Behavioral and Pharmacological Treatment Methods for Pregnant Smokers: Issues for Clinical Practice

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Active and passive exposure to tobacco smoke are the most serious and preventable causes of poor maternal, fetal, and infant outcomes in the United States. Unfortunately, the majority of pregnant smokers do not quit smoking before or during pregnancy or after childbirth. We describe a standardized behavioral counseling model and discuss issues to consider in recommending the use of pharmacotherapy during pregnancy. Although the Food and Drug Administration no longer classifies nicotine replacement therapy (NRT) as contraindicated during pregnancy, precautions should be carefully considered for use in this population. This paper provides a synopsis of the risks of exposure to tobacco smoke during pregnancy and the postpartum; estimates the population at risk and the potential for increased cessation if effective health education methods during pregnancy were routinely provided; presents a meta-analysis of “best practice” patient education methods for pregnant smokers; and estimates the number of pregnant heavy smokers who might be eligible for NRT. We suggest five issues for the physician to consider before recommending NRT medications to pregnant patients who are heavy smokers. The judicious use of NRT medications may significantly reduce harm to the infants of heavy smokers. More evidence derived from large population-based research, however, is needed to provide guidance to the physician about NRT eligibility, dose, scheduling, and effectiveness in clinical practice. (JAMWA. 2000;55:304-310.)

Smoking during pregnancy and the postpartum period is a serious and enduring national public health problem. It has numerous significant negative effects on the health of mothers, infants, and families. Although the majority of pregnant smokers are unable to quit smoking during pregnancy, effective and cost-effective methods are available to assist a significant percentage to quit or to significantly reduce their risk.

This paper discusses the rationale and procedures for the routine delivery of standardized, evidence-based health education methods in maternity care and examines issues related to the consideration of pharmacotherapy for pregnant smokers.

We present a discussion in five areas: 1) the risks of exposure to tobacco smoke during pregnancy and the postpartum period; 2) estimates of the population at risk and the potential for increased cessation if physicians and nurses routinely provided effective methods; 3) a meta-analysis and a description of a best practice health education model for pregnant smokers; 4) estimates of the number of pregnant smokers who can’t quit using best practice methods, and who may be eligible for NRT use; and 5) issues for physicians to consider in recommending NRT to pregnant patients who are heavy smokers and want to quit.

Risks to Fetus, Infant, Child, and Mother

From the Simpson study in 1957 to the 1979 and 1990 surgeon general’s reports on the effects of smoking and the benefits of cessation, to the Year 2000 Objectives, the substantial negative impact of smoking on maternal and child health has been thoroughly documented. Active and passive exposure to tobacco smoke are the most important and preventable causes of poor infant and maternal outcomes. Smoking causes increases in the rates of infant morbidity and mortality, spontaneous abortion, ectopic pregnancy, placenta previa, placental abruption, fetal growth retardation, and sudden infant death syndrome (SIDS).

The smoking attributable risk for low birthweight (LBW) is 20% to 30%. Compared to nonsmoking pregnant women, light and heavier smokers have a 54% to 130% increase in LBW incidence. Among women who smoke a pack a day or more, the LBW rate is 15%, more than double the rate of 7% for nonsmokers. LBW and preterm birth are associated with increased fetal and infant mortality. Pregnant smokers have infants typically 200 g lighter than those of matched, nonsmoking women. Kleinman et al examined mortality among 362,621 live births and found combined fetal and infant mortality rates to be 25% to 56% higher in smokers for all categories of race and parity, after controlling for such factors as marital status, education, and age. Smoking during pregnancy has also been associated with an increased risk of learning disabilities, behavioral problems, and attention deficit hyperactivity disorder.

Tobacco smoke contains more than 4000 chemicals. The gaseous phase of cigarette smoke contains such toxins as urethane, formaldehyde, hydrogen cyanide, acetaldehyde, acrolein, and nitrogen oxides, and a number of carcinogens and tumorogenic agents.
The specific role of these compounds
in complicating fetal development in
cigarette smokers is unknown, however. The particulate phase of cigarette smoke
contains a variety of other carcinogens,
nicotine, and other minor tobacco alka-
loids. Any single compound or combina-
tion of compounds may contribute to
adverse fetal development. The mechanisms of how smoking
causes poor clinical outcomes, especially
through nicotine, continue to be eluci-
dated.16-22 Acute and chronic fetal hypoxia
is likely produced from carbon monoxide
binding to fetal hemoglobin or from a
reduction in placental blood flow from
nicotine. Fetal hypoxia has been impli-
cated in growth restriction and neuro-
behavioral deficits in the offspring of
mothers who smoke. Cyanide from
tobacco smoke may contribute to
impaired growth and increased fetal
mortality. Nicotine or carbon monoxide
may directly alter fetal development,
including that of the nervous system.
An animal model has linked nicotine to
SIDS.17 A 1998 report has indicated that
total nicotine/tobacco exposure, because
of its deleterious effects and dramatically
higher prevalence rate, is worse than fetal
cocaine exposure.22
The risks of ETS exposure to fetuses
and infants are also well established.
Cigarette smoking is the principal cause
of infant respiratory diseases and, poten-
tially, of long-term irreversible decre-
ments in infant lung function, SIDS,
and asthma. A US Working Group on
Passive Smoking23 evaluated the published
evidence on the health risks caused by
infant ETS exposure in the home and
came to the following major conclusions:
1) There is strong evidence that ETS is
a primary cause of severe respiratory
illnesses and of pediatric asthma and
ear inflammation. 2) There is convincing
evidence that ETS causes multiple chronic
and acute respiratory illnesses. 3) Small
reductions in physiological measures
of respiratory function have been docu-
mented among both children and adults

### Table 1. Past Month Cigarette Use Among US Women Age 15 to 44
by Pregnancy Status and Demographic Characteristics,
Averages Based on 1994, 1995, and 1996 Samples Combined

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Pregnant, %</th>
<th>Not Pregnant, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 15-25</td>
<td>27</td>
<td>31</td>
</tr>
<tr>
<td>26-44</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>23</td>
<td>35</td>
</tr>
<tr>
<td>Black non-Hispanic</td>
<td>21</td>
<td>29</td>
</tr>
<tr>
<td>Hispanic</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>16</td>
<td>27</td>
</tr>
<tr>
<td>Not married</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>Adult education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>44</td>
<td>49</td>
</tr>
<tr>
<td>High school graduate</td>
<td>22</td>
<td>38</td>
</tr>
<tr>
<td>Some college</td>
<td>13</td>
<td>31</td>
</tr>
<tr>
<td>College graduate</td>
<td>7</td>
<td>17</td>
</tr>
</tbody>
</table>

From Office of Applied Studies6

### Table 2. Studies of Effectiveness of the SCRIPT Model

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Site</th>
<th>Provider</th>
<th>E Group, % (n)</th>
<th>C Group, % (n)</th>
<th>Risk Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windsor et al14</td>
<td>2000</td>
<td>Alabama</td>
<td>RN/SW</td>
<td>17 (139)</td>
<td>9 (126)</td>
<td>2.0</td>
<td>1.0-3.9</td>
</tr>
<tr>
<td>Gebauer et al31</td>
<td>1998</td>
<td>Ohio</td>
<td>RN</td>
<td>16 (84)</td>
<td>0 (94)</td>
<td>.</td>
<td>. . .</td>
</tr>
<tr>
<td>Hartmann et al32</td>
<td>1996</td>
<td>North Carolina</td>
<td>MD(OB)</td>
<td>20 (107)</td>
<td>10 (100)</td>
<td>2.0</td>
<td>1.0-4.0</td>
</tr>
<tr>
<td>Valbo, et al33-34</td>
<td>1994</td>
<td>Norway*</td>
<td>MD(OB)/RN</td>
<td>25 (161)</td>
<td>8 (155)</td>
<td>3.2</td>
<td>1.8-6.0</td>
</tr>
<tr>
<td>Windsor et al35</td>
<td>1993</td>
<td>Alabama</td>
<td>Health Educator</td>
<td>14 (400)</td>
<td>3 (100)</td>
<td>4.7</td>
<td>1.5-14.6</td>
</tr>
<tr>
<td>O’Conner et al36</td>
<td>1992</td>
<td>Canada</td>
<td>RN</td>
<td>12 (101)</td>
<td>5 (101)</td>
<td>2.4</td>
<td>0.9-6.6</td>
</tr>
<tr>
<td>Hjalmarson et al37</td>
<td>1991</td>
<td>Sweden</td>
<td>MD(OB)</td>
<td>13 (417)</td>
<td>8 (231)</td>
<td>1.7</td>
<td>1.0-2.8</td>
</tr>
<tr>
<td>Windsor et al7</td>
<td>1985</td>
<td>Alabama</td>
<td>Health Educator</td>
<td>14 (102)</td>
<td>2 (104)</td>
<td>7.1</td>
<td>1.7-30.6</td>
</tr>
<tr>
<td>Walsh et al8</td>
<td>1997</td>
<td>Australia</td>
<td>RN/MD(OB)</td>
<td>12 (127)</td>
<td>0 (125)</td>
<td>.</td>
<td>. . .</td>
</tr>
<tr>
<td>Sexton et al39</td>
<td>1984</td>
<td>Maryland</td>
<td>RN</td>
<td>27 (395)</td>
<td>3 (388)</td>
<td>8.7</td>
<td>4.9-15.6</td>
</tr>
</tbody>
</table>

*Combines data from two studies.
Smoking Rates During Pregnancy

Many American women try to quit or to reduce their smoking during pregnancy, but only about 20% to 25% succeed (see Table 1).

The self-reported smoking prevalence rates and Washington, DC, the National Center for Health Statistics (NCHS) reported that smoking prevalence rates during pregnancy decreased from 19.5% in 1989 to 13.6% in 1996.24 The self-reported smoking rate of the 1.6 million pregnant women on Medicaid in 19966 was about 35%, or 560,000 women. These rates, however, do not reflect patient deception. Improved methods are needed to promote disclosure by pregnant smokers so clinicians can help them to change their behavior.26,27 If the NCHS sample deception rate were 10%, then the national smoking rate during pregnancy would be at least 20%.

Household survey data on 10,500 women collected by the Substance Abuse and Mental Health Services Administration (SAMHSA) for 1994, 1995, and 19966 combined strongly support an estimated 20% prevalence rate. The SAMHSA data, derived from face-to-face interviews, which are more likely to be accurate, confirmed a self-reported national smoking rate of 21% during pregnancy. If we use a 20% rate, an estimated 800,000 pregnant women will smoke in the year 2000. A cotinine-confirmed deception rate of 24% among a representative sample of 431 Medicaid patients enrolled in prenatal clinics in Alabama was recently reported.14 Thus, the higher deception rates documented among Medicaid patients strongly suggest that this cohort may represent 75% of the total population of pregnant smokers in the United States.

The SAMHSA6 and NCHS24 surveys (Table 1) confirmed that smoking prevalence was highest among white non-Hispanic women, followed by black non-Hispanic women and Hispanic women. Both sources found that self-reported smoking prevalence during pregnancy among those with a high school education or less was 40%. In the SAMHSA survey, 68% of the women (and men) who smoked one or more packs of cigarettes per day indicated that they considered this behavior to be high risk. Fifty-seven percent of the total sample of women (and men) currently smoking 20 or more cigarettes per day (CPD), indicated that they wanted to try to quit, but could not. Although the reported number of CPD during pregnancy is inaccurate,6,14 the SAMHSA and NCHS surveys indicated that about 35% of women smoked at least 10 CPD during pregnancy in 1995, and approximately 20% smoked 20 CPD or more. Using these rates, there would be about 160,000 heavy smokers (>20 CPD) and about 440,000 (≥10 CPD) at high risk in 2000.

Effective Health Education Methods for Clinical Practice

There is considerable potential for improvements in maternal, fetal, infant, and child health produced from increased cessation rates and eliminating ETS exposure during pregnancy and infancy.1-12 The Agency for Health Care Policy and Research (AHCPR),28 a national consensus report,29 and the Agency for Health Care Research and Quality (AHRQ)30 have recommended that pregnant smokers be encouraged to quit throughout pregnancy. We reviewed 32 evaluation studies of patient education methods for pregnant smokers to define best practice methods7-14 and to specify which “encouragement” methods recommended by the AHCPR and AHRQ should be routinely delivered by prenatal care providers. We applied three screening criteria to define what methods are “effective”: 1) documentation of baseline comparability of experimental (E) and control (C) groups, 2) independent confirmation of E and C group patient self-reports of smoking status, and 3) documentation of a significantly higher cessation rate in the E group than in the C group.

The ten studies that met the three meta-analysis criteria are presented in chronological order in Table 2.5,14,31-39 The first eight studies were grouped because they translated or adapted a self-help manual, A Pregnant Woman’s Guide to Quit Smoking40 to their language, patient population, and maternity care setting. These eight studies confirmed the feasibility of routine use of the Guide by trained providers of maternity services and documented significantly higher E than C group cessation rates. The combined risk ratio (RR) and cessation rates for the eight studies and 3557 patients were: RR=3.65, 17.5% in the E group (n=2033) and 4.8% in the C group (n=1524).32 Based on this strong, consistent evidence and the AHCPR and AHRQ guidelines, a tailored self-help guide should be routinely provided to patients by trained clinical staff.

The SCRIPT Model

The Smoking Cessation or Reduction in Pregnancy Treatment (SCRIPT) Model14 was derived from two meta-evaluations35,38 and two meta-analyses.11,14 It is an evidence-based example of a health education best practice method representing AHCPR-AHRQ encouragement procedures.24,30 It is based in part on the 4 As: Ask, Advise, Assist, Arrange, and derived from the eight studies that empirically documented its effectiveness. The ten patient health education procedures from the SCRIPT Model14 to be provided at the first visit by maternity care staff to all smokers are described in the figure.

At their first maternity visits, all patients should be asked if they smoke (Ask); be informed of the serious health risks to themselves, fetus, and infant; and receive a strong personal message to quit smoking (Advise). The patient’s level of motivation to quit should also be assessed; about 75% of pregnant smokers indicate a readiness to try. Physicians and nurses need to examine their current patient education structure, process, and content for pregnant smokers to determine who should provide what procedures and when at the first maternity care visit. Physicians would typically provide Ask-Advise and nurses would typically provide Assist-Arrange. In a public health setting a social worker or nutritionist might provide all of these methods.

The Assist phase includes a three-component patient education program.
The first component is the *Commit to Quit Smoking – During and After Pregnancy* video. It enhances motivation to quit, improves comprehension of risk information, ensures exposure to recommended cessation methods, and introduces the *Guide*. It simplifies the process and also reduces face-to-face counseling time by clinical staff; time and complexity are serious barriers to routine delivery of new patient education methods. Eighty percent of pregnant smokers live with one or more smokers. Allowing the patient to take the video home should help her to establish a smoke-free home and to facilitate communication between herself and her smoking partner.

Component 2, *A Pregnant Woman’s Guide to Quit Smoking*, is a 32-page tailored guide with a fifth- to sixth-grade reading level. It uses a self-directed, seven-day cessation process to teach patients 12 problem-solving and coping skills. It has been comprehensively evaluated by patients and staff focus groups and found to be effective and cost effective.

Component 3 is a five-minute (or less) patient-centered counseling session that reviews the risks of smoking and the rewards of quitting. The provider should clarify any of the patient’s concerns and briefly discuss what the patient learned from the video and *Guide*. This component helps each patient to: 1) describe plans, dates, times, and actions to begin the cessation process; 2) set a quit date; 3) sign a written agreement to use the *Guide*; and 4) agree to have smoking status assessed at each maternity visit. A color-coded chart reminder can be used to prompt staff to assess smoking status at subsequent visits (Arrange).

**Estimated Impact of Dissemination of Effective Methods**

We reviewed the meta-analyses results to estimate the potential impact of effective best practice (BP) methods for different smoking levels: light, moderate, and heavy. Although the CPD self-reports are not accurate, they can be used to group patients by ordinal levels of daily exposure. Data in Table 3 estimate the number and percentage of patients who might quit from BP examples. The quit rates for patients exposed to typical information and advice to quit methods (Ask and Advise) will vary by education and socioeconomic status from about 5% to 10%. Because the most highly motivated and less addicted patients have quit on their own before entry into care, the nicotine addiction levels for the remaining patients are much higher. BP methods have had a consistently greater effect on light smokers (<69 CPD) with a quit rate of about 20%. The impact of BP for women who report smoking 10 CPD or more is typically about 15%. BP may assist only about 5% of patients who smoke 20 CPD or more to quit. Clearly, a substantial proportion of pregnant smokers, 80% to 90%, are not able to quit, even with effective methods.

**Nicotine Replacement Therapy During Pregnancy**

NRT or other pharmacotherapies combined with behavioral methods are most effective in helping nonpregnant smokers to quit. NRT products typically double success rates among nonpregnant smokers. Benowitz suggested that the benefits of NRT for pregnant heavy smokers (>200 CPD) outweighed the risks of smoking when behavioral methods failed. Because of reduced nicotine exposure and elimination of carbon monoxide and other toxic substances in cigarette smoke, Benowitz asserted that NRT would probably be less harmful for many pregnant heavy smokers, noting that the daily dose of nicotine and peak blood levels of nicotine from the gum or patch are lower than those of 20 CPD for nonpregnant smokers. The 1996 AHCPR *Clinical Practice Guideline* recommended use of NRT during pregnancy only if the likelihood of cessation outweighed the risk of combined NRT and smoking. The AHRC guideline concluded that the evidence to support a recommendation either for or against NRT during pregnancy was insufficient. NRT (gum or patch) is currently available over the counter and can be purchased in the United States by a pregnant smoker.

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**Table 3. Estimated Number of Pregnant Smokers and Behavioral Impact of Best Practice Methods**

<table>
<thead>
<tr>
<th>Level, CPD</th>
<th>Smokers, n</th>
<th>Cessation Rate, %</th>
<th>Smokers Who Quit, n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light (&lt;69)</td>
<td>360 000</td>
<td>20</td>
<td>72000</td>
</tr>
<tr>
<td>Moderate (10-19)</td>
<td>280 000</td>
<td>15</td>
<td>42000</td>
</tr>
<tr>
<td>Heavy (&gt;20)</td>
<td>160 000</td>
<td>5</td>
<td>8000</td>
</tr>
</tbody>
</table>

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**ASK < 1 minute**

1. Document smoking status (cigarettes per day) and desire to quit:
   - A. Never smoker
   - B. Quit before pregnant
   - C. Quit since pregnant
   - D. Smoker: reduced CPD
   - E. Smoker: same CPD

   **Response A-B-C: Congratulate her on success and stop home and social ETS exposure.**
   **Response D-E: Advise, Assist, and Arrange**

**ADVISE < 1 minute**

2. Provide clear, strong messages about risks of smoking to mother/fetus.
3. Provide clear, strong, and personal advice to quit and stay quit.

**ASSIST > 3 minutes**

4. Provide *Commit to Quit* video.
6. Review cessation skills in video and *Guide*; develop specific quit plan.
7. Express confidence that use of *Guide* and methods will help to quit.
8. Encourage patient to seek family and social support and stop ETS.

**ARRANGE < 1 minute**

9. Remind patient of next visit and put “smoking as vital sign” label in chart.
10. Assess status during pregnancy: if a smoker, encourage cessation.

**Smoking Cessation or Reduction in Pregnancy Treatment (SCRIPT) Model**
Although the Food and Drug Administration (FDA) has classified nicotine gum as a Category C drug during pregnancy, certain risks cannot be ruled out. All other nicotine replacement products, ie, patch, nasal spray, and inhaler, are classified as Category D drugs with positive evidence of potential fetal risks. In a 1999 review of the literature on maternal-dose formulation, Little found that only two studies synthesized pharmacokinetic data into guidelines for individual clinical regimens. Guidelines for dose or scheduling were lacking in medical practice and in the pharmacokinetic literature. More studies were recommended to clarify dose and scheduling of all pharmacotherapies.

Nicotine levels from NRT are generally lower than levels from smoking. The highest dose transdermal nicotine patch typically delivered nicotine levels approximately half those received by women who smoke 30 CPD. In one of the few studies to examine the safety and effectiveness of nicotine gum, plasma cotinine nicotine levels were significantly lower from gum chewing than they were from smoking 10 CPD or more. Nicotine concentrations and maternal and fetal hemodynamic effects were also less than those documented in smokers. These data suggest that short-term nicotine gum use is likely to be safer than smoking during pregnancy for women who can’t quit with behavioral methods alone.

Studies among small samples of patients by Wright et al and Oncken et al in 1997 and Ogburn et al in 1999 have also examined the nicotine and cotinine concentrations and short-term effects of the patch with healthy pregnant smokers. Ogburn suggested that fetal well-being may improve with smoking cessation and transdermal nicotine, because the morning fetal heart rate significantly decreased after a few days of smoking treatment. Wright also found that the concentrations of salivary cotinine nicotine levels were consistently lower in patch users than in smoking, nonpregnant adults. Collectively, these studies reported no significant adverse maternal or fetal effects from nicotine patch use compared to usual smoking of 10 CPD or more.

Advantages and Disadvantages of Nicotine Replacement Therapies

Nicotine Polacrilex Gum

Advantages: two doses (2 or 4 mg) are available with a bioavailability of about 50%; patient can control dose; available for over-the-counter purchase; has been shown to be effective with behavioral intervention; and has been studied with pregnancy.

Disadvantages: may cause stomach upset, heartburn, and nausea (side effects that are also common in pregnancy).

Nicotine Patch

Advantages: different brands and dosage levels allow patients to match dose to their daily smoking rates, good compliance (best compliance in nonpregnant individuals), consistently doubles success rates in clinical trials, and has been studied in pregnancy.

Disadvantages: fetal nicotine exposure at night may exceed usual smoking levels; because efficacy rates do not improve with 24-hour use and to reduce peak nighttime levels, physicians should advise patients to remove the patch at night.

Nicotine Inhaler

Advantages: intermittent nicotine delivery system, buccally absorbed, relatively good side effect profile in nonpregnant smokers, relatively low nicotine exposure compared with usual smoking, and similar to the smoking ritual.

Disadvantages: no studies for pregnant smokers.

Nicotine Nasal Spray

Advantages: intermittent delivery system, nicotine delivered through the nasal mucosa, relieves cravings quickly, and may be the most useful in highly dependent smokers.

Disadvantages: no studies for pregnant smokers, and use may be associated with nasal irritation and stuffiness, which may limit compliance and tolerability.

Patients who have not quit or significantly reduced their intake (to 10 CPD) at the second visit should be encouraged again to quit. The 10 CPD cutoff is suggested because studies examining NRT in pregnancy have used this as a minimum criterion. Pregnant smokers who cannot quit might be candidates for NRT, and a recent survey has confirmed that some obstetricians (25% to 30%) are discussing NRT with pregnant patients who are heavy smokers. Based on the current, very limited evidence in the literature, the following five questions should be asked by physicians considering recommending NRT to pregnant smokers: 1) Has the patient indicated that she wants to quit? 2) Has the patient received effective counseling procedures and not been able to quit? 3) Has the patient reported smoking 10 CPD or more? 4) Are there coexisting medical problems that need to be addressed, such as other drug dependence or depression? 5) Is NRT acceptable to the patient? If so, which method does she prefer?

Because there are few studies of NRT during pregnancy, documenting overall nicotine exposure from smoking and from three to four days of NRT would be prudent. Studies have suggested that cotinine measurements may be lower in pregnant than in nonpregnant smokers. Although cotinine measurements may underestimate nicotine exposure during pregnancy to some extent, if repeated samples are taken, the measure of nicotine intake from replacement compared to that from smoking should be valid. Cotinine concentrations should be measured at approximately the same time of day, because of the diurnal variation. If cotinine concentrations
with NRT exceed values obtained from those of usual smoking by more than 10%, a reduction in the NRT dose should be considered. The clinical variation of plasma cotinine after five days of continued smoking during pregnancy was approximately 10% in one study. This assumes that maternal cravings and withdrawal symptoms are relieved. A urine cotinine dipstick test can be used to obtain an estimate of daily exposure. These FDA-approved methods cost about $2 per patient and can provide a valid estimate of tobacco exposure at each visit.

Summary
Concerted efforts are needed to provide education to motivate pregnant women to accelerate their cessation efforts. Support for patients who make such attempts with routine professional guidance, behavioral treatment, and selected pharmacological treatment will enable them to achieve their goal of smoking cessation. The first step is for physicians and nurses to provide best practice methods as a routine part of prenatal care. Staff training in delivery of effective methods and integration of these methods into a clinical practice and system of maternity care is essential. Much more evidence is needed, however, to provide guidance on NRT eligibility, dose, scheduling, and efficacy for clinical practice. Because published studies had small patient samples, a prospective clinical trial involving at least 500 pregnant moderate to heavy smokers (210 CPD) is needed to document the acceptability, feasibility, and efficacy of NRT, including subgroup analyses by race, parity, and postpartum smoking rates. Patients in this study must be monitored carefully.

The benefits of NRT for pregnant women who smoke 10 CPD or more appear to outweigh the risks for several reasons. Nicotine medications do not expose the mother or fetus to the other harmful toxins and carcinogens contained in cigarette smoke. Nicotine medications can significantly reduce the duration of exposure to nicotine. Whereas a woman who continues to smoke exposes the fetus to nicotine and thousands of other chemicals throughout the duration of pregnancy, a woman who quits smoking using a 12-week nicotine medication treatment would significantly reduce the dose and duration of exposure in the last three or four months of gestation.

The judicious use of NRT may significantly reduce harm to the infants of heavy smokers who want to quit. There is a very large population of addicted smokers who want to quit. The decision to use or not to use NRT or other pharmacotherapies during pregnancy, however, must be an individual decision between a patient and her physician. Currently, there is insufficient safety or efficacy data for us to make specific recommendations about use of NRT products. If future studies show that these products are as safe and effective for pregnant smokers as they are for non-pregnant smokers, a large number of pregnant women at high risk would be able to quit each year. An impact of this magnitude would enhance achievement of our national health objectives and improve the health of many mothers and infants in the United States.

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References