ESTIMATING STATE COST SAVINGS
BASED ON EXISTING OR PROJECTED SMOKING DECLINE DATA

This factsheet describes several ways that state cost savings from recent or projected future state smoking declines among adults, youths or pregnant women can be estimated. For example, the following equations can be used to estimate the likely reductions in total state healthcare expenditures from the smoking declines expected from an upcoming state cigarette tax or from other state tobacco prevention efforts. Or they can be used to estimate what cost savings the state has secured from any recent declines in state adult, youth, or pregnant women smoking rates. Similarly, these formulas, with a few minor adjustments, can also be used to produce estimates of the increased state healthcare expenditures caused by any recent smoking increases in the state.

The following steps and formulas are based on available data and scientific and economic research, and they have been used for some time by the Campaign for Tobacco-Free Kids to develop its estimates of cost savings from actual or projected smoking declines. Dollar amounts have been put in 2004 dollars, following the current practice and procedures of the U.S. Center's for Disease Control & Prevention and its latest estimates (in 2004 dollars) of smoking-caused healthcare costs and productivity losses.[1] To be conservative, all savings calculated through these formulas should also be rounded down.

The following text provides full citations to all references and data sources, with links to copies on the Internet, when available. Most of the data needed for making these state-specific calculations is available in an online document at: http://www.tobaccofreekids.org/research/factsheets/pdf/0329.pdf. But more up-to-date state-specific data to make more up-to-date estimates might be available from state agencies and other sources.

Estimating Lifetime Healthcare Savings From A Youth Smoking Decline of X%

1. The U.S. Centers for Disease Control & Prevention (CDC) provides estimates of how many youth alive today in each state will become addicted adult smokers and how many of them (roughly one-third) will die prematurely from their smoking).[2] Getting those totals for the specific state in question is the first step; see: http://www.tobaccofreekids.org/research/factsheets/pdf/0329.pdf.

2. A sustained reduction to youth smoking of X% is assumed to reduce the number of children alive today that are projected to become adult smokers by X%, as well – and to reduce the number of kids alive today projected to die early from smoking by X%.

3. Despite dying sooner, smokers, on average, have lifetime healthcare costs that are an estimated $17,500 higher (in 2004 dollars) than those who do not smoke.[3] That amount can be multiplied by the number of kids alive today who will not become addicted adult smokers because of the smoking declines (from step 2) to produce an estimate of the related total net reduced healthcare costs that will accrue over the lifetimes of those youths.

4. Published research has estimated the portion of all smoking-caused healthcare expenditures in each state that are paid for by the state Medicaid program.[4] Applying that percentage to the total from Step 3

[1] See, e.g., U.S. Centers for Disease Control & Prevention (CDC), *State Data Highlights 2006*, accessed January 17, 2008, http://www.cdc.gov/tobacco/data_statistics/state_data/data_highlights/2006/index.htm.

[2] These totals (and other state-specific tobacco use, harms and cost data) are also in CDC, *State Data Highlights 2006*, http://www.cdc.gov/tobacco/data_statistics/state_data/data_highlights/2006/index.htm. See, also, 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.

[3] The basis for this $17,500 amount (with citations to references) is set forth in detail in the Campaign for Tobacco-Free Kids factsheet, *Health Costs of Smokers vs. Former Smokers vs. Non-Smokers And Related Savings From Quitting,* http://tobaccofreekids.org/research/factsheets/pdf/0327.pdf.

[4] Miller, L, et al., "State Estimates of Medicaid Expenditures Attributable to Cigarette Smoking, Fiscal Year 1993," *Public Health Reports* 113:140-151, March/April 1998.

will provide an estimate of the reduction to future state Medicaid program expenditures from the youth smoking declines. See: http://www.tobaccofreekids.org/research/factsheets/pdf/0329.pdf.

5. After their state Medicaid program expenditures are made, the federal government reimburses each state for a portion of those expenditures. On average, each state ends up covering the cost of approximately 43% of its Medicaid expenditures, but each state's specific post-reimbursement percentage is different.[5] Applying these post-reimbursement percentages to the amounts calculated in step 4 provides an estimate of the net savings to the state Medicaid program from the youth smoking declines, over their lifetimes, after federal reimbursements. For each state's non-reimbursed share of Medicaid program expenditures, see: http://www.tobaccofreekids.org/research/factsheets/pdf/0329.pdf.

Somewhat nearer-term savings could be estimated by looking only at the reduction in the number of current high-school aged smokers, and using the above process to calculate the related savings over the lifetimes of just those, older, high-school-aged youth.

Estimating Lifetime Healthcare Savings From An Adult Smoking Decline of X%

1. Applying the change in the percentage of adults in the state who smoke (e.g. a 24.2% to 23.1% = 1.1 percentage point drop) to the number of adults in the state provides an estimate of the number of adult quitters from the smoking decline.

2. The previously referenced research on higher average lifetime healthcare costs among smokers compared to nonsmokers indicates that, on average, adult smokers who quit (not counting those who quit because of they have a serious smoking-caused disease) have lifetime healthcare costs that are roughly $9,500 less than the average smoker's (in 2004 dollars).[6] Multiplying $9,500 times the number of adult quitters from step 1 produces an estimate of the total reduction to healthcare expenditures in the state from the smoking decline, over the lifetimes of the adults who quit.

3. Using the percentages listed above, the savings estimate from step 2 can be multiplied by the Medicaid percentages to produce estimates of the savings to the state Medicaid program from the adult smoking declines, over the lifetimes of the adults who quit.

Estimating Five-Year Healthcare Savings From An Adult Smoking Decline of X%

1. The previously referenced research on higher average lifetime healthcare costs among smokers compared to quitters indicates that, on average, adult smokers who quit (not counting those who quit because of they have a serious smoking-caused disease) have, over the next five years from baseline, healthcare costs that are $2,400 lower than the average smoker's (in 2004 dollars).[7] Multiplying $2,400 times the calculated number of adult quitters produces an estimate of the total reduction to healthcare expenditures in the state from the smoking decline, over the next five years after the adults quit.

2. Using the Medicaid percentages listed above, the savings estimate from step 1 can be multiplied by the Medicaid percentages to produce estimates of the savings to the state Medicaid program from the adult smoking declines, over the next five years after the adults quit.

Estimated Annual Savings from Reducing Smoking Among Pregnant Women By X%

1. The first step is to get the most current available data on the number of births in the state – and, if available, a breakdown of births to mothers above and below the age of 18.[8] For overall birth data for each state, see: http://www.tobaccofreekids.org/research/factsheets/pdf/0329.pdf.

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[5] Federal Register 71(230): 69209-69211,http://aspe.hhs.gov/health/fmap08.htm.

[6] Campaign for Tobacco-Free Kids factsheet, *Health Costs of Smokers vs. Former Smokers vs. Non-Smokers And Related Savings From Quitting,* http://tobaccofreekids.org/research/factsheets/pdf/0327.pdf.

[7] Campaign for Tobacco-Free Kids factsheet, *Health Costs of Smokers vs. Former Smokers vs. Non-Smokers And Related Savings From Quitting,* http://tobaccofreekids.org/research/factsheets/pdf/0327.pdf.

[8] See, e.g., CDC, Births: Preliminary Data for 2006, *National Vital Statistics Reports* 56(7), December 5, 2007, http://www.cdc.gov/nchs/data/nvsr/nvsr56/nvsr56_07.pdf & http://www.cdc.gov/nchs/data/nvsr/nvsr56/nvsr56_07_tables.pdf.

2. The total state births data from step one can be multiplied by the most current data on smoking rates among pregnant women to obtain estimates of how many total smoking-affected pregnancies and births there are in the state each year. If birth and smoking data is available for pregnant adults versus pregnant girls under the age of 18, more specific estimates can be made of the number of smoking-affected adult and youth pregnancies and births there are in the state each year. See http://www.tobaccofreekids.org/research/factsheets/pdf/0329.pdf.[9]

3. The total number of smoking-affected births in the state each year can be multiplied by the smoking decline among all pregnant women to produce an estimate of the reduced number of smoking-affected pregnancies and births. More specific estimates can be obtained if step 2 produced estimates of adult vs. teen smoking affected births that can be multiplied by adult vs. youth smoking decline data.

4. Healthcare costs for smoking-affected pregnancies and births have been found, on average, to be $1,565 to $1,860 higher (in 2004 dollars) than for those pregnancies and births not affected by smoking through to the end of the first year after the births.[10] Multiplying these totals, or their average ($1,712) times the totals from step 3 can produce estimates of the total reductions to state healthcare expenditures each year following the pregnancy smoking declines. [But note that smoking-affected pregnancies and births – and secondhand smoke exposure after birth – also translates into additional excess healthcare costs well beyond the first year after birth.[11]]

5. The Medicaid program handles 40% of all pregnancies in the United States;[12] and CDC has found that women on Medicaid are more than three times as likely to smoke during the last 3 months of pregnancy as women with private insurance.[13] That indicates that Medicaid covers approximately two-thirds of all pregnancies affected by smoking. Accordingly, the costs from step 4 can be multiplied by 60% (or 50% to be conservative) to estimate the total state Medicaid program expenditure reductions each year from the smoking declines among pregnant women and girls.

6. The estimates from step 5 can be multiplied by the state reimbursement percentage, as discussed above, to calculate the annual net savings to the state budget, after Federal reimbursement, from the total annual state Medicaid program expenditure reductions caused by the smoking declines among pregnant women and girls in the state.

Estimated Per-Year Healthcare Savings Over the Next Seven Years From The Reductions to Heart Attack and Stroke From An Adult Smoking Decline of X%

Besides pregnancy studies, the only study that estimates smoking decline savings into specific years is the Lightwood-Glantz study that estimates the nationwide savings (in 1995 dollars) relating just to reductions in

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[9] Actual pregnancy smoking rates are likely even higher than reported levels because of underreporting of pregnancy smoking on birth certificates and in surveys. In addition, these estimates will not include those smoking-affected pregnancies that did not go to term (e.g., because of spontaneous abortions that can be caused by smoking); nor do they include pregnancies affected not by the mother smoking but by exposure to others' secondhand smoke.

[10] Miller, P, et al., "Birth and First-Year Costs for Mothers and Infants Attributable to Maternal Smoking," *Nicotine & Tobacco Research* 3(1):25-35, February 2001. See, also, Campaign for Tobacco-Free Kids factsheet, *Harm Caused by Pregnant Women Smoking or Being Exposed to Secondhand Smoke*, and the studies cited therein, http://tobaccofreekids.org/research/factsheets/index.php?CategoryID=13; and CDC, "State Estimates of Neonatal Health Costs Associated with Maternal Smoking – United States 1996," MMWR 53(39): 915-917, October 8, 2004, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5339a2.htm.

[11] See, e.g., Campaign factsheet, *Harm Caused by Pregnant Women Smoking or Being Exposed to Secondhand Smoke*, http://tobaccofreekids.org/research/factsheets/index.php?CategoryID=13, and the studies cited therein.

[12] National Governor's Association Center for Best Practices, *Maternal and Child Health (MCH) Update 2005: States Make Modest Expansions to Health Care Coverage*, http://www.nga.org/Files/pdf/0609MCHUPDATE.PDF, September 28, 2006. See, also, CDC, *Prenatal Smoking Data Book: State Highlights*, 2006 [48.8% of births were covered by Medicaid, 1998], http://www.cdc.gov/reproductivehealth/PrenatalSmkbk/states/anystate.htm.

[13] CDC factsheet, "Preventing Smoking and Exposure to Secondhand Smoke Before, During and After Pregnancy," http://www.cdc.gov/nccdphp/publications/factsheets/Prevention/smoking.htm#reference, accessed December 13, 2007 [from 26-state 2004 Pregnancy Risk Assessment Monitoring System (PRAMS) data].

direct medical care treatment costs from there being fewer smoking-caused heart attacks and strokes in each of the seven years following a one-percentage-point decline in adult smoking or in each of the seven year if there were a one-percentage-point per year decline in adult smoking over the time period.[14] These findings are shown in the following table, with adjustments to account for changes to the relevant population (a one percentage point decline in smoking among adults now equals a larger number of people than in the study period) and to put the dollar amounts in 2004 dollars.[15] [But it is important to note that these heart/stroke savings are just a tip of the iceberg compared to the overalls savings obtained from adult smoking declines.]

Nationwide Heart/Stroke Savings From a Single Percentage Point Decline in Adult Smoking

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Health Savings (millions)	$79	$183	$244	$274	$292	$300	$301

Nationwide Heart/Stroke Savings From Reducing Adult Smoking By One Percentage Point Per Year

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Health Savings (millions)	$79	$262	$506	$781	$1,074	$1,374	$1,676

1. The data in the above tables can be used to estimate the heart/stroke savings in each state from either a one-time adult smoking decline of a single percentage point or from a smoking decline of one percentage point per year for seven years simply by multiplying the above numbers by the fraction created by dividing the state's study-relevant adult population (34 to 64 year olds) by the total parallel USA adult population. See http://www.tobaccofreekids.org/research/factsheets/pdf/0329.pdf.

2. The state-specific heart/stroke savings table for a single one percentage point decline created in step 1 can be used to estimate the year-by-year heart/stroke savings for smoking declines of any other amount by figuring out what fraction or multiple of a one percentage point decline in adult smoking the X% decline at issue is and multiplying the table amounts by that fraction or multiple. For example, if the adult smoking decline at issue was a decline from 26.5% to 24.9%, the change would be 1.6 percentage points, and the savings amounts from the first state-specific table created in step one would be multiplied by 1.6 to obtain the corresponding heart/stroke savings amounts.

3. Using the Medicaid share of all smoking-caused health cost percentage and the state post-reimbursement rates, as discussed above, the state savings estimates from step 2 can be multiplied by the Medicaid percentages to produce estimates of the year-by-year heart/stroke savings just to the state Medicaid program from the adult smoking declines.

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[14] J.M. Lightwood & S.A. Glantz, "Short-Term Economic and Health Benefits of Smoking Cessation -- Myocardial Infarction and Stroke," *Circulation* 96(4): 1089-1096, http://circ.ahajournals.org/cgi/content/full/96/4/1089, August 19, 1997.

[15] Since the Lightwood-Glantz study was published, new research has appeared that indicates that even more heart attacks and strokes are likely caused by direct smoking and exposure to secondhand smoke than the figures used in the Lightwood-Glantz study. See, e.g., Teo, K., et al. “Tobacco Use and Risk of Myocardial Infarction in 52 countries in the INTERHEART Study: a Case-control Study,” *The Lancet* 368(9536): 647-58, August 19, 2006. Indeed, the Lightwood-Glantz study did not even consider any possible reductions to heart attacks and strokes from the declines in adult exposure to secondhand smoke caused by there being fewer adult smokers.