

# Cost Savings Associated with Smoking Cessation for Low-Income Pregnant Women

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## ABSTRACT

Despite the many health risks associated with smoking during pregnancy, it remains a chief public health concern with a high prevalence evident at the local level. In Wisconsin, the *First Breath* program was developed to help pregnant smokers quit and served 424 women during its pilot phase in 2001 and 2002. This cost savings analysis included claims associated with *First Breath* enrollees who were identified within the Wisconsin Medicaid data warehouse. This analysis allowed for a comparison of medical claims for women who quit smoking through the *First Breath* program versus those who continued to smoke. Three billing categories were included in this analysis: mother's maternity admissions (maternal DRG), inpatient neonatal care (neonate DRG), and infant's medical costs for the first 6 months of life. Average Medicaid savings per *First Breath* enrollee who quit smoking was \$1274. Applying this savings to the actual number of women who quit smoking during the pilot study gives a total savings of \$137,592 for the Medicaid program. Considering the maximum Medicaid cost of providing cessation services to all *First Breath* participants, the return on investment associated with the *First Breath* program is 9 to 1.

## INTRODUCTION

Evidence continues to validate the multitude of unfavorable health outcomes caused by tobacco use during and after pregnancy. Women who smoke have a 1.3 times greater risk for spontaneous abortion, as high as a

1.8 times greater risk for preterm delivery, a 2.7 times greater risk for a small for gestational age (SGA) baby and a 2 times greater risk of placenta previa.<sup>1</sup> Prenatal maternal smoking increases the risk of stillbirth by 40%-60% and fetal mortality rates are 35% higher in smokers compared to non-smokers.<sup>2,3</sup>

Women who continue to smoke after giving birth continue to put their child at risk. Research suggests that children exposed to environmental tobacco smoke (ETS) have an increased risk for upper and lower respiratory infection, incidence of otitis media with effusion, incidence of sudden infant death syndrome (SIDS), and incidence of asthma exacerbations.<sup>4</sup>

In spite of these health consequences, 11.4% of pregnant women nationwide smoke and 15.9% of pregnant women in Wisconsin smoke.<sup>5,6</sup> It is well known that maternal age, ethnicity, and education are strongly correlated with smoking during pregnancy.<sup>7</sup> Socioeconomic disparities in Wisconsin also exist pertaining to prenatal smoking. In 2002, 24.5% of Wisconsin women enrolled in WIC (Special Supplementary Nutrition Program for Women, Infants, and Children) reported smoking.<sup>8</sup> In addition, of the 3084 women who were pregnant when they joined a Medicaid HMO from January 2003 to September 2003, 563 women (18.25%) self-reported in a health risk appraisal that they smoke.<sup>9</sup>

At the national level, it is estimated that direct health care costs associated with birth complications caused by pregnant smokers could be as high as \$2 billion per year.<sup>3</sup> In Wisconsin, 10,900 babies are born to mothers who smoke each year and \$12.4 million are spent in related health costs.<sup>6</sup>

The need for a prenatal smoking cessation program in Wisconsin is compelling due to the high rates of maternal smoking and the significant associated costs, both personal and societal. The *First Breath* program was created by the Wisconsin Women's Health Foundation in 2001 and is designed to reduce tobacco

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use among pregnant women through the use of research-based, best practice smoking cessation techniques implemented by “*First Breath* sites” in 15 Wisconsin communities. In the *First Breath* pilot study (2001–2002), smoking cessation counseling was provided primarily by WIC and PNCC (Prenatal Care Coordination) providers at local health departments and health care facilities. The program has shown early success with quit rates, consistently reaching 35% throughout the pilot study and statewide implementation phases.

A large majority—90%—of *First Breath* pilot study clients were Medicaid recipients, as the program was developed to serve low income women since they tend to have the highest rates of prenatal maternal smoking. This allows for comparison of Medicaid claims data based on program smoking outcomes. This analysis provides a baseline measure of cost-savings associated with quitting smoking through the *First Breath* program.

## METHODS

The *First Breath* program was monitored through analysis of data collected by local *First Breath* site cessation counselors. Data were collected every time there was a contact, either in person or over the telephone, with an enrolled woman during which her smoking was discussed. The data collection tool was a “Client Contact Sheet” that consisted of 10 questions, most of which described the smoking cessation intervention. Smoking status was established by asking, “In the past 7 days, how many cigarettes has the client had in the average or typical day.” There were 8 response options for this question ranging from “40+ cigarettes per day (more than 2 packs)” to “None - not even a puff.” There was no biological verification of this smoking status.

To determine client smoking status for this savings analysis, smoking information was taken from the client contact sheet completed prior and closest to the delivery. Those answering “None - not even a puff” are categorized as women who quit smoking and everyone else is categorized as a continued smoker. Medicaid paid amounts were taken from the data warehouse maintained by the Division of Health Care Financing (DHCF) within the Wisconsin Department of Health and Family Services. This data warehouse contains all claims for all Medicaid recipients enrolled in fee-for-service for the past 5 years. It also includes encounter records (proxy claims) for all Medicaid recipients enrolled in an HMO since 2000. Each encounter record is

priced as if it was a fee-for-service claim. *First Breath* clients were identified within the Medicaid data warehouse by matching the Medicaid recipient’s ID when it was known. If the ID was not known, a match was made on the last name, first name (pattern match) and date of birth. Paid amounts were totaled 3 months after the date of service to allow for claims lag time.

Claims associated with each *First Breath* participant were stratified into 3 groups: mother’s maternity admissions (maternal DRG), inpatient neonatal care (neonate DRG), and infant’s medical costs for the first 6 months of life. Average claims per woman were calculated for continued smokers and women who quit smoking within each group. Differences between quitters and non-quitters on paid amounts for health care were tested using independent group t-tests.

To calculate return on investment, Medicaid savings from smoking cessation was compared with the Medicaid cost to pay for the smoking cessation as part of the Prenatal Care Coordination benefit.

## RESULTS

Four hundred twenty-four women were enrolled in the *First Breath* pilot study (1-1-2001 to 12-31-2002); 114 (26.9%) were lost to follow-up. The primary reasons for this loss to follow-up were miscarriages (24.5%), client moved (20%), pre-delivery smoking status data missing (18.4%), dropping out of the *First Breath* program (10.5%), and incarceration (1.8%). Of the remaining 310 women, 108 (34.8%) quit smoking. Of these 310 women, 303 (98%) were matched in the Medicaid data. Because of the method of assigning Medicaid IDs to newborns it is not always possible to link an infant to a mother unambiguously. Two hundred seventy-three infants were linked to these 303 women.

### *Cost Savings*

Cost savings were calculated for the 3 categories of care, comparing claims for women who quit smoking through *First Breath* to those who continued to smoke. Figure 1 presents the cost savings results. The difference between maternal DRG payments (\$57) was significant ( $t = 5.57$ ,  $df = 244$ ,  $P = .019$ ) as was the difference in infant 6-month health care costs (\$1067) ( $t = 4.18$ ,  $df = 302$ ,  $P = .042$ ). The average savings per woman for those who quit smoking, across all 3 care types, was \$1274.

### *Return on Investment*

If all 424 women in the *First Breath* program had been Medicaid recipients, the Medicaid program would have

saved \$137,592 on the 108 women who quit smoking during the pilot study (108 x \$1274). This assumes that women lost to follow-up did not quit. As reported by WIC and PNCC site counselors, the average time spent providing smoking cessation counseling was 44 minutes per woman. Assuming that all *First Breath* clients were treated by PNCC providers (a conservative assumption) and using the maximum Medicaid payable amount of \$12.18 per 15 minutes, smoking cessation counseling would have cost \$15,389 (\$12.18 x 2.98 15-minute intervals x 424 women). In addition, this assumes that women lost to follow-up received the maximum amount of smoking cessation counseling possible under Medicaid billing standards. Thus, the maximum Medicaid could have paid for *First Breath* smoking cessation was \$15,366 to achieve a savings of \$137,592. This is a return on investment (ROI) of 9 to 1.

## DISCUSSION

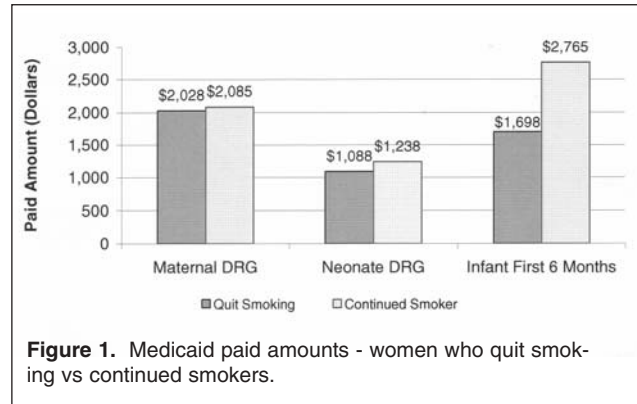
The preliminary results of savings related to the *First Breath* pilot study show promising findings. Across the 3 categories of data analysis, the average savings per woman who quit smoking was \$1274. The most substantial savings were seen in the cost of medical care during the baby's first 6 months of life. The Medicaid program achieves a very favorable ROI by helping pregnant women quit smoking.

There were some limitations in this study. First is the reliance upon self-report of smoking status. *First Breath* does not biologically verify whether or not women consume tobacco. Self-report of smoking by pregnant women is known to be unreliable because smokers will deny they smoke especially when they report to health care providers who are trying to help them quit. This probably negates some of the findings of monetary difference between those who smoke and those who do not smoke.

Another limitation relates to the drop-out rate (26.9%). Because of loss to follow-up, the results may not apply to all pregnant Medicaid recipients. However, this drop-out rate is not unusually high given the nature of the population served.

Evaluation of the cost implications of smoking cessation during pregnancy continues. For example, there are indications that among women who quit smoking, the half that quit earliest (at least 149 days before delivery) accounted for \$900 less Medicaid claims for infant health care in the first 6 months than the half who quit later in pregnancy. Future analyses will investigate these and other subtleties within the data.

The *First Breath* pilot study has shown substantial



**Figure 1.** Medicaid paid amounts - women who quit smoking vs continued smokers.

savings for the Medicaid program. Programs like *First Breath* can help lessen the burden of health care costs through reduction in tobacco use. Currently there are over 100 *First Breath* sites throughout Wisconsin, serving more than 1200 women. In the months to come, *First Breath* will continue following a larger number of women up to 12 months postpartum, collect additional data regarding secondhand smoke exposure, and analysis of statewide expansion efforts will begin, investigating further cost-savings data and the efficacy of *First Breath* cessation counseling techniques.

## ACKNOWLEDGMENTS

Funding for the *First Breath* pilot program was provided by the Wisconsin Tobacco Control Board. Currently *First Breath* funding is provided by the Wisconsin Division of Public Health and the American Legacy Foundation. The Wisconsin Women's Health Foundation would like to acknowledge the cooperation of the Division of Health Care Financing within the Wisconsin Department of Health and Family Services who made this evaluation possible by providing cost information from the Medicaid data warehouse. Additional thanks go to our partners at the Wisconsin Division of Public Health, APS Healthcare Inc., and at the University of Wisconsin Center for Tobacco Research & Intervention for their ongoing contributions to *First Breath* and their commitment to improving the health of Wisconsin women and their families. Finally, the Wisconsin Women's Health Foundation thanks all of the local health care providers participating in the *First Breath* program around the state for their time, dedication to their patients, and commitment to smoking cessation efforts.

## REFERENCES

1. US Department of Health and Human Services. *Women and Smoking: A Report of the Surgeon General*. Rockville, MD:

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