

**Smoking Cessation and
Medicaid Expenditures:
*A Cost-Benefit Analysis***

Steve Lerch, Ph.D.

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EXECUTIVE SUMMARY

Tobacco use is a major cause of preventable illness and death. In Washington State, nearly one-third of low-income adults, many of whom receive state-funded medical care, are smokers. To assess the feasibility of offering smoking cessation services through state medical assistance programs, this report examines the potential costs and benefits of providing such services to adults enrolled in the state's Medicaid program.

The Washington State Institute for Public Policy (Institute) was directed by the Legislature "to research and evaluate strategies for constraining the growth in state health expenditures."¹ In consultation with legislative fiscal committee staff, a cost-benefit analysis of a possible Medicaid smoking cessation program was identified as a useful area of research.

Key Findings

Although smoking cessation programs reduce health care expenditures and increase the life span of successful quitters, they do not appear to save more money than they cost in the short-term state budget.

- ❑ Medicaid program costs for smoking cessation treatment occur immediately, but many of the benefits (in terms of reduced health care expenditures) occur in the future.
- ❑ The percentage of individuals receiving treatment who successfully quit and remain abstinent is very small. Therefore, health care costs are reduced for only a small fraction of persons receiving treatment.
- ❑ Due to changes in employment and family situations over time, individuals leave the Medicaid program. If individuals were to receive smoking cessation treatment and then leave Medicaid, the benefits associated with reduced health care costs would not accrue to the state Medicaid program.

¹ ESSB 6153, Section 608(8), Chapter 7, Laws of 2001.

INTRODUCTION

Nearly one-quarter of all adults in Washington State are smokers; among very low-income adults, nearly one-third are smokers.² Because smoking has been recognized as a major cause of preventable illness and death,³ tobacco control advocates have long argued for greater funding to reduce the rate of smoking and promote cessation activities.

Although the rate of smoking is substantial among low-income adults, very few resources are available to assist this group in quitting. As a result of funding related to the national tobacco settlement, the Washington State Department of Health (DOH) is currently operating a tobacco prevention and control program intended to reduce smoking statewide.⁴ However, few of this program's resources are directed toward low-income adults. Additionally, while many low-income individuals in Washington receive health care through state medical assistance programs, only one of these programs provides smoking cessation services.⁵

To assess the feasibility of offering smoking cessation services through state medical assistance programs, this report examines the potential costs and benefits of providing such services to adults enrolled in Washington's Medicaid program. Broadly interpreted, these costs and benefits could include expenses such as transportation to receive treatment and benefits such as lifetime changes in health care expenditures and additional years of life associated with smoking cessation.

Study Purpose

This report analyzes the following question: Can smoking cessation programs help lower the cost of Washington's Medicaid program? The costs and benefits from the taxpayers' perspective are considered. On the cost side, this signifies all new Medicaid expenditures for providing smoking cessation services. On the benefit side, this represents all smoking-related Medicaid expenditures avoided as a result of treated individuals who quit smoking.

² Mary LeMier, *Tobacco and Health in Washington State* (Olympia, WA: Washington State Department of Health, Office of Community Wellness & Prevention, 1999), <<http://www.doh.wa.gov/Tobacco/Report/contents.htm>>.

³ Centers for Disease Control, *Reducing the Health Consequences of Smoking: 25 Years of Progress* (Atlanta, GA: Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1989); U.S. Department of Health and Human Services, publication CDC 89-8411; J. Bartlett et al., "Medical-care Expenditures Attributable to Cigarette Smoking: United States, 1993," *Morbidity and Mortality Weekly Report* 43 (1994).

⁴ Washington State Department of Health, *A Tobacco Prevention and Control Plan for Washington State* (Olympia, WA: Washington State Department of Health, 1999), <<http://www.doh.wa.gov/Tobacco/program/reports.htm>>.

⁵ This is not unusual: 27 state Medicaid programs, as well as Medicare and many private insurers, do not cover smoking cessation. H. H. Schaufli et al., "State Medicaid Coverage for Tobacco Dependence Treatments – United States, 1998 and 2000," *Morbidity and Mortality Weekly Report* 50, no. 44 (November 9, 2001). As of April 13, 2002, the Washington State Medicaid program provides smoking cessation treatment for eligible pregnant women.

Service costs are estimated based on a federally recommended set of smoking cessation guidelines,⁶ while benefits are estimated by drawing on existing research and using Medicaid data sources.

The following issues are addressed:

- ❑ Section I discusses the concepts of cost effectiveness and cost savings as applied to smoking cessation.
- ❑ Section II estimates the costs of smoking cessation treatments.
- ❑ Section III examines the benefits of quitting smoking for Medicaid-eligible adults.
- ❑ Section IV provides overall cost and savings estimates of providing smoking cessation treatment as a Medicaid benefit.

⁶ M. C. Fiore et al., *Treating Tobacco Use and Dependence: A Clinical Practice Guideline* (Rockville, MD: U.S. Department of Health and Human Services, AHRQ Publication No. 00-0032, 2000). The 2000 guidelines update the 1996 guidelines issued by the federal Agency for Health Care Policy and Research, or AHCPR: M. C. Fiore et al., *Smoking Cessation: Clinical Practice Guideline No. 18*, (Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, AHCPR Publication No. 96-0692).

I. SMOKING CESSATION: THE DIFFERENCE BETWEEN COST EFFECTIVENESS AND COST SAVING

As health economist Louise Russell points out, “Clearly, it is better not to suffer a disease than to have it and try to repair the damage afterwards.”⁷ For this reason, preventive health care services, such as smoking cessation, have great appeal—they provide the means to avoid pain, suffering, and treatment costs associated with a disease. However, this does not mean that preventive services are without cost or risk.

A typical cost-benefit analysis would appear to address the issue of whether or not a preventive service should be adopted. In other words, if the dollar value of benefits associated with the service exceeds the costs, the service should be implemented. While it is possible to estimate the dollar cost of providing a service, assigning a dollar value to the benefit, which might be a death averted or a year of life saved, is difficult and controversial.

Therefore, preventive health care policies are often studied using “cost effectiveness” models rather than “cost-benefit” analyses. Cost effectiveness refers to the costs associated with a particular health improvement, such as deaths averted or years of life saved.⁸ This avoids the issue of applying a dollar value to human life while providing a way to evaluate preventive services.

There is a consensus among researchers that smoking cessation programs are among the most cost effective preventive services available. A recent ranking of 50 preventive services lists smoking cessation for adults as second only to vaccination of children in terms of cost effectiveness, with estimated cost per year of life saved equal to \$12,000 or less.⁹ Another group of researchers estimates the cost per year of life saved as ranging from \$1,100 to \$4,500 for smoking cessation programs.¹⁰

Cost effectiveness is not the same as cost savings. The measurement of the change in costs associated with a smoking cessation program depends on two factors. First, the perspective from which new expenditures or savings are being measured is critical. From a societal point of view, total new costs and total new benefits are relevant. However, individuals, governments (in other words, taxpayers), and employers may each bear only a portion of the costs or receive only a portion of the benefits related to a smoking cessation program.

Second, the period of time under consideration is very important. The health care costs associated with smoking occur over an individual’s entire life, as do the health benefits associated with quitting. Therefore, capturing all costs and benefits of smoking cessation

⁷ L. B. Russell, *Is Prevention Better Than Cure?* (Washington, D.C.: Brookings Institution, 1986).

⁸ Partnership for Prevention, *What Policymakers Need to Know about Cost Effectiveness* (Washington, D.C.: Partnership for Prevention, Fall 2001).

⁹ A. B. Coffield et al., “Priorities Among Recommended Clinical Preventive Services,” *American Journal of Preventive Medicine* 21, no. 1 (2001).

¹⁰ J. Cromwell et al., “Cost-effectiveness of the Clinical Practice Recommendations in the AHCPR Guideline for Smoking Cessation,” *Journal of the American Medical Association* 278, no. 21 (December 3, 1997).

may require examining a period of 50 or more years after the start of the program. On the other hand, there is evidence of health care benefits and related reductions in health care expenditures that occur soon after an individual quits smoking.¹¹

This report focuses on the short-term costs and benefits of smoking cessation from the taxpayers' perspective. Specifically, this means considering only those impacts of smoking cessation that increase or decrease Medicaid program expenditures. While long-term costs and benefits are certainly of interest, there is a need to consider the more immediate impacts of smoking cessation relevant to state budget decisions over a two- or four-year period.

The need to consider short-term impacts of smoking cessation is also related to the fact that the length of time for which any individual will retain Medicaid eligibility varies. Employment, change in family structure (marriage, divorce, children leaving home), and relocation to another state can all cause individuals to lose Medicaid eligibility or to disenroll. Eligibility for some Medicaid programs, such as for low-income pregnant women who do not qualify for income assistance, is designed to be time-limited. These timing issues raise concerns that providing smoking cessation services will increase immediate Medicaid program costs but that health care savings associated with quitting may occur far in the future, perhaps after individuals leave Medicaid.

A related issue concerns the debate over whether smoking cessation actually does reduce health care expenditures over an individual's lifetime. Health care costs are reduced by smoking cessation because of the reduced likelihood of cancer and of cardiac and respiratory diseases. However, health care costs may also increase because quitters may live longer and may use other health care services during these additional years of life.¹²

Therefore, to determine whether smoking cessation is cost saving for the Medicaid program, it will be necessary to consider three factors: (1) the costs of providing the smoking cessation services, (2) the reduction in health care expenditures due to the smoking cessation services, and (3) the interaction of individual costs and benefits with overall Medicaid features, such as average length of Medicaid eligibility and the proportion of Medicaid recipients who smoke.

¹¹ J. M. Lightwood and S. A. Glantz, "Short-term Economic and Health Benefits of Smoking Cessation: Myocardial Infarction and Stroke," *Circulation* 96, no. 4 (August 19, 1997); J. M. Lightwood, C. S. Phibbs, and S. A. Glantz, "Short-term Health and Economic Benefits of Smoking Cessation: Low Birth Weight," *Pediatrics* 104, no. 6 (December 1999).

¹² For a discussion of lifetime medical expenditures and smoking, see T. A. Hodgson, "Cigarette Smoking and Lifetime Medical Expenditures," *The Milbank Quarterly* 70, no. 1 (1992); J. J. Barendregt, L. Bonneux, and P. J. van der Maas, "The Health Care Costs of Smoking," *The New England Journal of Medicine* 337, no. 15 (October 9, 1997); G. Picone and F. Sloan, "How Costly are Smokers to Other People? Longitudinal Evidence on the Near Elderly," in *Frontiers in Health Policy Research, Volume 4*, ed. Alan M. Garber (MIT Press, 2001). In addition to changes in direct medical expenditures associated with smoking cessation, some research has also considered changes in pension and social insurance expenses, impacts of secondhand smoke, changes in fire hazards, and tobacco-related tax collections.

Three groups of adult Medicaid recipients are analyzed:

- ❑ **Aged, Blind, or Disabled:** Low income persons eligible for Medicaid due to age, blindness, or a severe disability.
- ❑ **WorkFirst/Family Medical:** Low income persons with children who qualify for the WorkFirst welfare program and the Medicaid Family Medical program.
- ❑ **Pregnant Women:** Women eligible for Medicaid because they are pregnant and have income at or below 185 percent of the federal poverty level. (Very low-income pregnant women qualify for WorkFirst/Family Medical).

To provide a clear picture of the impact of smoking cessation programs, the estimates of costs and benefits make the somewhat artificial assumptions that each person attempting to quit smoking makes only one attempt per year and that smoking cessation services are offered for one year only. This allows a direct comparison of new costs with the benefits generated over a six-year period.

II. COSTS OF PROVIDING SMOKING CESSATION SERVICES

To estimate the costs of providing smoking cessation services to Medicaid enrollees, it is first necessary to identify an effective set of cessation services. Smoking cessation services can range from “cold turkey” (unassisted) to acupuncture. The costs of these services vary from minimal (e.g., self-help publications) to relatively expensive (e.g., intensive individual counseling, pharmaceutical therapy).

Based on an analysis of extensive research on smoking cessation services, the United States Public Health Service (PHS) has developed tobacco cessation guidelines that provide several treatment options ranging from minimal to intensive.¹³ The basic components of these programs are:

- Pretreatment activities;
- Counseling; and
- Pharmaceutical therapies.

Pretreatment activities include screening to identify smokers and advising and motivating smokers to quit. The costs associated with these activities occur even if individuals choose not to participate in smoking cessation activities. For those who decide to make a quit attempt, the PHS guidelines suggest counseling, ranging from minimal physician counseling to intensive counseling from physicians, nurses, and psychologists. In addition to counseling, most individuals attempting to quit should be urged to use pharmaceutical therapy, such as nicotine replacement therapy (e.g., nicotine patches) or the prescription drug Zyban.

More extensive counseling and use of pharmaceutical therapies increase the cost of treatment and the likelihood of successfully quitting. The more successful the treatment, the greater the number of individuals with improvements in health status and the greater the reduction in smoking-related health care expenditures, at least in the short-term.

This section focuses on adult Medicaid recipients using two of the PHS guidelines: minimal counseling (the least expensive treatment), and full counseling with the use of a nicotine nasal spray (the most effective treatment). In addition, two interventions for Medicaid-eligible pregnant women are considered that are related to the PHS guidelines and have been successful.¹⁴

To estimate the costs of these treatments, we utilize research outcomes reported as part of the PHS guidelines and rely heavily on the methodology developed by Cromwell and

¹³ Fiore, *Treating Tobacco Use*.

¹⁴ R. A. Windsor et al., “Health Education for Pregnant Smokers: Its Behavioral Impact and Cost Benefit,” *American Journal of Public Health* 83, no. 2 (February 1993); R. A. Windsor et al., “Effectiveness of Agency for Health Care Policy and Research Clinical Practice Guideline and Patient Education Methods for Pregnant Smokers in Medicaid Maternity Care,” *American Journal of Obstetrics and Gynecology* 182, no. 1 (January 2000).

associates¹⁵ to estimate the costs of the original PHS guidelines. As a starting point, Exhibit 1 contains a description of the type and intensity of services provided under each of these treatments.

Exhibit 1
Components of Selected Smoking Cessation Programs:
Intervention Time in Minutes

Group	Aging, Blind, and Disabled WorkFirst/Family Medical		Pregnant Women	
	Minimal Counseling	Full Counseling	Modified Minimal Counseling (I)	Modified Minimal Counseling (II)
Screening for Tobacco Use Registered Nurse	1	1	1	1
Advice to Quit Registered Nurse Physician	— 1	— 1	— —	1 —
Initial Cessation Counseling Registered Nurse Physician Physician With Nicotine Spray	— 3 6	— 15 18	— — —	1 — —
Follow-up Counseling Physician - 1st Follow-up Visit Physician - 2nd Follow-up Visit	3 —	10 10	— —	5 —
Other Self-Help Manual Motivational Video	Yes —	Yes —	Yes —	Yes Yes

Data from Fiore, Bailey et al.; Windsor, Lowe et al.; Windsor, Woodby et al.

To convert the service information in Exhibit 1 into cost estimates, we must first estimate the per-minute wages of registered nurses and physicians and the costs of self-help and motivational material. The cost of a nurse's time is calculated at \$25 per hour in 2001. The

¹⁵ Cromwell, "Cost-effectiveness."

wage is then doubled to account for overhead expenses, giving a total of \$0.83 per one-minute screening.¹⁶

The PHS guidelines recommend that screening occur regularly. Using the assumption that this requires screening at each physician office visit and each hospital admission,¹⁷ the per-person cost of screening for tobacco use is approximately \$3. If smoking cessation services were offered to Medicaid recipients under the PHS guidelines, this cost would be incurred for all recipients whether they smoke or not.

To estimate physician cost per minute, we use the 2001 Medicaid fee schedule for Washington State.¹⁸ Using a standard 10-minute office visit for a new patient and a standard 5-minute office visit for an established patient, per-minute physician costs range from \$1.98 to \$2.34. Each smoker is advised to quit (or provided motivation to remain abstinent) by a physician at each office visit and hospital admission. Those persons attempting to quit will be given one additional minute of motivational assistance twice per year, while persons refusing to quit will be given one additional minute of advice to quit at each office visit or hospital admission. This yields an estimated average cost of \$13 per smoker per year.

Initial and follow-up counseling estimates use the same per minute costs estimated above for physicians and nurses. In addition, an estimated \$2 for self-help manuals and \$5 for motivational videos are added to costs as indicated in Exhibit 1.¹⁹

The costs for these selected treatments are displayed in Exhibit 2. As noted, the cost estimates assume each person attempting to quit smoking makes only one attempt per year and that smoking cessation services are offered for one year only.

To complete the information needed to estimate total costs in Exhibit 2, data are needed on overall caseloads, number of smokers, and number of smokers expected to make a quit attempt and receive treatment. The "All Recipients" figure for each Medicaid group is the July 2001 adult caseload for each program. Based on Washington State survey data, the number of smokers in the Aged, Blind, Disabled and WorkFirst/Family Medical programs is

¹⁶ U.S. Department of Labor, Bureau of Labor Statistics, <<http://www.bls.gov/data/home.htm>>. Based on the median nursing wage in Washington (\$24 per hour in 2000) updated to 2001 dollars using the consumer price index.

¹⁷ Cromwell et al. use survey data to estimate an average of 3.11 physician visits and 0.149 hospital admissions per year for adults in the United States. We use the same values here, although some Medicaid populations, such as the Aged, Blind, and Disabled group, are likely to have above-average rates of health care use.

¹⁸ The Washington State Medicaid fee schedule uses the Resource-Based Relative Value Scale (RBRVS) developed for the Medicare program. This system assigns "relative value units" to each physician procedure based on effort and skill involved. A dollar amount per relative value unit (\$21.27 for Washington State Medicaid in 2001) is designated; reimbursement equals the number of relative value units multiplied by the per unit fee. For more on RBRVS, see W. C. Hsiao et al., "Estimating Physicians' Work for a Resource-Based Relative-Value Scale," *New England Journal of Medicine* 319, no. 13 (September 29, 1988).

¹⁹ Costs assumed in Cromwell, "Cost-effectiveness," and Windsor, "Effectiveness of Agency."

assumed to equal 33 percent of each group,²⁰ while 21 percent of pregnant women are assumed to smoke during pregnancy.²¹

Although Cromwell and associates assume 75 percent of all smokers will make a quit attempt, research on smoking cessation among Medicaid recipients suggests that quit attempts will be less frequent. Therefore, we assume that 52 percent of smokers in the Medicaid Aged, Blind, and Disabled group and the WorkFirst/Family Medical group and 59 percent in the Pregnant Women group who smoke would be willing to make a quit attempt.²²

The final cost component is an estimate of the cost of nicotine nasal spray for the “Full Counseling with Nicotine Nasal Spray” treatment option. The costs of the nicotine nasal spray depend upon how long a quit attempt lasts. Based on PHS guidelines, a full treatment course would average 11 to 12 doses per day for 14 weeks. At \$42.50 per bottle of 100 doses,²³ this adds \$464 to treatment costs. However, many quit attempts will not last the full 14 weeks.

Adjusting the smoking cessation results reported in the PHS guidelines concerning nicotine nasal spray to account for differences in research samples compared with the entire population²⁴ yields a successful “quit rate” of nearly 20 percent. Accounting for lower success rates among Medicaid recipients²⁵ reduces this further to 9 percent. Therefore, the costs estimates assume that 9 percent²⁶ of quitters under the “Full Counseling with Nicotine Nasal Spray” option use the spray for the full 14 week course, while the remaining 91

²⁰ Washington State Department of Health, *Tobacco and Health*. Survey data from the 1997 Behavioral Risk Factor Surveillance System indicate a smoking rate of 32.7 percent for persons with income under \$10,000 in Washington, which exceeds income eligibility standards for the Medicaid Aged, Blind, and Disabled and WorkFirst/Family Medical programs.

²¹ Washington State Department of Health Pregnancy Risk Assessment Monitoring System (PRAMS), <<http://www.doh.wa.gov/cfh/PRAMS/default.htm>> provides average rates of smoking during pregnancy during 1994–96 for Medicaid-eligible women receiving a welfare grant (37.8 percent) and for those with incomes up to 185 percent of the federal poverty level who do not receive a grant but are Medicaid eligible (16.4 percent). Smoking rates for 1994–96 (16.4 percent) and 1999 (14.4 percent) are available for all pregnant women in Washington from T. J. Mathews, “Smoking During Pregnancy in the 1990s,” in *National Vital Statistics Reports* 48, no. 7 (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, August 28, 2001). Assuming that the relationship of smokers in the two Medicaid groups to all pregnant women remains the same, we estimate a 1999 smoking rate of 33.2 percent for pregnant women receiving a welfare grant and 14.2 for Medicaid-eligible pregnant women not receiving a welfare grant, for a weighted average smoking rate of 20.9 percent for pregnant, Medicaid-eligible women in Washington.

²² W. C. Wadland, B. Soffelmayr, and K. Ives, “Enhancing Smoking Cessation of Low-Income Smokers in Managed Care,” *Journal of Family Practice* 50, no. 2 (February 2001); R. A. Windsor et al., “Effectiveness of Agency.”

²³ Price and quantity information provided by Siri Childs and Tom Zuchlewski, Washington State Department of Social and Health Services, Medical Assistance Administration; dosage information from Fiore, *Treating Tobacco Use*.

²⁴ Cromwell, “Cost-effectiveness.”

²⁵ Wadland, “Enhancing Smoking Cessation.”

²⁶ Following Cromwell and associates, we assume that 45 percent of all quitters relapse after five months, which ultimately reduces this successful quit rate to 5.1 percent.

percent of quitters relapse after an average of four weeks.²⁷ For these relapsing quitters, the cost of the nicotine nasal spray is \$179.

Using the Medicaid Aged, Blind, and Disabled group as an example, the cost estimate in Exhibit 2 starts with the July 2001 caseload of 163,200 adult recipients. Under either treatment, *all* group members would be screened for tobacco use at an annual cost of \$3 per person. The 33 percent of adults (53,400) identified as smokers would then receive brief advice and motivation to quit from physicians at a cost of \$13 per smoker.

Once smokers have been identified and advised to quit, 52 percent (27,100) would then be expected to make a quit attempt. The low-cost “Minimal Counseling, No Pharmaceutical Therapy” treatment costs an additional \$15 per quit attempt while the more intensive “Full Counseling with Nicotine Nasal Spray” costs \$263 to \$549 per quit attempt, depending on whether the individual relapses before completing the nasal spray treatment. Exhibit 2 also displays similar information for the Medicaid WorkFirst/Family Medical group and the Medicaid pregnant women group.

Exhibit 2
Total Estimated Washington State Medicaid Costs:
Selected Smoking Cessation Programs

Aged, Blind, Disabled Program				
Service	Group Affected	Number of Individuals	Per-Person Cost	Total Cost
Costs Common to All Treatments				
Screening	All Recipients	163,200	\$3	\$490,000
Advice, Motivation (Physician)	All Smokers	53,400	\$13	\$694,000
Treatment Costs				
Minimal Counseling, No Pharmaceutical Therapy	Quit Attempts	27,800	\$15	\$417,000
Full Counseling, Nicotine Nasal Spray	Quit Attempts	27,800	\$549 (\$263)	\$8,050,000
Overall Treatment Costs				
Minimal Counseling, No Pharmaceutical Therapy				\$1,601,000
Full Counseling, Nicotine Nasal Spray				\$9,234,000

Note: All quit attempts are assumed to last long enough to complete counseling components, but unsuccessful quitters do not complete a full course of the nasal spray and have lower costs than successful quitters. (For sources, see end of exhibit.)

²⁷ The four-week relapse average is based on an assumption in Cromwell, “Cost-effectiveness.”

Exhibit 2 (continued)
**Total Estimated Washington State Medicaid Costs:
Selected Smoking Cessation Programs**

WorkFirst/Family Medical Program				
Service	Group Affected	Number of Individuals	Per-Person Cost	Total Cost
Costs Common to All Treatments				
Screening	All Recipients	67,600	\$3	\$203,000
Advice, Motivation (Physician)	All Smokers	22,100	\$13	\$287,000
Treatment Costs				
Minimal Counseling, No Pharmaceutical Therapy	Quit Attempts	11,500	\$15	\$173,000
Full Counseling, Nicotine Nasal Spray	Quit Attempts	11,500	\$549 (\$263)	\$3,337,000
Overall Treatment Costs				
Minimal Counseling, No Pharmaceutical Therapy				\$663,000
Full Counseling, Nicotine Nasal Spray				\$3,827,000
Pregnant Women Program				
Costs Common to All Treatments				
Screening	All Recipients	35,500	\$3	\$107,000
Additional Cost for Modified Brief Counseling II				
Advice, Motivation (Nurse)	All Smokers	7,400	\$3	\$22,000
Treatment Costs				
Modified Brief Counseling I	Quit Attempts	4,400	\$11	\$48,000
Modified Brief Counseling II	Quit Attempts	4,400	\$13	\$57,000
Overall Treatment Costs				
Modified Brief Counseling I				\$155,000
Modified Brief Counseling II				\$186,000

Note: All quit attempts are assumed to last long enough to complete counseling components, but unsuccessful quitters do not complete a full course of the nasal spray and have lower costs than successful quitters.

Sources: Caseload data: Washington State Office of Financial Management Medicaid SPAN file (WorkFirst Family Medical); Washington State Caseload Forecast Council, <<http://www.wa.gov/cfc>>. Number of smokers: Washington State Department of Health: Behavioral Risk Factor Surveillance System, Pregnancy Risk Assessment System; Matthews, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Quit attempts: Wadland, Soffelmayr, and Ives; Windsor, et al. Screening, advice, and counseling costs: Cromwell et al.; U.S. Department of Labor, Bureau of Labor Statistics; Washington State Department of Social and Health Services, Medical Assistance Administration. Nicotine nasal spray costs: Washington State Department of Social and Health Services, Medical Assistance Administration; Fiore et al.

III. BENEFITS OF SMOKING CESSATION SERVICES

The potential benefits from smoking cessation occur over an extended period of time. However, because any expansion of Medicaid services to include smoking cessation would incur new and immediate public expenditures, this section focuses on short-term benefits.

Recent research identifies two types of short-term benefits associated with smoking cessation. For all persons, the risk of heart attack and stroke declines rapidly once they stop smoking.²⁸ This translates into fewer hospitalizations, even one year after quitting, and therefore reduced health care expenditures in the short-term.

For pregnant women, smoking is strongly related to low birth weight infants for whom the risk of illness and death is increased relative to normal birth weight babies.²⁹ Therefore, because smoking cessation among pregnant women leads to fewer low birth weight infants, it reduces health care costs for newborns and infants in the short-term.³⁰ In addition, those women who do not resume smoking after pregnancy benefit from the same reduction in the risk of heart attack and stroke as do other adult quitters.

Exhibit 3 displays the estimated total health care expenditures by Medicaid program that would be avoided *per successful quitter* over a six-year period, assuming smoking cessation services were provided in the initial year of the first biennium. Avoided costs associated with the reduced risk of heart attack and stroke are based on the research of Lightwood and Glantz.³¹ From a meta-analysis of studies examining smoking-related risks of heart attack and stroke, they estimate the reduction in the probability of these events from one to seven years after smoking cessation. Using this information and estimated treatment costs, they then estimate the average health care costs avoided by quitting smoking. The health care savings for males and non-pregnant females in Exhibit 3 update Lightwood and Glantz's figures to 2001 to account for changes in health care inflation.

The estimates in Exhibit 3 for pregnant women are based on several sources and modified with Washington data. To estimate the average costs of maternal smoking in a child's first year of life, we use a methodology developed by Lightwood, Phibbs, and Glantz³² to estimate the increased probability (excess risk) of smokers having a low birth weight delivery and the difference in average costs between low and normal birth weight infants. In other words, the methodology estimates the number of low birth weight deliveries that would

²⁸ Lightwood, "Myocardial Infarction and Stroke."

²⁹ U.S. Department of Health and Human Services, *Women and Smoking: A Report of the Surgeon General* (Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2001).

³⁰ See Lightwood, "Low Birth Weight"; R.A. Walsh et al., "A Smoking Cessation Program at a Public Antenatal Clinic," *American Journal of Public Health* 87, no. 7 (July 1997); P. Dolan-Mullen, G. Ramirez, and J. Y. Groff, "Obstetrics: A Meta-Analysis of Randomized Trials of Prenatal Smoking Cessation Interventions," *American Journal of Obstetrics and Gynecology* 171, no. 5 (November 1994).

³¹ The estimates for the Aged, Blind, and Disabled and WorkFirst/Family Medical programs apply the proportion of males and females in each program to the gender-specific reductions in health care costs in Lightwood "Myocardial Infarction and Stroke."

³² Lightwood, "Low Birth Weight."

be prevented if pregnant women did not smoke. To make these estimates more relevant to Washington’s Medicaid population, we use data on maternal smoking among low-income women in Washington³³ and data on the cost and likelihood of low birth weight deliveries among Medicaid-covered deliveries in Washington.³⁴ These cost estimates are then updated to 2001 to account for changes in medical inflation.

Exhibit 3
Estimated Medicaid Savings per Successful Quitter:
Selected Smoking Cessation Programs

Medicaid Program	Biennium 1	Biennium 2	Biennium 3
Aged, Blind, Disabled	\$209	\$737	\$1,350
WorkFirst/Family Medical	\$134	\$429	\$733
Pregnant Women	\$490	\$243	\$138

Sources: Lightwood and Glantz; Lightwood, Phibbs and Glantz; First Steps Data Base, Washington State Department of Social and Health Services, Research and Data Analysis; Lewit et al.; US Congress, Office of Technology Assessment

There are additional, although much smaller, health care costs that would be avoided over the remainder of a low birth weight child’s life. Using estimates from previous research³⁵ and applying the excess risk of having a low birth weight delivery due to smoking gives an estimate of these additional avoided costs due to smoking cessation. These estimates are also updated to account for medical inflation and are limited to health care costs only—additional costs associated with child care and education are excluded.

Relative to smokers, the risk of stroke and heart attack continues to decline over time for successful quitters.³⁶ Therefore, the average savings per quitter associated with the reduction in heart attacks and strokes grows over time. The growth in savings is partially offset by the tendency for individuals to leave the Medicaid program. This does not affect the savings per quitter but does affect the amount of savings per quitter captured by the Medicaid program.

³³ See footnote 21 on data sources and methods related to smoking rates for low-income pregnant women in Washington.

³⁴ Data on low birth weight infants born to Medicaid-eligible women in Washington were provided by Laurie Cawthon from the First Steps Database, developed and maintained by Research and Data Analysis, Department of Social and Health Services; the database links birth and death certificate data to Medicaid eligibility and maternity claims data. For each pregnant woman who quits smoking, an estimated \$637 in costs would be avoided based on an estimated 3.6 percent excess risk of a low birth weight infant due to smoking among Medicaid women in Washington.

³⁵ E. M. Lewit et al., “The Direct Cost of Low Birth Weight,” *The Future of Children* 5, no. 1 (Spring 1995); U.S. Congress, *Healthy Children: Investing in the Future*, OTA-A-345 (Washington, D.C.: U.S. Congress, Office of Technology Assessment, February 1988).

³⁶ Lightwood, “Myocardial Infarction and Stroke.”

Savings associated with pregnant women would primarily occur in the first year of a newborn's life. When mothers quit smoking, there would also be two additional but smaller sources of health care savings over time. First are the ongoing savings that occur over the remainder of a child's life, and second are any savings associated with reduced risk of heart attack and stroke. As with the other groups, these future reductions in health care costs are captured by Medicaid only to the extent that individuals remain eligible for Medicaid. This point is discussed further in Section IV.

IV. COMPARING COSTS AND BENEFITS OF SMOKING CESSATION

Individual costs and benefits associated with smoking cessation provide only part of the picture in determining the impacts of a Medicaid smoking cessation program. Total costs would depend on the number of Medicaid recipients who are smokers and the number who would take advantage of smoking cessation services. Total benefits would depend on how many attempts to quit are successful and how long quitters remain eligible for Medicaid. Since much of this information is unavailable until after a smoking cessation program has been implemented, the estimates of total costs and benefits in Exhibits 2 and 3 are based on survey data, previous research on Medicaid smoking cessation programs, and Medicaid eligibility information.³⁷

The PHS guidelines for smoking cessation present an array of services that differ in terms of cost and effectiveness. Translating the costs and effectiveness rates from a general population to a Medicaid population also adds to the potential confusion of identifying costs and benefits of implementing a smoking cessation program.

We would expect that both the costs of new smoking cessation services and the benefits associated with quitting would be phased in over the first year of a smoking cessation program. Further complicating matters, individuals who make an unsuccessful quit attempt may subsequently choose to make another attempt. Over time, smokers, non-smokers, and quitters would leave and enter the Medicaid program. One way to reduce this confusion is to assume that each person attempting to quit smoking makes only one attempt per year and that smoking cessation services are offered for one year only.

Exhibit 4 shows the estimated costs and benefits, at the individual level, of two smoking cessation treatments for each Medicaid group of interest. Costs are equal to total Medicaid smoking cessation expenses divided by the number of attempts to quit smoking. This includes the costs of screening provided to all individuals and advice to stop smoking to those smokers who do not make a quit attempt, as well as all services provided to those attempting to quit smoking (see Exhibit 2). Benefits are equal to the average Medicaid expenditures (see Exhibit 3) that would be avoided if a smoker successfully quits.

Treatment Effectiveness

The research on smoking cessation summarized in the PHS guidelines indicates that more intensive counseling and the addition of certain pharmaceutical therapies increases the fraction of treated smokers who successfully quit. Because more intensive treatment is more expensive, the smoking cessation tradeoff is between cost and effectiveness. This tradeoff is demonstrated in Exhibit 4.

³⁷ Washington State Department of Health, PRAMS; Wadland, "Enhancing Smoking Cessation"; Washington State Office of Financial Management, Medicaid SPAN files.

Exhibit 4
Estimated Costs and Benefits: Selected Smoking Cessation Programs

	Medicaid Costs per Quit Attempt (1)	Estimated % Successful Quit Attempts (2)	Biennium 1	Biennium 2	Biennium 3	Present Value	Estimated Benefits Per Quit Attempt (4)	Benefit/Cost Ratio (5)
<i>Aged, Blind, Disabled Program: Estimated Medicaid Costs Avoided Per Successful Quitter (3)</i>								
Minimal Counseling, No Pharmaceutical Therapy	\$58	0.4%	\$209	\$737	\$1,350	\$2,067	\$7.61	\$0.13
Full Counseling, Nicotine Nasal Spray	\$332	5.1%	\$209	\$737	\$1,350	\$2,067	\$106.38	\$0.32
<i>WorkFirst/Family Medical Program: Estimated Medicaid Costs Avoided Per Successful Quitter</i>								
Minimal Counseling, No Pharmaceutical Therapy	\$58	0.4%	\$134	\$429	\$733	\$1,170	\$4.30	\$0.07
Full Counseling, Nicotine Nasal Spray	\$332	5.1%	\$134	\$429	\$733	\$1,170	\$60.20	\$0.18
<i>Pregnant Women Program: Estimated Medicaid Costs Avoided Per Successful Quitter</i>								
Modified Brief Counseling I	\$35	2%	\$490	\$243	\$138	\$820	\$16.39	\$0.47
Modified Brief Counseling II	\$42	3%	\$490	\$243	\$138	\$820	\$24.24	\$0.57

Table notes:

(1) See Table 2 notes; costs per quit attempt include screening costs for all group members and advice costs for all smokers.

(2) Cromwell et al.; Fiore et al.; Wadland, Soffelmayr, and Ives; Windsor et al.

(3) See Table 3 notes; present value calculation based on a 3 percent discount rate.

(4) Equals percent of Successful Quit Attempts * Present Value of Avoided Costs per Successful Quit Attempt.

(5) Equals Estimated Benefits per Quit Attempt / Costs per Quit Attempt.

The “Minimal Counseling, No Pharmaceutical Therapy” treatment is relatively inexpensive at \$58 per quit attempt,³⁸ although the “quit rate” is very low: 0.4 percent³⁹ of all persons attempting to quit. At \$332 per quit attempt, the “Full Counseling with Nicotine Nasal Spray” is over five times more expensive because of increased counseling time by physicians, nurses, and psychologists and the cost of the nicotine spray. However, full counseling is nearly 13 times more effective in enabling smokers to successfully quit (5.1 percent compared with 0.4 percent).

Avoided Medicaid Costs

Differences among the three groups in avoided Medicaid costs per quitter depend on the fraction of the three-biennium analysis period in which individuals remain eligible for Medicaid. Persons in the Aged, Blind and Disabled group generally have substantial health care problems and are likely to remain enrolled in Medicaid for an extended period of time.⁴⁰ This means that the Medicaid program will receive most of the benefits of lower future health care costs when members of this group quit smoking.

On the other hand, members of the WorkFirst/Family Medical group will have (on average) shorter periods of Medicaid eligibility due to changes in employment status and household composition. More of the health care costs that are avoided when a member of this group quits smoking will be avoided when the individual is not eligible for Medicaid. In other words, non-Medicaid insurers and health care providers will capture some of the avoided costs. For this reason, the three-biennium total of avoided Medicaid costs for quitters in the Aged, Blind, and Disabled group (\$2,067 in present value terms) are higher than for quitters in the WorkFirst/Family Medical group (\$1,170).

For pregnant women, the Medicaid portion of avoided health care costs has two components. First, health care costs associated with low birth weight infants are avoided when pregnant women quit smoking. For women in this group, Medicaid pays all costs associated with childbirth, and children in households with incomes below 200 percent of the federal poverty level are eligible for Medicaid. Therefore, it is reasonable to assume that, when a pregnant woman quits smoking, all of the avoided costs associated with smoking and low birth weight infants (\$647 in present value terms) are avoided Medicaid costs.

³⁸ The cost per quit attempt includes the costs of providing services to persons who do not smoke and smokers who do not attempt to quit as well as providing services to smokers who do attempt to quit.

³⁹ See the discussion of quit rates in Section II. Quit rates are based on the meta-analysis contained in the PHS guidelines, modified as suggested by Cromwell and associates.

⁴⁰ Based on historic Washington State Medicaid enrollment data, the average individual in the Aged, Blind, and Disabled group is estimated to retain Medicaid enrollment in 54 months of any six-year period, while the average TANF adult is expected to retain Medicaid enrollment in 32 months of any six-year period. Because the TANF estimate is based in part on experience under the previous AFDC welfare program, this number may be overstated.

In addition, 35 percent of women⁴¹ in this group qualify for the Medicaid WorkFirst/Family Medical program and remain eligible for Medicaid after childbirth. If these women were to quit smoking and not resume after pregnancy, they would reduce their own risk of heart attack and stroke, leading to avoided Medicaid costs similar to those in the WorkFirst/Family Medical group. However, survey data⁴² suggest that a substantial number of pregnant women who quit smoking during pregnancy resume smoking after giving birth. Therefore, because only a fraction of the women in this group would remain Medicaid-eligible after pregnancy and the relapse rate is quite high, avoided Medicaid costs associated with heart attack and stroke would average \$173 (in present value terms)⁴³ per woman who quits smoking during pregnancy.

Benefit-Cost Ratio

The Medicaid expenditures avoided *per successful quitter* over a one- to two-biennium period exceed the new Medicaid costs per quit attempt for each of the three groups. However, the rate of successful quitting is quite low, ranging from 0.4 percent to 5.1 percent of all persons making a quit attempt. As a result, Medicaid smoking cessation costs are greater than the avoided health care expenditures for all three groups.

This is observed most clearly by comparing person-level benefits and costs with a benefit-cost ratio. The benefit part of the ratio is the average Medicaid costs avoided over a three-biennium period from a quit attempt. In other words, benefits equal the avoided Medicaid costs from successfully quitting multiplied by the percentage of quit attempts that are actually successful. The cost part of the ratio is the total costs of providing smoking cessation treatment per quit attempt.

The benefit-cost ratio is then the avoided Medicaid expenditures for each Medicaid dollar spent on smoking cessation. Examining the results in Exhibit 4, we see that the benefits to the Medicaid program range from 7 cents to 57 cents per dollar spent on smoking cessation, depending on the group and the treatment option. This indicates that, while there are Medicaid health care expenditures that can be avoided by providing smoking cessation treatment, the costs of the treatment exceed those avoided costs.

Financing Considerations

The Medicaid benefits and costs associated with smoking cessation in Exhibits 2, 3, and 4 are based on what Medicaid would pay or avoid paying under a “fee for service” financing

⁴¹ From the First Steps Database, developed and maintained by Research and Data Analysis, Department of Social and Health Services; the database links birth and death certificate data to Medicaid eligibility and maternity claims data. The remaining 65 percent of women in this group are eligible for Medicaid only during and immediately after pregnancy.

⁴² Washington State Department of Health Pregnancy Risk Assessment Monitoring System, for women eligible for welfare and Medicaid in 1994–96, which corresponds to the current Medicaid WorkFirst/Family Medical program; nearly 51 percent of women who quit smoking during pregnancy resumed smoking after giving birth.

⁴³ Based on Lightwood, “Myocardial Infarction and Stroke.”

mechanism. In other words, the estimates represent what physicians, hospitals, and other health care providers would hypothetically bill Medicaid for smoking cessation services and what they would have billed for other health care services if smokers had not quit.

These types of estimates make sense when discussing the Aged, Blind, and Disabled group, since they receive health care on a fee-for-service basis. However, many Medicaid recipients receive health care through a managed care organization. Under managed care, Medicaid enters into an annual contract that sets a fixed monthly fee to be paid to an insurer for each Medicaid enrollee, regardless of the level of health care utilization.

If smoking cessation were to be covered under managed care, Medicaid and managed care organizations would have to negotiate how this should alter the monthly per-person fee. Because managed care contracts are annual and renewal is not guaranteed, managed care organizations may look at the costs and benefits of smoking cessation from a one-year perspective, where all of the costs are incurred but only a fraction of the savings are realized.

V. CONCLUSION

The adoption of a Medicaid smoking cessation treatment program would cost more than it saves, regardless of which Medicaid group is considered, when viewed from the standpoint of short-term impacts. The reduction in preventable deaths, increase in years of life, and potential reduction in lifetime health care expenditures attributable to smoking cessation are all desirable outcomes. However, when smoking cessation treatments are provided to Medicaid enrollees, all of the costs—but only a fraction of these savings—accrue to the Medicaid program. This is especially true when considered from the perspective of a biennial budget. The bottom line is that smoking cessation programs may be able to achieve long-term social benefits, but the programs do not appear to be able to save more than they cost for the short-term state budget.

Options for Reducing Costs

There are two general approaches that could be taken to reduce state Medicaid costs of smoking cessation programs. The first would be to make greater use of the existing Department of Health (DOH) tobacco prevention and control program funded through the national tobacco settlement. For example, the Medicaid program might incorporate patient screening and advice to quit into physician office visits, as suggested by the PHS guidelines, but then refer those smokers willing to make a quit attempt to the DOH “quit line.”⁴⁴ Using the pregnant women group as an example, this could reduce costs by approximately \$50,000 per year, although it may require some changes to the DOH program and could reduce access for non-Medicaid smokers attempting to quit.

A second approach would be to eliminate the screening and advice-to-quit components from any Medicaid smoking cessation program. For cessation programs that do not have pharmaceutical therapies, these components account for as much as two-thirds of smoking cessation costs.

However, Medicaid health care expenditures are reduced only to the extent that smokers successfully quit. Therefore, some type of informational campaign, which could range from signs posted in Community Service Offices to letters mailed to Medicaid recipients, would be necessary. Regardless of the approach taken, it is unlikely that as many smokers will be motivated to make a quit attempt as under a program with screening and advice to quit from health care providers.⁴⁵ This means that there will be fewer successful quitters, resulting in smaller reductions in health care expenditures. In the worst case, this change could result in only the smokers most motivated to quit making a quit attempt. Since some of these more motivated individuals are likely to successfully quit even without a cessation program, the net impact on Medicaid expenditures could be reduced further.

⁴⁴ Information on the DOH quit line can be found at <<http://www.doh.wa.gov/Tobacco/quit/factquitA.htm>>.

⁴⁵ The meta-analysis in Fiore indicates that both of these components have a strong impact on the likelihood of quitting.

Margin of Error in Cost and Benefit Estimates

As with any analysis using information from surveys and other research, the estimated costs and savings presented in this report are approximate. When this is true, sensitivity analyses that examine costs and savings under alternative, but reasonable, scenarios are often worth investigating. For two of the three Medicaid groups, the large difference between cost and savings estimates suggests that alternative scenarios are unlikely to provide evidence of possible net savings. However, the costs and savings are much closer for providing smoking cessation services to pregnant women. The appendix presents alternative scenarios, some of which indicate that Medicaid smoking cessation services could break-even or provide small net savings for pregnant women, while others find a somewhat higher net cost.

Impact of Higher Tobacco Taxes

With the passage of Initiative 773, Washington cigarette taxes increased by \$0.60 per pack as of January 1, 2002. Research shows that higher cigarette prices reduce the number of smokers and the number of cigarettes smoked per smoker. These findings hold true for youths and adults in general⁴⁶ and specifically for low-income persons⁴⁷ and pregnant women.⁴⁸ To the extent that these new taxes cause smokers to quit, offering smoking cessation services to Medicaid recipients may result in fewer quit attempts or a lower rate of successful quitting than have been assumed in this report.

While the cost-benefit estimates in this report must be viewed as approximate, the conclusion remains valid: although providing smoking cessation services to Medicaid recipients would increase expected years of life and eventually decrease overall health care expenditures, it would not reduce Medicaid expenditures enough to offset the costs of the cessation programs, particularly in the short-term.

⁴⁶ For example, see Congressional Budget Office, *The Proposed Settlement: Issues From a Federal Perspective* (Washington, D.C.: Congressional Budget Office, April 1998).

⁴⁷ M. C. Farelly and J. W. Bray, "Response to Increases in Cigarette Prices by Race/Ethnicity, Income, and Age Groups—United States," *Morbidity & Mortality Weekly Report* 47, no. 29 (July 31, 1998).

⁴⁸ W. N. Evans and J. S. Ringel, "Can Higher Cigarette Taxes Improve Birth Outcomes?" (University of Maryland: Department of Economics, working paper, undated).

APPENDIX: SENSITIVITY ANALYSIS OF ESTIMATES

A degree of uncertainty exists with some of the factors used to estimate costs and savings. To test the sensitivity of cost and savings estimates to changes in assumptions about the number of smokers in a group, success rates of treatment, and other key parameters, we have estimated costs and savings under several alternate scenarios for the Pregnant Women group.

Given the large disparity between costs and savings for the other two groups (Aged, Blind, and Disabled and WorkFirst/Family Medical), no reasonable change in assumptions would alter the qualitative conclusion that the net impact of smoking cessation increases Medicaid expenditures. However, the costs and savings for pregnant women appear to be close enough to warrant further investigation.

Exhibit A-1 presents a number of alternative estimates of the costs and benefits of smoking cessation under changes to key smoking-related parameters. For example, based on the experience of recent research on smoking cessation among Medicaid-eligible pregnant women,⁴⁹ the estimates presented in Exhibit 4 of the report assume 59 percent of pregnant women who smoke make an attempt to quit. If the percentage of smokers willing to make a quit attempt is actually higher, this has impacts on both costs and benefits.

When more individuals receive smoking cessation treatment, total Medicaid costs increase. However, the cost per quit attempt actually goes down. This results from spreading the costs of two activities, screening for tobacco use and advising smokers to quit, over a larger number of quit attempts. The benefits (avoided Medicaid costs) per successful quitter remain the same, but, because more individuals are attempting to quit, there are more successes. Therefore, total Medicaid benefits increase. The net impact is to increase benefits more than costs. As indicated in Exhibit A-1, the ratio of benefits to costs rises by 11 cents if we assume that the fraction of smokers attempting to quit increases to 75 percent.

As the above example points out, changes in some assumptions may have the effect of changing both the estimated costs and benefits of smoking cessation. Other changes impact only costs (such as changes to the assumed per-person treatment costs) or only savings (such as changes to the excess risk of a low birth weight delivery due to smoking). Because many of these factors interact, the combined impact of several changes will not equal the sum of those changes individually.

The sensitivity analyses in Exhibit A-1 suggest that reasonable changes to some parameters could move the ratio of benefits to costs much closer to or much further from the break-even value of 1. In other words, a more optimistic but not unreasonable set of assumptions could lead to the conclusion that smoking cessation treatment for pregnant women has roughly equal costs and benefits to the Medicaid program.

⁴⁹ Windsor, "Effectiveness of Agency for Health Care Policy."

However, as the analysis in this report has been designed, “break-even” means that Medicaid treatment costs in year one equal the benefits (avoided Medicaid costs, in present value terms) over six years. If smoking cessation treatment were to be offered as a Medicaid benefit, this would mean that each year new costs would be incurred, with the associated avoided costs accumulating over the following six years. Even over a six-year period, this would mean total Medicaid costs would exceed total Medicaid benefits.

Exhibit A-1

**Sensitivity Analysis: Costs and Benefits of Cessation Treatment for Pregnant Women
Treatment Option: Modified Brief Counseling (II)**

	Medicaid Costs Per Quit Attempt	Percent of Successful Quit Attempts	Estimated Benefits Per Successful Quitter	Estimated Benefits Per Quit Attempt	Benefit/Cost Ratio	Change in Benefit/Cost Ratio
Baseline Estimates	\$39	3.0%	\$820	\$24	\$0.62	N/A
Increase Basic Treatment Costs by 20%	\$47	3.0%	\$820	\$24	\$0.52	\$(0.10)
Decrease Basic Treatment Costs by 20%	\$31	3.0%	\$820	\$24	\$0.78	\$0.16
Increase Quit Attempts to 75%	\$33	3.0%	\$820	\$24	\$0.73	\$0.11
Decrease Quit Attempts to 45%	\$47	3.0%	\$820	\$24	\$0.52	\$(0.11)
Increase Success Rate by 25%	\$39	3.7%	\$820	\$30	\$0.78	\$0.16
Decrease Success Rate by 25%	\$39	2.2%	\$820	\$18	\$0.47	\$(0.16)
Increase Excess Risk by 25%	\$39	3.0%	970	\$29	\$0.74	\$0.11
Decrease Excess Risk by 25%	\$39	3.0%	669	\$20	\$0.51	\$(0.11)

NOTE: Dollar amounts in 2001 dollars