Smoking Cessation – Myocardial Infarction and Stroke," *Circulation* 96(4), August 19, 1997.

²⁵ Kabir, et al., "Coronary Heart Disease Deaths and Decreased Smoking Prevalence in Massachusetts, 1993-2003," *American Journal of Public Health* 98(8):1468-69, August 2008.

health care savings over the first five or ten years. Since many smoking-related diseases take years to develop, smoking-caused health care cost savings from a cigarette tax increase will be relatively small in the first few years after an increase; however, they grow quickly. The projected long-term total health care cost savings from reducing the number of future youth and current adult smokers accrue over the lifetimes of youth (under 18 years old) alive in the state today who quit or don't start because of the tax increase and over the lifetimes of current adult smokers who quit because of the tax increase. Smokers' lifetime health care costs average about \$28,300 (in 2019 dollars), despite shorter life spans. However, the savings per adult quitter are less than that amount (about \$15,400 in 2019 dollars) because adult smokers have already been significantly harmed by their smoking and have already incurred or locked-in extra future smoking-caused health costs.^{26 27 28 29}

The five-year savings to the state Medicaid program are estimated based on the number of non-disabled, non-elderly adult Medicaid recipients expected to quit due to the tax increase and the costs averted per quitting Medicaid recipient.³⁰ Estimates for adults enrolled in state Medicaid programs include the additional expected enrollment in states that expanded their Medicaid eligibility as part of the Affordable Care Act as of December 2018³¹ and adults who were previously eligible under existing rules and are expected to be enrolled in the years 2019-2023. Any legislated changes to the Affordable Care Act's Medicaid expansion enacted after December 2018 are not incorporated into the calculations but may affect state Medicaid program costs and cost savings.³² Enrollment projections and cost analyses were provided by Matt Broaddus at the Center on Budget and Policy Priorities, based on data from the Centers for Medicare and Medicaid Services (CMS).^{33 34} The projected Medicaid cost savings are calculated using per capita adult Medicaid spending data³⁵ and take into account the costs of newly-

²⁶ Hodgson, TA, "Cigarette Smoking and Lifetime Medical Expenditures," *The Milbank Quarterly* 70(1), 1992. CDC, "Projected Smoking-Related Deaths Among Youth—United States," *MMWR* 45(44):971-974, November 8, 1996, <http://www.cdc.gov/mmwr/preview/mmwrhtml/00044348.htm>. Health care costs are adjusted to 2017 dollars using the Consumer Price Index for Medical Care (MCPI) from the U.S. Bureau of Labor Statistics.

²⁷ Nusselder, W, et al., "Smoking and the Compression of Morbidity," *Epidemiology & Community Health*, 2000.

²⁸ Warner, K, et al., "Medical Costs of Smoking in the United States: Estimates, Their Validity, and Their Implications," *Tobacco Control* 8(3):290-300, Autumn 1999.

²⁹ CDC, "Annual Smoking-Attributable Mortality, Years of Potential Life Lost, and Economic Costs—United States 2000-2004," *MMWR* 57(45):1226-1228, November 14, 2008, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5745a3.htm>.

³⁰ Miller, LS, et al., "State estimates of Medicaid expenditures attributable to cigarette smoking, fiscal year 1993," *Public Health Reports* 113(2):140-51, 1998.

³¹ Kaiser Family Foundation, "Status of State Action on the Medicaid Expansion Decision," November 8, 2017. Available at <http://kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/>.

³² Virginia expanded enrollment went into effect on January 1, 2019, but the state opened up enrollment beginning in November 2018, so projected cost savings include the early enrollment. Idaho, Maine, Nebraska, and Utah are expected to expand enrollment in 2019, but the specific implementation dates have not yet been determined.

³³ Centers for Medicare and Medicaid Services (CMS), "Total Medicaid Enrollees - VIII Group Break Out Report," updated September 2017, <https://www.medicaid.gov/medicaid/program-information/downloads/cms-64-enrollment-report-jan-mar-2016.pdf>.

³⁴ Medicaid and CHIP Payment and Access Commission (MACPAC) "Exhibit 14a. Medicaid Enrollment by State, Eligibility Group, and Dually Eligible Status, Updated FY 2013 (thousands)," *MACStats: Medicaid and CHIP Data Book*, 2017, <https://www.macpac.gov/wp-content/uploads/2015/01/EXHIBIT-14.-Medicaid-Enrollment-by-State-Eligibility-Group-and-Dually-Eligible-Status-FY-2013-FY-2014.pdf>.

³⁵ Projected current and future costs are extrapolated from estimates of Medicaid spending per full-benefit enrollee for FY 2013 from MACPAC [EXHIBIT 22a. Medicaid Benefit Spending Per Full-Year Equivalent Enrollee by State and Eligibility Group, Updated FY 2013, <https://www.macpac.gov/wp-content/uploads/2015/01/EXHIBIT-22.-Medicaid-Benefit-Spending-Per-Full-Year-Equivalent-Enrollee-by-State-and-Eligibility-Group-FY-2013-FY-2014.pdf>] adjusted to 2018 dollars using

eligible adult Medicaid enrollees separately from the previously eligible adult Medicaid beneficiaries, as well as future projected cost increases. The proportion of the state Medicaid program's projected cost savings that would accrue to the state government are based on the state's Federal Medical Assistance Percentage (FMAP),³⁶ calculated separately for newly-eligible and previously-eligible enrollees. Only the projected cost savings that would accrue to the state government are reported.

All projected savings have been adjusted to 2019 dollars using the Consumer Price Index for Medical Care (MCPI) from the U.S. Bureau of Labor Statistics, with the exception of the Medicaid cost savings, which were adjusted using national inflation factors from the Centers for Medicare and Medicaid Services (see footnote 33). Forecasted costs are estimated using the average difference between annual medical inflation and annual inflation that occurred between the years 2012 and 2017. These projections do not include a range of additional short and long-term savings from other declines in smoking-caused health problems and other smoking-caused costs.³⁷

Projections for cigarette tax increases much higher than \$1.00 per pack are limited, especially for states with relatively low current tax rates, because of the lack of research on the effects of larger cigarette tax increase amounts on consumption and prevalence. Projections for cigarette tax increases much lower than \$1.00 per pack are also limited because small tax increases are unlikely to produce significant public health benefits. Limited research suggests that tax increases of very large or small amounts may have different impacts on price than those of an amount close to \$1.00.

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Projections change when new data or research findings become available and the underlying data and methodologies are updated or revised.

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Campaign for Tobacco-Free Kids' resources on state tobacco tax increases:

<https://www.tobaccofreekids.org/what-we-do/us/state-tobacco-taxes>

<https://www.tobaccofreekids.org/what-we-do/us/state-tobacco-taxes/fact-sheets>

American Cancer Society Cancer Action Network's resources on tobacco taxes:

<http://acscan.org/tobacco/taxes>

Tobacconomics' resources on tobacco taxes:

<http://tobacconomics.org/database/#42>

national inflation factors from the Centers for Medicare and Medicaid Services [<https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/ActuarialStudies/Downloads/MedicaidReport2016.pdf>]. Because they were not available through MACPAC, FY 2011 Medicaid expenditures for Vermont were obtained from <http://www.statenetwork.org/resource/data-points-to-consider-when-assessing-proposals-to-cap-federal-medicaid-funding-a-toolkit-for-states/> and adjusted using the same methodology described for other states.

³⁶ 83 Fed Reg 61159, <https://www.gpo.gov/fdsys/pkg/FR-2018-11-28/pdf/2018-25944.pdf>.

³⁷ See, e.g., U.S. Department of the Treasury, *The Economic Costs of Smoking in the U.S. and the Benefits of Comprehensive Tobacco Legislation*, 1998.