# Cost and Coverage Impacts of Five Proposals to Reform the Colorado Health Care System

*Appendix I: Methods Used to Estimate Revenues Under alternative Funding Sources*

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**Summary of Data and Methods used to Develop Estimates of Revenues under Alternative Proposal for Financing Health Reform Proposals in Colorado**

In this study, we estimated the amount of revenues that could be raised under several proposed sources of revenues. In this Appendix, we describe the methodology used to estimate revenue from possible tax provisions including:

- Increasing the cigarette tax from $0.84 to $2.00 per pack

- Increasing alcohol taxes as follows:
    - Spirits: from $0.6026 to $5.63 per liter
    - Wine: from $0.073 to $0.66 per liter
    - Beer: from $0.08 to $0.26 per gallon

- A nutritional sales tax on consumable food items that have little or no nutritional value as follows:
    - Carbonated Soft Drinks: range from 2.0% to 5.0%
    - Salty Snack Foods: range from 2.0% to 5.0%

## A. Cigarette Tax

Currently, the tax per pack of cigarettes in Colorado is $0.84 per pack. An author proposed increasing the tax to $2.00 per pack. In *Figure 1*, we display the estimated increase in revenue associated with such a tax increase - $210.6 million for FY 2007-2008. We assume that the average pack of cigarettes in the State of Colorado is currently $4.13, which includes the current tax of $0.84.[1]

According to monthly estimates by the Colorado Department of Revenue there were 220,865,760 packs of cigarettes that were charged the $0.84 tax in FY 2006-2007. We trend this number forward using the projected growth in cigarette tax revenue from FY 2006-2007 to FY 2007-2008 reported in the June 2007 Revenue Forecast by the Office of State Planning and Budgeting (OSPB).[2] Our estimate of FY 2007-2008 packs is 214,272,752. We apply the current tax rate to the number of packs to estimate tax revenue under current law, which amounts to approximately $180.0 million.

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[1]  Ann Boonn, July 1, 2007. *Campaign for Tobacco-Free Kids, State Cigarette Prices, Taxes, and Costs per Pack.* Available as of July 8, 2007 at http://tobaccofreekids.org/reports/prices.

[2]  The growth rate was -3.0 percent. The report was available as of July 8, 2007 at http://www.state.co.us/gov_dir/govnr_dir/ospb/economics/cep/2007/cep2007-06.pdf.

**Figure 1**
**FY 2007-2008 Estimate of Additional**
**Revenue from Cigarette Tax Increase**

| Status Quo - $0.84 per pack | |
|---|---:|
| Average Price per Pack | $4.13 |
| Packs | 214,272,752 |
| Cigarette Tax Revenue | $179,989,112 |
| **Proposed Tax - $2.00 per pack** | |
| New Average Price per Pack | $5.29 |
| Percent Increase Price per Pack | 28.09% |
| Price Elasticity of Demand for Cigarettes | -0.315 |
| Percentage Decrease in Utilization | -8.85% |
| Packs | 195,315,061 |
| Cigarette Tax Revenue | $390,630,123 |
| **Additional Tax Revenue** | **$210,641,011** |

Source: Lewin Estimates

Applying a $2.00 tax increases the average price of cigarettes in Colorado by 28.1 percent to $5.29 per pack.   Studies have shown that increases in the price of cigarettes will decrease the demand for cigarettes.  According to estimates reported in Farelly et al., the price elasticity of demand for cigarettes ranges from -0.30 to -0.33.[3]  We use the midpoint of that range, -0.315 for our estimates.  Therefore, for every 1.0 percent increase in price, we estimate a 0.315 percent decrease in the demand for cigarettes.  This leads to an 8.85 percent decrease in the number of packs that are taxed in FY 2007- 2008.  We apply the proposed $2.00 tax to the estimated number of packs under the proposed tax scenario, 195,315,061, and obtain an estimate of $390.6 million in total cigarette tax revenue.  This amounts to an estimated $210.6 million in additional cigarette tax revenue.

## B. Alcohol Tax

*Figure* 2 displays our estimates for the increases in beer, wine and spirit taxes.   We begin with the FY 2006-2007 tax collections for beer, wine and spirits reported by the Colorado Department of Revenue and calculate implied utilization statistics by dividing the total tax collections by the corresponding current tax rate.  Note that beer utilization is in gallons and wine and spirits are in liters.  The taxes are applied similarly; that is, the beer tax is per gallon while the wine and spirit tax is per liter.

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[3]  Farrelly, M.C. et al.  2003.  The impact of tobacco control program expenditures on aggregate cigarette sales: 1981-2000. *Journal of Health Economics*, 22: 843-859.

## Figure 2
## FY 2007-2008 Estimate of Additional
## Revenue from Beer, Wine and Spirit Tax Increases

| | Current Tax rate | FY 2006-2007 Tax Collections | Implied Utilization w/o tax increase | Price Elasticity of Demand for Alcohol | New Tax Rate | Average Price Before the New Tax Rate | New Utilization | Proposed FY 2007-2008 tax revenue | FY 2007-2008 Additional Revenue from Tax Increase |
|---|---|---|---|---|---|---|---|---|---|
| Beer [a] | $0.08 | $8,742,155 | 109,276,938 | -0.30 | $0.26 | $12.89 | $108,615,681 | $28,240,077 | $19,497,922 |
| Wine | $0.07 | $3,793,661 | 51,755,266 | -1.00 | $0.66 | $8.34 | $47,658,447 | $31,454,575 | $27,660,914 |
| Spirits | $0.06 | $21,297,741 | 35,343,082 | -1.50 | $5.63 | $17.00 | $17,785,886 | $100,134,539 | $78,836,798 |
| Total | | $33,833,557 | | | | | | $159,829,191 | $125,995,634 |

a/ Includes hard cider.
Source: Lewin Estimates.

As with the cigarette tax, we take into account the offsetting effect of reduced demand due to price increases. We use elasticity estimates of -0.3, -1.0 and -1.5 for beer, wine and spirits respectively, which are based on estimates reported in Chaloupka et al.[4] We estimate the current average price for one gallon of beer and one liter of wine and spirits to be $12.89,[5] $8.34,[6] and $17.00[7] respectively. Using the percentage increase in price due to the proposed tax increases and the elasticity estimates just described we are able to calculate utilization figures under the new tax structure. In order to estimate FY 2007-2008 tax revenue, we multiply the new tax rates with the new utilization figures.

Total tax revenue for FY 2007-2008 is estimated to be $159.8 million. Since we did not assume any new utilization (i.e. the utilization would have been the same in FY 2007-2008 if not for the tax increase), we estimate the additional tax revenue from the new taxes as the difference between the FY 2007-2008 and FY 2006-2007 amounts. This estimate is $126.0 million.

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[4] Chaloupka, F.J., et al. 2002. The Effects of Price on Alcohol Consumption and Alcohol-Related Problems. Alcohol Reseach and Health, 26(1): 22-34. The elasticity estimates are actually based upon a meta-analysis of economic studies on alcohol demand: Leung, S.F. and Phelps, C.E. *"My Kingdom for a Drink…?" A Review of Demand for Alcoholic Beverages*. InHilton, M.E. and Bloss, G., eds. *Economics and the Prevention of Alcohol-Related Problems*. NIAAA Research Monograph No. 25, NIH Pub. No 93-3513.

[5] This estimate for beer is based upon the national average price for one gallon of Corona as reported by the American Water Works Association. Available as of July 9, 2007 at http://www.awwa.org/Advocacy/news/info/PricePerGallon.

[6] We used two reports to get data on average prices for wine in Colorado. (1) Thilmany, D. et al. May 2006. *The Economic Contribution of the Colorado Wine Industry*. Cooperative Extension, Colorado State University, Department of Agricultural and Resource Economics: Fort Collins, CO. Available as of July 11, 2007 at http://dare.colostate.edu/csuagecon/extension/docs/impactanalysis/edr06-08.pdf. (2) Colorado Wine Statistics. November 2, 2006. *Colorado Wine Production and Market Share*. Available as of July 11, 2007 at http://www.coloradowine.com/pdf/COWineStats.pdf.

[7] The estimate of the average price for one liter of liquor is based upon best guesses by the analysts.

## C. Nutrition Tax

In order to estimate possible revenue obtained from nutrition taxes, we estimated a range, of impacts for taxes on carbonated soft drinks and on snack foods. At the bottom end of the range we analyzed a 2.0 percent tax and at the top a 5.0 percent tax. These are the magnitudes for nutrition taxes proposed by one of the authors.

### 1. Carbonated Soft Drinks

*Figure 3* displays our results for taxes on carbonated soft drinks (CFDs). We first estimate FY 2007-2008 per household expenditures for CSDs. We base this estimate on 2004 and 2005 estimates of the total national retail value of CSDs ($65.9 billion and $68.1 billion respectively)[8] divided by the corresponding total estimated number of US households (112.0 million and 113.1 million respectively).[9] This division gives us per household estimates for 2004 ($588) and 2005 ($602) which we trend forward using the percent change from these two years. The estimate of per household CSD expenditures is $630 for FY 2007-2008.

**Figure 3**
**FY 2007-2008 Estimate of Additional**
**Revenue from Tax on Carbonated Soft Drinks**

| Per Household CSD Expenditures | Households in Colorado | Total CSD spending | Tax Elasticity of Spending | Revenue from 2% Tax | Revenue from 5% Tax |
|---|---|---|---|---|---|
| $630 | 1,990,000 | $1,253,262,407 | 0.5 | $12,532,624 | $31,331,560 |

Source: Lewin Estimates

We also estimate the total number of households in Colorado using data from the Current Population Survey and our Health Benefit Simulation Model. We multiply the total number of households by per household CSD expenditures to get a total of $1.3 billion in CSD spending for the State. According to a study by Tefft, a one percent tax on the price of soda will lead to revenue of 0.5 percent. [10] Using this result, we estimate revenue from a 2.0 percent tax to be $12.5 million and a 5.0 percent tax to be $31.3 million.

### 2. Salty Snack Foods

We also estimated the impact of a 2.0 percent and 5.0 percent tax on certain salty snack foods; potato chips, pretzels, cheese puffs, microwave popcorn, and nuts (packaged in bulk). *Figure 4* displays our results.

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[8] Beverage Digest. March 8, 2006. Special Issue: All Channel Carbonated Soft Drink Performance in 2005, Vol 48(7). Available as of July 11, 2007 at http://www.beverage-digest.com/pdf/top-10_2006.pdf.

[9] US Census. *Statistical Abstracts of the United States*. http://www.census.gov/prod/2006pubs/07statab/pop.pdf

[10] Teft. NW. March 2006, DRAFT, *The Effects of a "Snack Tax: on Household Soft Drink Expenditure*.

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We used data form the 1999 AC Neilsen Homescan Panel to estimate a per pound household expenditure for salty snack foods.[11]  We project the 1999 figure to FY 2007-2008 using the Bureau of Labor Statistics Consumer Price Index for food and beverages.  This amounts to $2.93.  According to the 1999 AC Neilsen data, the average number of pounds of salty snack foods purchased by a household was 31.810 lbs.   We assume this would be the same in FY 2007-2008 before any tax increases.

**Figure 4**
**FY 2007-2008 Estimate of Additional**
**Revenue from Tax on Salty Snack Foods**

| Average Amount of Household Expenditures per pound | Average Pounds Per Household before tax | Price Elasticity of Demand | Average Pounds Per Household with 2% Tax | Revenue from 2% Tax | Average Pounds Per Household with 5% Tax | Revenue from 5% Tax |
|---|---|---|---|---|---|---|
| $2.93 | 31.810 | -0.45 | 31.524 | *$3,671,906* | 31.094 | *$9,179,764* |

Source: Lewin Estimates

We use a price elasticity of demand for snacks of -0.45 to account for the offset in consumption due to the increase in price.[12]  This leads to slight decreases in the average household consumption of salty snack foods to 31.524 lbs and 31.094 lbs under the 2 percent and 5 percent tax scenarios respectively.  The corresponding revenues are $3.7 million and $9.2 million.

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[11]   This data was reported in: Kuchler et al.  August 2004. Taxing Snack Foods: What to Expect for Diet and Tax Revenues. *Agriculture Information Bulletin*, No 747-08

[12]   Kuchler et al.  August 2004. Taxing Snack Foods: What to Expect for Diet and Tax Revenues. *Agriculture Information Bulletin*, No 747-08.  We average the low (-0.2) and high (-0.7) elasticity estimates reported.