

▲ S.M.A.R.T. Mothers Are Resisting Tobacco: Prenatal Smoking Cessation in WIC Mothers

Martha Jo Edwards, EdD
Terri Geiser, MT, MPH
Cynthia Chafin, MEd, CHES
Norman L. Weatherby, PhD
Carol M. Smith, MA

This article presents outcomes of the Smart Mothers Are Resisting Tobacco (S.M.A.R.T. Moms) project, a "5 A's"-based, best-practices intervention for prenatal smoking cessation targeting primarily pregnant WIC patients in Tennessee. Evidence-based training using "5 A's" materials were provided to health care providers. Providers in turn counseled patients on smoking cessation and provided individual cessation treatment plans with educational information and materials. At the conclusion of the 4-year project, 13,285 patients had received counseling and smoking cessation resources through the project. The overall success rate for participants who received counseling and agreed to use the self-help guide was 24.2% vs 20.9% for those who did not choose to use the self-help guide but did receive counseling, exceeding success rates previously found in similar settings. The outcomes of this project support research that even brief tobacco cessation counseling (5 to 15 min), delivered by trained providers and coupled with pregnancy-specific self-help materials, can increase cessation rates in women during pregnancy. Outcomes from this project also support that, when provided with adequate training and pregnancy-specific self-help materials, health care providers will more consistently counsel patients on smoking cessation during pregnancy. *J Allied Health* 2009; 38:170-176.

Dr. Edwards is Director of the Adams Chair of Excellence in Health Care Services and the Center for Health and Human Services, Ms. Chafin is a Project Director and Consultant for the Center for Health and Human Services, and Dr. Weatherby is Professor for the Department of Health and Human Performance, Middle Tennessee State University, Murfreesboro, TN; Ms. Grant is Grants Manager at Vanderbilt University Medical Center, Nashville, TN; and Ms. Geiser is Program Manager at Knox County Health Department, Knoxville, TN.

S.M.A.R.T. Moms was supported from 1 January 2002 to 31 December 2004 by the March of Dimes Mission Investment Opportunities Program. Continued funding from the March of Dimes Community Grants Program, as well as in-kind contributions from the Tennessee Department of Health and Middle Tennessee State University, allowed the program to continue for another year. As of 30 April 2006, S.M.A.R.T. Moms program activities have been adopted as an ongoing part of the Tennessee Department of Health's WIC program and are self-sustaining.

RA744; received June 30, 2007; revision accepted December 29, 2008.

Address correspondence and reprint requests to: Ms. Cynthia Chafin, Project Director, Middle Tennessee State University, Center for Health and Human Services, Box 99, Murfreesboro, TN 37132. Tel 615-847-3081; fax 615-847-3084; e-mail cindychafin@comcast.net.

PREGNANT SMOKERS represent a major public health challenge. Despite the Surgeon General's warnings about the dangers of tobacco use during pregnancy, a significant number of women continue to smoke during pregnancy. Tennessee has one of the highest rates of smoking and smoking-related deaths in the country and it is one of only five states that spent \$0 on tobacco prevention during 2007.¹ Nationally, 11.4% of pregnant women in the US are identified as smokers,² whereas the rate in Tennessee is 17.1%,³ the second highest in the nation. This rate is estimated to be even higher for pregnant women who are socially disadvantaged, including women who are covered by Medicaid⁴ and those who are unmarried, unemployed, or have less than a high school education.⁵ In 2005, 27,900 women received Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefits. Of all pregnant WIC patients, 29.3% smoked, and in 5 out of 14 regions of Tennessee, the percentage of pregnant women who smoked ranged from 32% to 38%.⁶

Smoking is the single most important modifiable cause of poor pregnancy outcomes in the US.⁷ Studies have shown that between 25% and 60% of pregnant smokers quit smoking spontaneously when they learn they are pregnant.⁸⁻¹³ Smoking during pregnancy has been shown to contribute to adverse outcomes including miscarriage, placental abruption and separation, premature rupture of membranes, preterm delivery, low birth weight, increased prenatal mortality, still birth, and sudden infant death syndrome (SIDS).¹⁴⁻¹⁵ Economic estimates indicate that the direct medical costs of a complicated birth for a smoker are 66% higher than for a nonsmoker.¹⁶ It is estimated that in 1996 smoking-attributable neonatal expenditures accounted for \$366 million in the US.¹⁷

Health care providers have compelling reasons to help pregnant women and mothers quit smoking. Many female smokers are motivated to stop smoking when they find out they are pregnant. Smoking cessation provides immediate and long-term benefits for pregnant women and their young children. The US Surgeon General reported that infants of women who quit smoking by the third trimester weighed more than infants of women who continued to smoke throughout pregnancy. While quitting early in pregnancy is best, health benefits can be achieved from cessa-

tion at any time before delivery.¹⁸ Quit rates using "best practice" interventions are 14% to 16% versus 5% to 6% achieved with usual care.¹⁹

The Smart Mothers Are Resisting Tobacco (S.M.A.R.T. Moms) project is a statewide collaboration among Middle Tennessee State University, the Tennessee Department of Health, and the March of Dimes Tennessee chapter designed to educate pregnant women about the dangers of smoking and provide them with counseling from trained health care providers. An advisory group was established and communicated regularly throughout the project to provide feedback and guidance on project activities, to discuss successes and barriers, and to provide information related to process evaluation.

The primary emphasis of the project was on provider education using "best practices" strategies. Evidence-based training using "5 A's" materials were provided to health care providers who participated in the project. The "5 A's" Counseling Method is an easy-to-implement, evidence-based clinical counseling approach. This approach has been published by the US Public Health Service in its *Treating Tobacco Use and Dependence Clinical Practice Guidelines*²⁰ and by the American College of Obstetricians and Gynecologists. The approach is effective for most pregnant smokers, including low-income women, the group most likely to smoke during pregnancy.²¹ Research cited by Smoke-Free Families reveals that even brief tobacco cessation counseling of 5 to 15 minutes delivered by trained providers and coupled with pregnancy-specific self-help cessation materials can result in increased percentages of women who stop smoking during pregnancy.²¹

The evidence-based intervention for providers to help their pregnant smokers quit is based on the following five steps (the "5 A's")^{22,23}:

1. Ask (1 min)
Ask patient about smoking status.
 - a. I have never smoked, or have smoked <100 cigarettes in my lifetime.
 - b. I stopped smoking before I found out I was pregnant, and I am not smoking now.
 - c. I stopped smoking after I found out I was pregnant, and I am not smoking now.
 - d. I smoke some now, but I cut down on the number of cigarettes I smoke since I found out I was pregnant.
 - e. I smoke regularly now, about the same as before I found out I was pregnant.
2. Advise (1 min)
Provide clear, strong advice to quit with personalized messages about the impact of smoking on mother and fetus.
3. Assess (1 min)
Assess the willingness of the patient to make a quit attempt within the next 30 days.

4. Assist (3 min +)
 - a. Suggest and encourage the use of problem-solving methods and skills for cessation.
 - b. Provide social support as part of the treatment.
 - c. Arrange social support in the smoker's environment.
 - d. Provide pregnancy-specific, self-help smoking cessation materials.
5. Arrange (1 min +)
Periodically assess smoking status and, if she is a continuing smoker, encourage cessation.

Implementing procedures such as those in the national clinical guidelines on tobacco is quite the challenge for health care providers. Many prenatal care providers do not provide even basic interventions for their smoking patients. National data indicate that only 49% of obstetricians and gynecologists routinely advise smoking cessation and provide assistance and follow-up for all their patients who use tobacco, and only 28% go on to discuss cessation strategies.²⁴

Significant barriers to clinicians include absence of systems to identify tobacco users, limited provider time, lack of training resulting in negative attitudes, low confidence regarding counseling skills, lack of available treatment resources, and lack of clinician incentives or remuneration.²⁵ These barriers must be addressed if tobacco cessation interventions are to be effective.

This article presents outcomes of the S.M.A.R.T. Moms project, a "5 A's"-based, best-practices intervention for prenatal smoking cessation targeting primarily pregnant WIC patients who smoke. Challenges and successes encountered throughout the 4-year project are discussed in addition to project outcome data.

Methods

"A Pregnant Woman's Guide to Quit Smoking" self-help guide, a "5 A's" best-practices program and modeled after Smoke-Free Families, was presented by trained providers to patients during the first 3 years of the project. Providers also counseled the patients on smoking cessation and provided individual cessation treatment plans with educational information and materials, including information on toll-free telephone support through the Smoking Quitline of the National Cancer Institute. During the last year of the project, the American College of Obstetricians and Gynecologists' "Need Help Putting Out that Cigarette" self-help guide was selected for use, which is also a "5 A's"-based program.

All WIC clinics throughout Tennessee received training in "best practices" counseling techniques. A patient consultation record for collecting data was designed with input from field staff. WIC and nutrition staff were instructed to assess smoking status during a woman's first prenatal visit. Data were collected in all WIC clinics to establish the target population of smokers who were eligible to participate in this project.

TABLE 1. Pregnant WIC Patients Who Did/Did Not Receive the Smoking Cessation Guide, 2002–2005

Year	Total Forms Submitted (n)	Forms Indicating if Patients Did/Did not Receive Guide (n)	Received Guide n (%)	Did not Receive Guide n (%)
2002	1,610	1,559	1,222 (78.4)	337 (21.6)
2003	4,327	4,188	3,254 (77.7)	934 (22.3)
2004	4,143	3,933	2,905 (73.9)	1,028 (26.1)
2005	2,053	1,943	1,335 (68.7)	608 (31.3)
Total	12,133	10,064	7,494 (74.5)	2,570 (25.5)

Counseling was given and data were collected on all pregnant smokers, but only those expressing a desire to quit were given smoking cessation guides. When given the guide, the women were asked to sign a commitment of intent to quit smoking and received additional materials and counseling, including the toll-free number to the Smoking Quitline of the National Cancer Institute, one of the S.M.A.R.T. Moms project partners. Each WIC participant was offered at least two follow-up visits, one prenatal and one postpartum. In order to increase success of the project, incentives were provided for all participants who agreed to attempt smoking cessation as well as to WIC staff. Incentives included S.M.A.R.T. Moms water bottles, baby bibs, sipper cups, and savings banks for money that would have been spent on cigarettes. Participants were asked about their commitment to quit smoking and asked to sign an agreement to quit if they so desired, which served as consent. Participants also gave consent to participate in WIC and its related programming, including S.M.A.R.T. Moms, through the WIC registration process in the local health departments. Provider behavior change was evidenced by the number of completed patient records submitted.

The project brought together a group of collaborators with expertise in tobacco evaluation at the county, regional, and state level. There are a number of surveillance measures available in Tennessee that provide tools for assessing baseline statewide rates of smoking among women in various age groups (e.g., March of Dimes PeriStats, birth certificate data, and the Behavioral Risk Factor Surveillance System). Preliminary studies of the effectiveness of the use of the cessation guide were conducted in East Tennessee counties by Dr. Gene Fitzhugh using materials and evaluation tools developed by Dr. Richard Windsor. Their Maternal Smoking Cessation Survey, the WIC Tobacco Exposure Survey, and surveys on folic acid use were used to create the data collection instrument.

The data collection instrument was developed to track WIC clients from prenatal care through postpartum care. Data were collected to measure the dates of visits; whether or not the woman received the cessation guide; if the woman quit smoking, reduced smoking, or continued smoking; whether or not the woman attended smoking cessation classes; if other members of her household smoked; and pregnancy outcomes, including infant birth weight and weeks of gestation. These data were gathered through self-

report and through observation by WIC staff during clinic visits. Data were entered using EpiData entry software (Odense, Denmark) with range checks to ensure accuracy of entry. Analysis was conducted using the Statistical Package for the Social Sciences (SPSS, Chicago, IL).

Data collection forms were distributed to WIC clinics throughout the state. Shelby (Memphis) and Davidson (Nashville) counties had limited participation in the project and were therefore excluded from analysis. During 2003 and 2004, in which we had 2 complete years of project operations, 15,858 women who smoked visited WIC clinics for prenatal care. Forms were completed for 8,470 of these women, for a response rate of 53.4%. In 6 of the 12 regions that participated in the project, the response rate was >70%, including the Southwest region's response rate of 100%. WIC clinics in three regions completed forms for <30% of their clients who smoked: the Southeast, Mid-Cumberland, and South Central regions.

Participant focus groups were held statewide to help shape the project's continuing activities and improve program planning and implementation. Tremendous efforts were taken to ensure these focus groups were successful and provided useful information. The information gathered from these groups was vital to program improvements made throughout the grant period as well as ensuring its sustainability.

Results

PATIENT DATA

At the end of the project period on December 31, 2005, 13,285 patients were documented to have received counseling through the S.M.A.R.T. Moms project over the 4-year period, and they received recommendations for smoking cessation. Of these, 12,133 had completed patient record forms entered into the database.

Statewide, 74.5% of pregnant WIC smokers (7,494 of 10,064 with complete information about the guide on the forms) received the cessation guide to assist in quitting smoking (Table 1). The percentage receiving the cessation guide decreased somewhat from 2002 (78.4%) to 2005 (68.7%).

Statewide, 24.2% of those who received the cessation guide quit smoking and 20.9% of women who did not receive the guide quit smoking. This exceeds the 14% suc-

TABLE 2. Pregnant Smokers Who Did/Did Not Receive the Guide, and Smoking Outcome, 2002–2005

Year	Forms with Data About Receiving the Guide and Smoking Cessation (n)	Received Guide		Did not Receive Guide		p-Value
		n	% Quit	n	% Quit	
2002	1,477	1,184	24.7	293	18.1	<0.05
2003	4,036	3,163	25.2	873	24.2	—
2004	3,823	2,816	23.7	1,007	21.4	—
2005	1,874	1,282	22.2	592	16.7	<0.05
Total	11,210	8,445	24.2	2,765	20.9	<0.05

cess rates found in similar settings,²⁶ as well as our projected behavioral change rate of 10% outlined in the original grant proposal (Table 2). In 2002 and 2005, significantly more women who received the guide quit smoking than those who did not receive the guide.

Among WIC mothers, beginning prenatal care in the first trimester of pregnancy significantly reduces the chance of a low birth weight infant. Among those who began prenatal care during the first trimester of pregnancy, 6.2% of those who quit smoking during pregnancy had low birth weight infants. Those who decreased smoking or did not decrease smoking were somewhat more likely to have a low birth weight infant (8.8% and 8.0%, respectively). The percentages of women having low birth weight infants were higher if they began prenatal care during the second or third trimester and quit smoking during their pregnancies (18.6% and 15.6%, respectively) (Table 3).

In high-risk regions of Tennessee, identified as the Northeast, Southeast, and Upper Cumberland regions and as Davidson, Hamilton, and Knox counties, more than 80% of pregnant women who smoked received the cessation guide. Two high-risk regions were exceptions: the North-

east with 67.8% receiving the guide, and Upper Cumberland with 64.7% receiving the guide. It was discussed that there may be other resources that patients are using for cessation services available in these areas (Table 4).

In high-risk regions of Tennessee where data were available, pregnant smokers who received the guide were more likely to quit smoking (25.2%) than those who did not receive the guide (16.3%). In Hamilton county, 35.1% of those receiving the guide quit smoking vs. 20.4% of those who quit but did not receive the guide. Women who received the guide in the Northeast and Upper Cumberland regions also were more likely to quit smoking than women in these regions who did not receive the guide. Observed differences in the percentages of women quitting smoking, depending on whether they did or did not receive the guide, were not significantly different in the Southeast region and in Knox county (Table 5).

PROVIDER DATA

While results from the patient data are important, equally important is the change in provider behavior. Providers

TABLE 3. Percentage of Low Birth Weight Babies Born to WIC Mothers by Trimester of Prenatal Care with Smoking Cessation

Trimester prenatal care began	No.	Birth Weight	
		Low* (%)	Acceptable (%)
First Trimester			
Quit smoking during pregnancy	1,493	6.2	88.5
Decreased smoking during pregnancy	3,072	8.8	88.3
Did not decrease smoking during pregnancy	750	8.0	89.3
Second Trimester			
Quit smoking during pregnancy	677	18.6	77.4
Decreased smoking during pregnancy	1,895	14.6	82.2
Did not decrease smoking during pregnancy	503	17.7	79.9
Third Trimester			
Quit smoking during pregnancy	224	15.6	82.1
Decreased smoking during pregnancy	1,016	12.8	84.6
Did not decrease smoking during pregnancy	312	14.1	83.3
Total	9,942	11.3	85.4

*Low birth weight is defined as <2,500 g, or 5 lbs, 8.5 oz.

Note: Counties represented in these figures include all 93 counties in the state of Tennessee with the exception of Davidson and Shelby counties.

TABLE 4. Percentage of Pregnant Women Who Did/Did Not Receive the Guide in High-Risk Regions in Tennessee

Region	Total Forms Submitted (n)	Forms Indicating if Patients Received the Guide		Did not Receive Guide n (%)
		Received Guide n (%)	Did not Receive Guide n (%)	
Total	5,012	4,762	3,830 (80.4)	932 (19.6)
Nonmetropolitan regions				
Northeast	946	937	635 (67.8)	302 (32.2)
Southeast	369	363	312 (86.0)	51 (14.0)
Upper Cumberland	1,327	1,300	841 (64.7)	459 (35.3)
Metropolitan regions				
Davidson	1,146	1,020	1,002 (98.2)	18 (1.8)
Hamilton	645	593	539 (90.9)	54 (9.1)
Knox	579	549	501 (91.3)	48 (8.7)

Note: Information from Shelby county was not available.

were asked to return completed forms at the end of a woman's postpartum period. The summary below refers to compliance to the protocol of the study.

Completed and submitted patient records increased from the first year (1,610 forms submitted, with the project beginning in June 2002) and remained somewhat consistent since the start of the project, indicating changes in provider behavior, an important overall goal of the project. In 2003, 4,327 forms were submitted, as were 4,143 in 2004. With the program ceasing to collect data after year 4 (2,053 forms submitted in 2005), we believe that there were completed forms still outstanding, due to the woman not reaching the postpartum period by the end of the grant. It is unknown how many data forms were outstanding at the end of the data collection period due to these timing issues.

The consistency in submitted patient records provides evidence that providers are continuing to counsel patients on smoking cessation, as the completed forms indicate that a true counseling process is taking place. As outlined earlier in this article, even brief tobacco cessation counseling of 5 to 15 min delivered by trained providers and coupled with

pregnancy-specific cessation self-help materials can result in increased smoking cessation rates. Without the supporting documentation, providers may or may not be providing effective counseling consistent with the "5 A's" approach. The completion of the forms helps the health care provider determine the appropriate type of counseling, and the increase in forms submitted from the first year of the project indicates an increase in the counseling being offered.

A total of 291 public health staff participated in training for the S.M.A.R.T. Moms project: 155 nurses, 129 nutrition staff, and 7 other (e.g., clerks, educators). An unknown number have received training through the taped video-conference materials, and 6,216 health care providers received smoking cessation information at community events and activities, grand rounds sessions, and other presentations over the course of the project.

While non-WIC patients and providers were not the primary targets of this intervention, information on prenatal smoking cessation was shared with this population as well to further the important message of smoking cessation during pregnancy.

TABLE 5. Percentage of Women in High-risk Regions of Tennessee Who Quit Smoking and Received the Guide

Region	Forms with Data About Receiving the Guide and Smoking Cessation (n)	Received Guide		Did not Receive Guide		p-Value
		n	% Quit	n	% Quit	
Total	3,532	2,718	25.2	814	16.3	<0.05
Nonmetropolitan regions						
Northeast	899	610	22.0	289	14.5	<0.05
Southeast	321	276	28.3	45	15.6	—
Upper Cumberland	1,192	812	23.3	380	17.1	<0.05
Metropolitan regions						
Hamilton	589	535	35.1	54	20.4	<0.05
Knox	531	485	20.0	46	17.4	—

Note: Information on quitting smoking was not available from Davidson and Shelby counties.

Discussion

The reasons that the prevalence of tobacco use in Tennessee is higher than the national average are complex. Studies conducted by the Centers for Disease Control and Prevention have shown smoking prevalence to be consistently higher among women with less than a high school education and poor economic stability. Tennessee ranked 36th worst for child poverty and 45th worst in the nation for high school dropouts.²⁷ The majority of these women utilize WIC services. In 2005, 27,900 women received WIC benefits. Of all pregnant WIC patients, 29.3% smoked, and in 5 out of 14 regions of Tennessee, the percentage of women who smoked ranged from 32% to 38%.⁶

It is of vital importance that WIC health care providers be educated about the dangers of tobacco use and have the ability and necessary tools to communicate successful cessation strategies to their patients. As stated in the introduction, smoking cessation is one of the most important actions a woman can take to improve her health and the health of her baby. Health behavior theory supports that behavior change is most likely at a crisis or major decision point in an individual's life. Pregnancy is a key decision point. According to several studies, health care providers are the primary source of health information for women. Experts attending a 1998 Consensus Workshop on Smoking Cessation in Pregnancy, sponsored by the Robert Wood Johnson Foundation, the Health Resources and Services Administration, and the Centers for Disease Control and Prevention, concluded that brief cessation counseling, when delivered by a trained provider and with the provision of pregnancy-specific self-help materials, significantly decreased smoking among pregnant women.^{22,23} The S.M.A.R.T. Moms project has followed this model and has documented decreases in smoking during pregnancy and changes in provider behavior.

The design of the S.M.A.R.T. Moms project addressed barriers such as those listed earlier in this paper: absence of systems to identify tobacco users, limited provider time, lack of training resulting in negative attitudes and low confidence regarding counseling skills, lack of available treatment resources, and lack of clinician incentives or remuneration. By providing training on counseling techniques that are short, brief, and simple to follow, along with providing patient resources and patient and provider incentives, these barriers were minimized and clinicians were able to easily identify pregnant smokers and to intervene with effective counseling.

Some of the identifiable successes from the S.M.A.R.T. Moms project contributing to sustainability include:

- *Changes in patient behavior*—Strategies used in the proposed S.M.A.R.T. Moms program have been implemented in numerous Medicaid settings throughout the US and determined to achieve success rates as high as 14% in smoking reduction and cessation.¹¹ As outlined in other sections of this article, the overall success rates

for S.M.A.R.T. Moms participants who received counseling and agreed to use the self-help guide was 24.4% (vs 21.4% who did not choose to use the self-help guide but did receive counseling), which exceeds the 14% success rates found in similar settings in the literature.²² In some regions of the state, it was determined that a large number of women who were successful in quitting but who did not use the S.M.A.R.T. Moms cessation guide may have been successful because of their participation in other smoking cessation initiatives being promoted in the community. These initiatives included smoking cessation classes, hospital-based counseling programs, and programs through local organizations such as the American Cancer Society and American Lung Association. It is also likely that many of the women who did not use the cessation guides did avail themselves of the other resources shared with them as part of the counseling process (i.e., the Quitline), which aided them in their efforts to successfully quit smoking.

- *Changes in provider behavior*—Completed patient records submitted have increased since the start of the project and remained relatively consistent, indicating changes in provider behavior, and should be considered a major success. The more providers become comfortable offering smoking cessation counseling, the more patients will benefit.
- *"Institutionalization" of project activities in a state government system*—The project was embraced by the Tennessee Department of Health and was self-sustaining as of April 2006. Through training provided to 100% of regional and metropolitan offices statewide, counseling on prenatal smoking cessation using best-practices methods are now standard procedure in WIC clinics.
- *Development of ongoing partnership relationships*—Partnerships such as that with the Tennessee Department of Health, the National Cancer Institute, March of Dimes division offices, and many other groups, including several patient focus groups, have been vital to the sustainability of this project and its related activities. The ongoing relationships developed will promote continued collaboration on smoking cessation in pregnancy.
- *Economic Impact*—Costs for a premature infant, which is only one possible negative outcome of smoking during pregnancy, are estimated to be 15 times higher than the average delivery (\$41,610 vs \$2,830, a difference of \$38,730 per baby).²⁸ These figures do not include costs for other lifelong health issues for either mother or child due to smoking, or intangible costs such as lost productivity and quality of life.

PROJECT CHALLENGES

Initial challenges included resistance of local staff to implement something new and perceived to take up more of their already limited time, issues related to training and ensuring all providers had received necessary instructions and mate-

rials, receipt of incomplete data forms back from staff, dealing with resistant smokers, and finding ways to use the media to promote the project with limited dollars. An advisory group was used to identify these barriers and develop solutions. With the exception of resistant smokers who remain a challenge, most issues have been adequately and successfully addressed. Staff have received additional training and guidance on dealing with resistant smokers.

Conclusion

The outcomes of this project support the research cited by Smoke-Free Families, which revealed that even brief tobacco cessation counseling (5 to 15 min), delivered by trained providers and coupled with pregnancy-specific self-help materials, can result in increased percentages of women who stop smoking during pregnancy. Further, when provided with adequate training and pregnancy-specific self-help materials, providers will more consistently counsel patients on smoking cessation during pregnancy. With the Tennessee Department of Health sustaining the activities of this project beyond the funding period, WIC providers statewide will continue to provide their patients with "best-practices" counseling on prenatal smoking cessation.

REFERENCES

1. Campaign for Tobacco-Free Kids: *Spending vs. Tobacco Company Marketing*. Washington, DC, Apr 26, 2007. Available at: <http://www.tobaccofreekids.org/Script/DisplayPressRelease.php3?Display=987>. Accessed Jun 20, 2007.
2. Martin JA, Hamilton BE, Sutton PD, et al: Births: final data for 2002. *Natl Vital Stat Rep* 2003; 52(10):1-113.
3. March of Dimes Peristats. White Plains, NY, March of Dimes. Available at: <http://www.marchofdimes.com/peristats>. Accessed Jun 20, 2007.
4. Lipscomb LE, Johnson CH, Morrow B, et al: PRAMS 1998 Surveillance Report. Atlanta: Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, CDC. Available at: http://www.cdc.gov/prams/pdfs/prams_98.pdf. Accessed Nov 3, 2005.
5. Ebrahim SH, Floyd RL, Merrit RK, et al: Trends in pregnancy-related smoking rates in the United States, 1987-1996. *JAMA* 2000; 283(3):361-366.
6. Tennessee Department of Health and Environment, Automated WIC System, Neonatal Summary Report 2001. Nashville, TN, Tenn. Dep. of Health, 2001. [see also reports for 2002-2005.]
7. Hasselmeyer E, Meyer M, Catz C: Pregnancy and infant health. In *Smoking and Health: A Report to the Surgeon General* (Pub no. 79-50066). Washington, DC: Office of Surgeon General, Office of Smoking and Health, US Department of Health, Education, and Welfare; 1997.
8. O'Campo P, Faden RR, Brown H, Gielen AC: The impact of pregnancy on women's prenatal and postpartum smoking behavior. *Am J Prevent Med* 1992; 8(1):8-13.
9. Floyd RL, Rimer BK, Giovino GA, et al: A review of smoking in pregnancy: effects on pregnancy outcomes and cessation efforts. *Annu Rev Public Health* 1993; 14:379-411.
10. Ershoff DH, Quinn VP, Mullen PD: Relapse prevention among women who stop smoking early in pregnancy: a randomized clinical trial of a self-help intervention. *Am J Prevent Med* 1995; 11(3):178-184.
11. Secker-Walker RH, Solomon LJ, Flynn BS, et al: Smoking relapse prevention during pregnancy: a trial of coordinated advice from physicians and individual counseling. *Am J Prevent Med* 1998; 12(2):71-72.
12. Windsor RA, Boyd NR, Orleans CT: A meta-evaluation of smoking cessation intervention research among pregnant women: improving the science and art. *Health Educ Res* 1998; 13(3):419-438.
13. Ershoff DH, Solomon LJ, Dolan-Mullen P: Predictors of intentions to stop smoking early in prenatal care. *Tobacco Cont* 2000; 9:41-45.
14. Mathews TJ, Rivera CC: Smoking during pregnancy—United States, 1990-2002. *MMWR* 2004; 53:911-915.
15. Byrd RS, Howard CR: Children's passive and prenatal exposure to cigarette smoke. *Pediatr Ann* 1995; 24:640-645.
16. Centers for Disease Control and Prevention: Medical-care expenditures attributable to cigarette smoking during pregnancy—United States, 1995. *MMWR* 1997; 46(44):1048-1050.
17. Melvin CL, Adams EK, Ayadi MF, Rivera CC: State estimates of neonatal health-care costs associated with maternal smoking—United States, 1996. *MMWR* 2004; 53:915-917.
18. US Department of Health and Human Services: *The Health Benefits of Smoking Cessation: A Report of the Surgeon General* [Publ No. (CDC) 90-8416]. Rockville, MD: Public Health Service, Centers for Disease Control, Office on Smoking and Health; 1990.
19. Orleans CT, Barker DC, Kaufman NJ, Marz JF: Helping pregnant smokers quit: meeting the challenge in the next decade. *Tobacco Cont* 2000; 9:6-11.
20. Fiore MC, Bailey WC, Cohen SJ, et al. *Treating Tobacco Use and Dependence: Clinical Practice Guideline*. Rockville, MD: US Department of Health and Human Services, Public Health Service; June 2000. http://www.surgeongeneral.gov/tobacco/treating_tobacco_use.pdf.
21. Dolan-Mullen P, DiClemente CC, Velasquez MM: Enhanced prenatal case management for low income smokers. *Tob Control* 2000; 9 (suppl 3): iii75-iii77. doi:10.1136/tc.9.suppl_3.iii75.
22. Goldenberg RL, Director, Smoke-free Families. Personal communication, Nov 10, 1999.
23. Melvin C, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. Personal communication, Nov 16, 1999.
24. US Department of Health and Human Services: *Healthy People 2000 Review 1998-99*. Hyattsville, MD: US Dept. of Health and Human Services, Public Health Service, CDC, National Center for Health Statistics, 1999.
25. Lichtenstein E, Hollis JF, Severson HH, et al: Tobacco cessation interventions in health care settings: rationale, model, outcomes. *Addict Behav* 1996; 21(6):709-720.
26. Windsor RA, Lowe JB, Perkins LL, et al: Health education for pregnant smokers: its behavioral impact and cost benefit. *Am J Public Health* 1993; 83:201-206.
27. *Kid's Count 2006 Data Book*. Baltimore, MD, The Annie Casey Foundation, State Profiles of Child Well Being, 2006.
28. March of Dimes: *Premature Births, The Cost to Business*. White Plains, NY, March of Dimes Foundation. Available at: www.marchofdimes.com/21198_15349.asp. Accessed Jun 15, 2006.