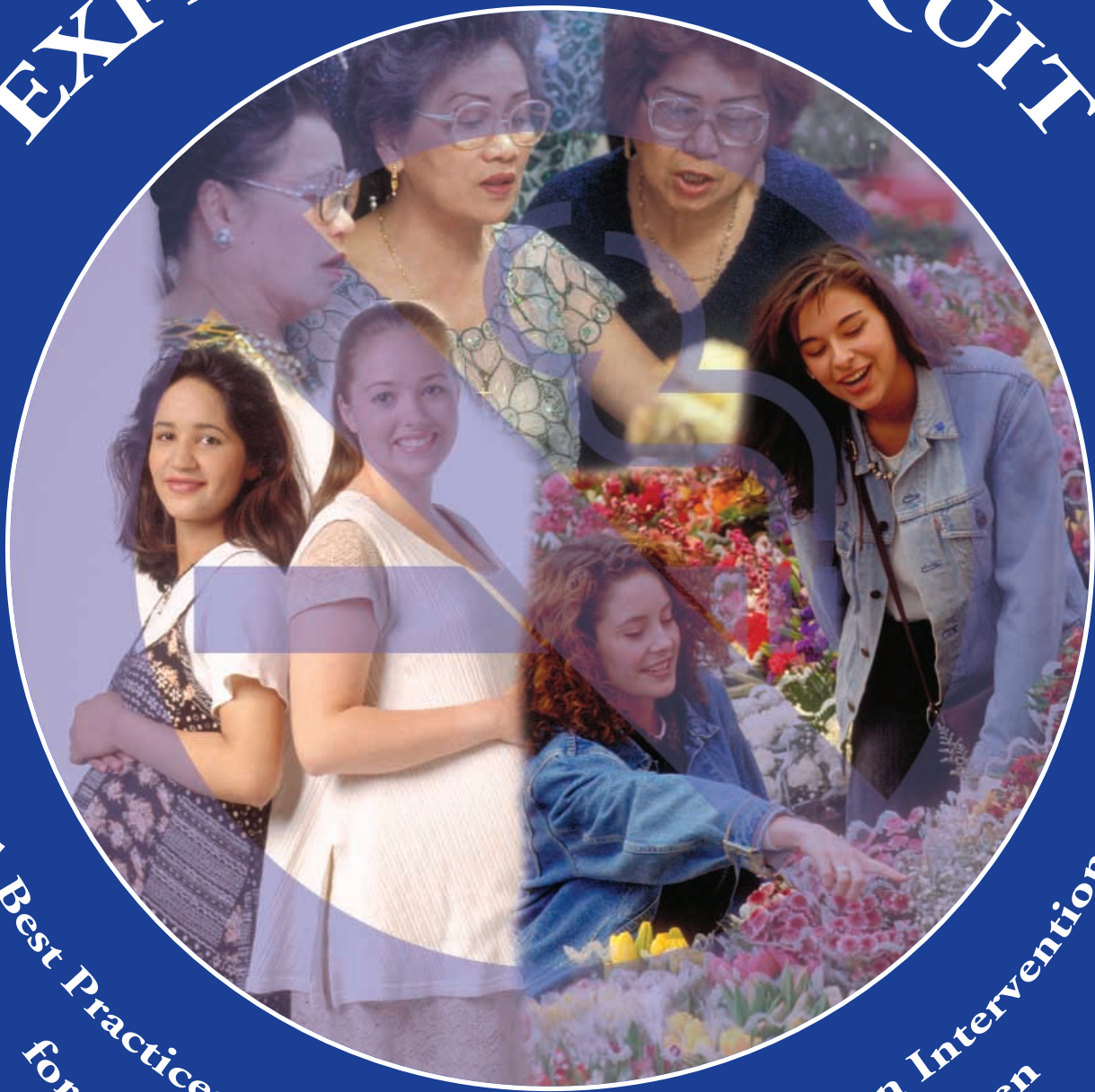
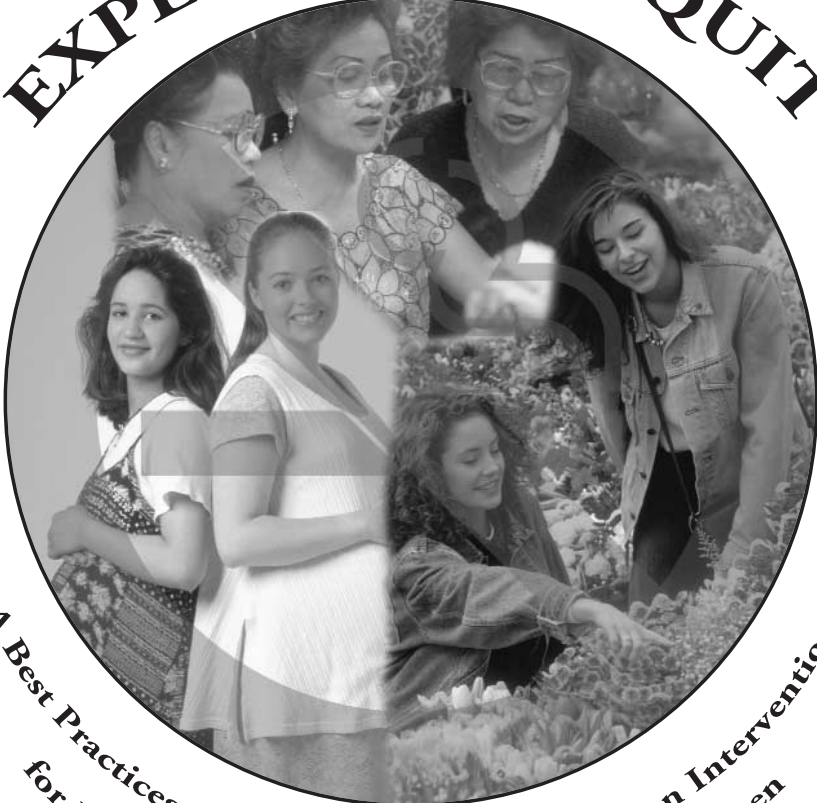


EXPECTING TO QUIT



A Best Practices Review of Smoking Cessation Interventions
for Pregnant and Postpartum Girls and Women

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Abstract

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Background:

Despite concerted efforts by researchers and health care professionals, maternal smoking during pregnancy remains a serious public health problem. Historically, smoking cessation treatments for pregnant women have used fetal health as a motivator to encourage quitting and they have achieved some success during pregnancy. However, smoking cessation observed in this population is generally not sustainable. This Review examines both evaluated smoking cessation interventions tested in pregnant populations and unevaluated program materials to determine the most effective strategies to facilitate smoking cessation both during pregnancy and into the postpartum period. Broader social and biological issues which affect cessation, including low socio-economic status, social environment, ethnicity, maternal age and nicotine dependence, are considered to provide insight into the reasons why some women continue to smoke during pregnancy.

Methods and Results:

Over 65 published and unpublished smoking cessation programs and interventions were reviewed according to the Better Practices Framework. Based on methodological strength and evidence of effectiveness, six interventions were deemed appropriate for use with pregnant smokers. Findings from the Review were considered in the context of broader theoretical literatures on women-centred care and harm reduction, and expert opinion was integrated to produce a set of Better Practice Recommendations.

Conclusions and Recommendations:

While there have been no shortage of attempts, effective smoking cessation programs and interventions for pregnant and postpartum girls and women are scarce. For sub-populations of pregnant smokers in particular, such as ethnic minority women, spontaneous quitters, Aboriginal women, heavy smokers and teenaged girls, tailored strategies are all but absent. Recommendations include shifting the focus of interventions to include women's health as motivation for cessation, increased tailoring of interventions, and the incorporation of harm reduction, stigma reduction, and a woman-centred approach into clinical practice.

1 Introduction

This report is an examination of better practices in tobacco cessation during pregnancy. It concentrates on interventions designed to reduce or eliminate smoking during pregnancy and examines these interventions using a Better Practices methodology designed by Moyer, Cameron, Garcia, & Maule (2001). The results of this analysis are contextualized in the wider literature

on women's health, women-centred care and women's tobacco use in order to better interpret them. These results, after review by an expert panel of practitioners and researchers, led to the recommendations offered at the end of the report. A comprehensive bibliography of smoking cessation interventions is provided in Appendix 8d, page 78.

1a. The Problem

Approximately 20%–30% of pregnant women use tobacco during pregnancy (Coleman & Joyce, 2003; Connor & McIntyre, 1999). Many of these women quit during pregnancy and another proportion reduce their tobacco use. However, cessation is often temporary. Relapse rates vary, but are reported as approximately 25% before delivery, 50% within four months postpartum, and 70%–90% by one year postpartum (Klesges, Johnson, Ward, & Barnard, 2001). Further, recent analyses in the United States indicate that the proportion of pregnant smokers reporting a quit attempt has actually reduced over the past decade to a current level of approximately 50% (Klesges et al., 2001). In short, smoking in pregnancy and postpartum remain serious public health problems in 2003.

The social factors affecting the processes of maintenance, cessation and relapse include socioeconomic status, education, and age. In addition, there are numerous physiological factors related to pregnancy—nausea and taste and olfactory changes—that affect these patterns. Combined with exposure to health education and wider social messages about pregnancy and smoking, all of these factors affect the rates of spontaneous and temporary quitting in pregnancy. Estimated levels of cessation vary, but a recent analysis of data

from ten US states indicates that the proportion of women smokers who actually spontaneously quit during pregnancy has increased between 1993 and 1999 from 37% to 46% (Coleman & Joyce, 2003). However, a US study examining spontaneous cessation in low income pregnant smokers documented only a 25% early pregnancy quit rate (Ockene, Ma, Zapka, Pbert, Gions, & Stoddard, 2002). An Australian sample had a spontaneous cessation rate of 23% (Panjari, Bell, Astbury, Bishop, Dalais, & Rice, 1997).

Facilitating successful and enduring tobacco cessation during pregnancy is an ongoing public health challenge. Tobacco cessation during pregnancy has considerable positive health ramifications for both women and fetuses, and reduces health problems for children born of mothers who smoke. However, creating the conditions for successful tobacco cessation during pregnancy has proven to be a persistent and difficult problem affecting both women's and fetal health.

There are general policies and comprehensive tobacco control programs that affect pregnant women. Policies regarding tobacco taxation and pricing, advertising and sponsorship, sales to minors regulations and smoking bylaws have an

effect on all members of a population. While there are positive effects (see, for example, Evans & Ringel, 1999, who report that increasing cigarette taxes reduces smoking by pregnant women) from these policies and programs aimed at the general population, this report deals with those interventions and programs aimed at pregnant women specifically.

Smoking in pregnancy results in serious risks both to the woman and the fetus. Cigarette smoking by pregnant girls and women has been shown to increase risk of complications in pregnancy and to cause serious adverse fetal outcomes including low birth weight, still births, spontaneous abortions, decreased fetal growth, premature births, placental abruption, and sudden infant death syndrome (Ellison, Morrison, de Groh, & Villeneuve, 1999). Other reproduction related effects of smoking include lower estrogen levels leading to early menopause and links to infertility (Albrecht, Higgins, & Lebow, 2000).

Very few studies have examined the effects of passive smoke on pregnancy outcome. Among those that have, the majority found no significant differences in birth weight related to either maternal or paternal passive smoke exposure. In studies with positive findings, infants exposed to environmental tobacco smoke (ETS) were between 1.5 and four times more likely to be born with low birth weight with the decrease ranging from 25g to 90g and infants born to women exposed to ETS were generally two to four times more likely to be born small for their gestational age (Pletsch, 2002).

In summary, there is a definite increase in perinatal morbidity and mortality in smokers and their fetuses. It has been estimated that 10% of all perinatal deaths are attributable to smoking (Fielding, Husten, & Eriksen, 1998). However, cessation of smoking before the first prenatal visit can reduce the risk of these complications to the same levels as those of non-smokers.

1b. History

Over the past 25 years, the problem of smoking in pregnancy has attracted increased attention in the tobacco intervention field. As more knowledge about the effects of tobacco use on fetal health has become available, health practitioners have taken an increased interest in improving fetal health and reducing future healthcare costs for premature and low-birth-weight babies by focusing on maternal tobacco cessation. In addition, pregnancy is often assumed to be an opportunity for change in behaviour in pregnant women, as it is thought to be a point of optimism and hope for a woman that carries with it a focus on health.

A growing social interest in, and condemnation of, the effects of smoking on others, has created the context for an enhanced focus on pregnant smokers, who are seen as directly increasing the risk of poor health for their fetus. An increased attention to ETS, and the growing unacceptability

of smoking in general, has led to more attention being directed to pregnant smokers, often in the form of health education and intervention. However, there is also increased interest from legal and societal perspectives, focusing on how to most effectively reduce the exposure of the fetus to maternal smoking. As a result, over 25 years of research, intervention, health education, and advocacy have been devoted to increasing the rates of successful tobacco cessation during pregnancy and reducing harm to the fetus.

Interestingly, as recently as the 1960s, physicians including obstetricians were told that moderate smoking was safe during pregnancy (Oaks, 2001), but this attitude has been radically transformed to one of censure and vilification of pregnant smokers. Alongside this trend, the fetus has acquired increased status—scientifically, socially, and legally—thereby complicating the production

of appropriate advice and intervention regarding smoking during pregnancy. The shift to a fetus-centric perspective in tobacco treatment mirrors legal trends in maternal drug and alcohol use, as well as the increase in fetal surgery, whereby the fetus is regarded increasingly as a “patient”

(Casper, 1998). The net effect of these trends has been to increase litigation about tobacco use in pregnancy and around children, often centring on family law, custody or abuse and neglect claims (Greaves, 1996; Oaks, 2001).

1c. Interventions

The health interventions designed over the past 25 years to reduce smoking during pregnancy have not been resoundingly successful. The approach to cessation during pregnancy appears to have been motivated mostly by a desire to lessen the deleterious effects on fetal health, and has, therefore, framed the interventions on fetal health outcomes and confined them largely to the period of pregnancy. As a result, pre-pregnancy and post-pregnancy tobacco cessation interventions, which would focus primarily on women’s health, have garnered proportionately less attention and emphasis. As Jacobsen claimed in 1986, “In rich countries, *most* women are *not* pregnant *most* of the time” (p. 125), concluding that smoking cessation campaigns *ignore most women most of the time* (p. 125).

Jacobsen also provided extensive critiques of the content of the medical profession’s concentration on tobacco cessation during pregnancy, and considered how this affected the tobacco advocacy field. In addition, she clearly identified the sexism inherent in this approach (1981, 1986). By 1973, women had become the focus of the anti-smoking attention, but this was due to the accumulating scientific evidence of harm to the fetus and not because of concern about women’s health. Subsequently, smoking messages and intervention programs focused on women, but usually as “receptacles for future generations” (Jacobsen, 1986, p. 124).

This was part of a larger trend. In Canada and elsewhere, only two aspects of women’s smoking—pregnancy complications and facial wrinkles—merited mention by the programmers in tobacco control until the mid-1980s (Greaves, 1996). The pregnancy campaigns were consistent with a long “uterine tradition” of understanding women’s bodies and women’s health, a concept described by Matthews (1987, p. 14), reflecting the focus on the reproductive value of women. It was the late 1980s before most developed countries and the World Health Organization clarified a focus on women’s health in their tobacco use publications (see, for example, ASH Women and Smoking Group, 1986; Chollat-Traquet, 1992; Greaves, 1987, 1990).

Part of the realignment that emerged by 1990 reflected a growing understanding that tobacco use prior to and during pregnancy was becoming increasingly linked to other factors such as poverty, race, and class. In addition, the amount of risk to the fetus resulting from maternal smoking during pregnancy was also amplified by these factors and their consequent nutritional deficits. The high rates of relapse after pregnancy contributed to the reassessment. It became obvious that they were, perhaps, a reflection of the focus on fetal health and that that may have obscured the real issues.

1d. Structural Factors

The emphasis on pregnancy smoking cessation has concentrated on individualistic behavioural changes in the woman herself. This narrow view has usually excluded an analysis of structural factors that matter in explaining smoking behaviour, such as poverty, class, age, education or experience of domestic violence. However, the cessation rates for pregnant women smokers are approximately 30%–40%, higher than for the general population (Klesges et al., 2001), with about 70% continuing to smoke during pregnancy. The majority of those who quit report doing so on their own without formal intervention. Spontaneous quitters are older, more highly educated, less addicted, and less likely to have partners who smoke (Klesges et al.). In addition, the extent of fetal risk is also predicated on the presence or absence of these factors, suggesting that tobacco use is only one factor among many in producing poor outcomes for the fetus and/or infant.

If most of the pregnant women who quit [...] do so without intervention, the advice and programming directed at pregnant women should take a different focus. It makes more sense to focus on women's health as opposed to fetal health, and to press those messages long before and long after pregnancy. (Greaves, 1996, p. 121).

Motivational and other psychological issues also affect cessation attempts and duration, with “concern about fetal health risks” serving as motivation for a short-term cessation among pregnant smokers. Again, these issues are affected by similar structural factors. Women in disadvantaged or marginal circumstances are less likely to be able to consider quitting when other pressures are affecting their lives and behaviour.

Finally, the emphasis on the pregnant woman's behaviour has obscured the effects of partners' smoking patterns and prevented the development of an appropriate emphasis on the partners' smoking. This has two levels of importance. First, the biological issues of fathers who use tobacco with respect to fertility and healthy fetal development have been under-studied and generally underemphasized in health education and advice surrounding risks to fetal health due to smoking. Second, the presence of fathers, partners, and others who smoke in the pregnant smoker's social network affect both the extent of passive smoking of the woman and the fetus, as well as the likelihood that she will have support to quit. In short, the structural factors affecting the pregnant smoker, in conjunction with factors in the environment in which she lives, are elements of the problem of tobacco use during pregnancy that are often overlooked when focusing on individual behavioural issues surrounding tobacco use in pregnant women.

1e. Implications for Outcomes and Better Practices

These factors, combined with the relapse rates of 70%–90% by one year postpartum (Klesges et al., 2001), indicate that different measures may be necessary to fully capture the effectiveness of interventions on tobacco cessation initiated during pregnancy. For example, increased focus on sub-groups of women smokers who have difficulty quitting is critical, as are pre-pregnancy interventions with adolescent women and women of reproductive age. Further, increased focus on

acknowledging and ameliorating the effects of structural factors on pregnant smokers, such as poverty and low education, as well as the impacts of those in the social systems of pregnant smokers, is likely to enhance interventions in this area.

Outcome measures for specific interventions are also problematic and inadequate when viewed from these perspectives. For example, the level of spontaneous quitting is not always measured in

intervention studies, but is crucial to understanding the effects of such interventions. Relapse rates during pregnancy and postpartum are often not measured in intervention studies. Measures of harm reduction or lowering of consumption are similarly underdeveloped. This leads to a lack of knowledge about how reduced consumption may affect fetal health.

Measures of addiction and dependency in pregnant smokers are not always taken, again obscuring the effectiveness of the intervention

on certain groups of women smokers. In many studies, the presence of structural factors affecting women's and fetal health, such as poverty and poor nutrition, go unmeasured, further obscuring the effectiveness of the intervention on health outcomes. Finally, measures of women's health are not generally included, which serves to illustrate the blindness of the field to the value and impact of women's health either on the fetus, or in and of itself.

1f. Conclusion

A historical trend from “condoning to condemning” smoking during pregnancy over the past 35 years has led to considerable interest in creating effective interventions for pregnant smokers, but primarily to reduce risks to fetal health. This fetus-centric perspective is in line with other social, medical, and legal trends regarding women, pregnancy, mothering, and fetal autonomy that have evolved in the same time period. Interventions and programs intended to reduce smoking during pregnancy have evolved in this context, absorbing some of these perspectives and features. These trends have created blindness

to the issues of women's health and have prevented due attention to the time periods of pre- and post-pregnancy. It may also have contributed to the perspective and relative lack of success of the many interventions that have been attempted in the area of tobacco use and pregnancy. Specifically, the definition of outcome measures and the inclusion of structural factors have been limited and could benefit from a more expansive view. What follows is an examination of interventions and programs in cessation for pregnant women, in an attempt to identify better practices in this field.

Theoretical Issues in Perinatal Smoking Cessation

2a. Introduction

The reasons underlying women's smoking patterns are complex, reflecting multiple and interacting social, cultural, economic, and biological influences. There are discernible social differences among women who smoke and women who do not. These differences are further accentuated in pregnancy. Education, income, employment, and social networks are the key determinants of socio-economic status that consistently document an inverse relationship with smoking in pregnancy. There is a need for sensitivity to the unique characteristics of sub-groups in the development and implementation of interventions. Given the contribution of smoking to the overall burden of disease, and the strong association between socio-

economic factors and smoking among pregnant women, greater effort and resources must be channelled to strategies in the broader community to reduce social inequalities.

In addition, there is emerging research and knowledge regarding genetic and biological factors that affect women, mothers, the fetus and children whose mothers smoked during pregnancy. These influences indicate that there are significant biological factors, which are combined with social factors in determining the initiation, maintenance and nicotine dependency patterns of maternal and child smoking, as well as on the fetal effects of maternal tobacco use.

2b. Social and Biological Factors Which Influence Cessation

i) Low Socio-Economic Status

The determinants of smoking among pregnant and postpartum women consistently reflect social disadvantage. Smoking prevalence is generally highest among pregnant white women of low socio-economic status (SES) as depicted by low income levels, low educational attainment, and low occupational status (Connor & McIntyre, 1999; Health Canada, 1994b, 1995; Mathews, 2001; Millar, 1997; Ockene et al., 2002). Rates of smoking among Aboriginal women of child-bearing years far exceed those of non-Aboriginal women (Reading, 1999) in large part because low socio-economic status is a central issue for Aboriginal people (see section 2b iv.). Overrepresentation of women of lower SES among pregnant women smokers is the result of historical trends in smoking initiation and cessation. While

smoking rates have declined over time, women of low SES have experienced a less steep decline relative to women in higher socio-economic groups. Coupled with this, cessation rates during pregnancy have been reported to be lower among low income and minority women, in the order of 6%–16% compared to 23%–40% in more affluent populations (Centers for Disease Control, 1992; Ershoff, Mullen, & Quinn, 1989; Mayer, Hawkins, & Todd, 1990; Windsor et al, 1993).

While the same set of social determinants is not documented in all studies, there is a clear pattern of findings from studies conducted in developed countries. In the UK, social class and employment class, which are more clearly delineated and measured than in Canada, have been equated with SES and studied as determinants of smoking in pregnancy. Morales, Marks and Kumar (1997), in the

London Cohort Study, found that pregnant smokers and their husbands were generally working class, consistent with other studies that report that pregnant women who smoke are likely to be of lower social class with fewer educational qualifications, less likely to be employed, or more likely to be on social assistance (Frost, Cawthorn, Tollestrup, Kenny, Schrage, & Nordlund, 1994; Graham, 1994, 1996; Tappin, Ford, Nelson, & Wild, 1996). Najman, Lanyon, Anderson, Williams, Bor and O’Callaghan, (1998) found that women in the lowest family income group had the highest rates of smoking before, during, and after pregnancy. Interestingly, however, while cessation rates were highest in the highest income group, relapse rates after birth were similar for all income groups. Lu, Tong and Oldenburg (2001) systematically reviewed nine published European cohort studies that examined determinants of smoking and cessation in pregnant women. Based on their classification scheme, a consistent and significant inverse relationship with smoking in pregnancy was found in 5–6 studies for maternal age, parity, SES, education and number of previous quit attempts. A consistent and significant relationship was found in 3–4 studies for social structure, occupation, and marital status.

Addressing the impact of social context on smoking within pregnant women’s lives has largely been avoided in smoking cessation strategies and interventions (Greaves, 1996; Horne, 1995), perhaps particularly for women of social and economic disadvantage. Stewart et al. (1996b) found that only 23% of women-centred cessation programs in Canada were appropriate for, or accessible to, disadvantaged women. Barriers to access include poverty, culture, language, literacy levels, and travel and child care costs (Health Canada, 1994a, Stewart et al. 1996a, Stout, 1997). In a study of spontaneous cessation of smoking and alcohol use among low-income pregnant women, Ockene et al. (2002) described a constellation of addiction, life worries, and a contextual environment that essentially reinforced continued smoking. Although realistic approaches to helping these women remain a challenge, it is important for health professionals to be aware of and acknowledge the difficulties these women

face. Smoking is rarely the only health challenge with which these women are confronted during pregnancy, and issues such as food and financial security, other substance abuse, and domestic violence may be more urgent. The social stigma of smoking in pregnancy is significant and may cause pregnant women to falsely report their smoking status if they feel that self-identification as a smoker will lead to harassment or increased feelings of guilt. Public health messages need to be framed and communicated in a way that is sensitive, non-judgemental, and relevant to the circumstances of these women’s daily lives.

High attrition rates are typically seen from smoking cessation programs among disadvantaged women (Lacey, Tukes, Manfredi, & Warnecke, 1991; Stewart et al., 1996b). Socio-demographic predictors of spontaneous quitting among pregnant women include being white, married, young, and educated (Cnattingius, Lindmark, & Meiriko, 1992). In the same study, the primary demographic characteristic predictive of sustained cessation was living with a non-smoking partner. Disadvantaged women may reject interventions because of previous negative experiences with the mainstream health care system (Browne, Shultis, & Thio-Watts, 1999; Stewart et al., 1996a). Women who attend unconventional support agencies such as community-based women’s centres tend to trust these agencies because of their focus on the broader issues of self efficacy, empowerment and the underlying social and economic factors influencing women’s lives. Approaches that divert attention away from “blaming the victim” and seek to increase acceptance and respect for individual values, capabilities, circumstances, and culture may carry particular relevance for women from disadvantaged groups (Lumley, Oliver, & Waters 2000).

ii) Social Networks

Social networks encompass marital status as well as family and social support structures. Increased risks of smoking during pregnancy have been associated with being without a partner and living with others who smoke (Halsam, Draper, & Goyder, 1997). Living with a smoking cohabitant was found to be associated with a sevenfold higher

risk than in those with lower education who lived with a non-smoking cohabitant (Nafstad, Botten, & Hagen, 1996). Conversely, women with a partner who did not smoke had higher rates of maintenance (Johnson, Ratner, Bottorff, Hall, & Dahinten, 2000). Parity has also been associated with smoking during pregnancy. The majority of studies found that women were less likely to smoke during their first pregnancy compared to subsequent pregnancies (Cnattingius et al. 1992; Dodds, 1995; Nafstad et al., 1996), though conflicting findings do exist (Isohanni, Oja, Moilanen, Koironen, & Rantakallio, 1995). Similarly, the number of children in the household has been positively associated with smoking, particularly among lone mothers (Jones, 1988 as cited in Oakley, 1989). Support can be further compromised when abuse occurs during pregnancy. Physical abuse during pregnancy is associated with higher use of tobacco, alcohol and illicit drugs, and detracts from cessation rates (McFarlane, Parker, & Soeken, 1996).

Stewart et al. (1996a, 1996b) and Graham (1996) emphasize the link between smoking and caring work, whereby lone parents in low-income households with few connections to the external working environment rely on smoking as a coping strategy and as a mechanism for claiming personal space. Oakley (1989) also found smoking in pregnancy to be associated with material disadvantage, social stress, low social support and lack of control over living conditions, factors which are more likely to be characteristic of the lives of women of lower socio-economic status.

iii) Role of Family Members in Influencing Smoking Behaviour

Research on the role of family members in influencing smoking and smoking cessation among pregnant/postpartum women and girls has been minimal. The few notable exceptions have highlighted the importance of family interactions in influencing tobacco reduction (Edwards and Sims-Jones, 1998; MacLean, Sims-Jones, Hotte, & Edwards, 2000; Wright, Bell, and Rock, 1989).

For example, couples who perceive themselves as a “working unit” in helping the woman quit or stay quit appear to be more successful with tobacco reduction.

There is evidence that partners play a powerful role in determining whether pregnant women quit smoking and whether they are able to maintain abstinence in the postpartum period (Johnson et al., 2000; McBride, Curry, Grothaus, Nelson, Lando, & Pirie, 1998; Pollak & Mullen, 1997; Wakefield & Jones, 1991). Compared to pregnant women who live with non-smokers, those who live with a partner who smokes are less likely to stop smoking during pregnancy and more likely to relapse during the postpartum period (McBride, Pirie, & Curry, 1992; Mullen, Quinn, & Ershoff, 1990). Despite this, the interaction processes underlying this phenomenon have not been fully explored, and partners have been virtually ignored as targets of intervention for pregnancy smoking cessation. There is ample research demonstrating that individual behaviour change influences, and is influenced by, all family members and the interrelational processes between family members (Wright and Leahey, 2000).

Although most of the research attention related to tobacco reduction during pregnancy has focused on women, partners of expectant women have also been the subject of research. Researchers have found, for example, that expectant fathers are more likely to quit or cut back (Waterson, Evans, & Murray-Lyon, 1990) and want their partners to quit smoking during pregnancy (McBride et al., 1998). Partner quitting may alter established interaction patterns within a relationship (Doherty & Whitehead, 1986) and, at least among some men whose partners are pregnant, concerns about stress-induced marital discord associated with smoking cessation that made the idea of quitting too much to cope with (Wakefield, Reid, Roberts, Mullins, & Gilles, 1998). Alterations in roles, responsibilities, and interactions that typically occur during the pre- and postnatal periods compound these complex dynamics. How couples engage each other in their efforts to promote family health through tobacco reduction endeavours remains unclear.

iv) Ethnicity

In the United States, minority women fare better than white women with respect to smoking in pregnancy, counter to expectations based on their relative social and economic disadvantage. African-American and Hispanic women generally have a lower prevalence of smoking in pregnancy than white women (Andreski and Breslau, 1995; Ruggiero and de Groot 1998; Wiemann, Berenson, & San Miguel, 1994) and immigrant women from South East Asia and the Middle East, (Bergen and Caporosa, 1999, as cited in DiClemente, Mullen, & Windsor, 2000; Potter, Lumley, & Watson, 1996; Ruggiero & de Groot 1998).

These ethno-cultural groups also have higher rates of cessation in pregnancy than do white women in similar socio-economic conditions (Lillington, Royce, Novak, Ruvalcaba, & Chlebowski, 1995). From 1989 to 1998 smoking among Aboriginal (specifically American Indian/Alaska native) pregnant women decreased by 2.8% to 20.2%, smoking among African-American pregnant women decreased by 7.6 % to 9.6%, and among Hispanic pregnant women decreased from 8.0% to 4.0% (US Department of Health and Human Services, 2001). Comparable statistics are simply not available in Canada. In one of the few Canadian studies to report on ethnicity, Connor and McIntyre (1999) found that immigrant women were 4.6 times more likely than non-immigrants to attempt to give up cigarettes during pregnancy. It is likely that cultural values, social norms and smoking rates in the country of origin play a large part in these differences.

In Canada the high prevalence of smoking noted in indigenous populations appears to correspond directly with their relative social and material deprivation (Kaplan, Lanier, Merritt, & Siegel, 1997; Wiemann et al., 1994), and systematic historical marginalization of Aboriginal women. Aboriginal peoples have the highest rates of smoking in Canada: in 1997, 62% of First Nations and 72% of Inuit were smokers compared with 29% of the general Canadian population (Reading, 1999). Smoking rates in the Northwest Territories

were 52.0% and 49.7% for men and women respectively in 1996 (NWT Bureau of Statistics, 1996). In Nunavut, overall smoking prevalence was 63.9%, with a prevalence of 77.9% for those aged 15 to 24 (both sexes). Given that the highest rates of smoking are found in the childbearing years, the smoking prevalence among pregnant Aboriginal women is likely to be extraordinarily high. However, this can only be hypothesized, as population-based age and sex-specific rates for these minority groups are not available. One study found that Aboriginal mothers were more than twice as likely as non-Aboriginal mothers to smoke during their pregnancies: 53% vs 26% respectively (Hildes-Ripstein reported in Williams, nd.). Very little information is available for African-Canadian and immigrant women in Canada.

v) Maternal Age

The impact of maternal age on smoking is difficult to assess. Conflicting findings have been reported among studies that have examined age in relation to smoking in pregnancy. Some studies report that younger women are more likely to be smokers at the time of conception (Cnattingius et al., 1992), and that older women have better cessation rates than younger women do (Mas, Escriba, & Colomer, 1996; Thue, Schei, & Jacobsen, 1995). Lawson (1994; as cited in Klesges et al., 2001) found that low-income, pregnant adolescents continued, or even increased, smoking during pregnancy to control weight and avoid dieting in the postpartum period. Conversely, there is also evidence to indicate that younger smokers are more likely to quit (Cnattingius et al., 1992; Isohanni et al., 1995), or to make an attempt to quit (Connor & McIntyre, 1999) during pregnancy, perhaps because they have not been smoking for as long and are therefore less dependent (O'Campo, 1995). Ockene et al. (2002) found that younger age was associated with spontaneous quitting, but the effect disappeared in multivariate analysis. This highlights the potential for confounding effects between age and other social factors such as education and income.

Teenaged girls are at risk for poor perinatal outcomes, and those who smoke cigarettes are at even greater risk. It is clear that many teenaged girls who smoke during pregnancy are dependent on tobacco and need the same types of support as women do. Failed quit attempts during adolescence are often related to nicotine addiction. Girls who experience withdrawal symptoms when they stop smoking should be treated much the same as women with nicotine addiction (Eissenberg, Stitzer, & Henningfield, 1999).

vi) Nicotine Dependence

The amount smoked prior to becoming pregnant has been used as an indicator of dependence, and may influence the relationship seen with age. In a multivariate analysis from the Norwegian Multi Center Study (Eriksson, Haug, Salvesen, Nesheim, Nylander, & Rasmussen, 1998), a low number of cigarettes smoked in the three months before pregnancy was the best predictor of smoking cessation. Women who smoked fewer than five cigarettes per day were 18 times more likely to quit in early pregnancy than those who smoked 20 or more cigarettes per day (Eriksson et al., 1998). In an unpublished study using data from studies by Windsor and Gielen (Windsor et al., 1998) among women who were exposed to a smoking cessation intervention, being a light smoker (<100 ng/ml baseline saliva cotinine) predicted cessation. Similarly, in a sample of pregnant women who received public health care support, lighter smokers (<55 ng/ml baseline cotinine) and those who had smoked for less than five years were more likely to quit (Woodby, Windsor, Snyder, Kohler, & DiClemente, 1999).

While a considerable proportion of women will spontaneously quit smoking or cut down on their tobacco use during pregnancy, there is a sub-group who do not reduce the amount they smoke. Indeed, it has been reported that a small proportion of women actually increase smoking during pregnancy (this may be due to increased circulating fluid volume and a dilution of nicotine); in addition, the metabolic clearance of nicotine has been reported to increase by a factor of 1.6 (Dempsey & Benowitz, 2001). A study by

Selby, Hackman, Kapur, Klein, & Koren (2001) found “unusually low serum concentration of nicotine” in a group of pregnant women who were heavy smokers and could not quit smoking, thus providing evidence of a sub-group of women with a pharmacokinetic predisposition to a high rate of nicotine metabolism. These researchers call for further genetic studies to confirm this finding.

vii) The Genetics of Nicotine Dependence

Abundant evidence of a genetic influence on smoking behaviour exists (for reviews see Arinami, Ishiguro and Onaivi, 2000; Munafo, Johnstone, Murphy, & Walton, 2001; and Picciotto and Corrigan, 2002). While research on this topic is ongoing, emerging data suggest that genetic influences on male and female smoking initiation and maintenance are unequal (Li, Cheng, Ma, & Swan, 2003 [review]; Madden, Heath, Pedersen, Kapiro, Koskenvuo, & Martin, 1999; but see also Munafo et al., 2001 [review]). According to a recent meta-analysis, heritable factors are more important in determining female smoking initiation than persistence, whereas in men, genes play a more important role in maintenance of smoking (Li et al., 2003). For female smokers, the environmental sphere, including socio-economic class, and parent and friend smoking seems to be more important in determining current smoking status (Madden et al., 1999; White, Pandina, & Chen, 2002).

While the relative male/female differences observed in genetic influence on smoking seem to be stable across cultures (Madden et al., 1999), few data exist on which particular ethnic groups, if any, carry genes that predispose them to detrimental smoking outcomes. Since smoking is a polygenetic phenotype (smoking behaviour is influenced by many genes), it is extremely difficult to determine with certainty if any particular group is at increased risk. Available research indicates that African-American smokers may absorb more nicotine per cigarette (Perez-Stable, Herrera, Jacob, & Benowitz, 1998), and metabolize cotinine (the major by-product of nicotine breakdown) more slowly than whites do (Carabello et al., 1998;

Perez-Stable et al., 1998), possibly due to an interactive effect with menthol (Ahijevych, Tyndale, Dhatt, Weed, & Browning, 2002). Chinese smokers metabolize nicotine more slowly than their white and Latino counterparts, and take in less nicotine per cigarette than whites and Latinos (Benowitz, Perez-Stable, Herrera, & Jacob, 2002). Despite these differences, however, the current state of knowledge is such that classification based on ethnicity is not specific enough to provide improved treatment. “Race” has limited biological significance (Benowitz, 2002)—only genotyping procedures on *individuals* would determine if they have genes that predispose them to metabolic problems.

Genotyping has the potential to greatly improve smoking cessation treatments, since both pharmacological and behavioural interventions could be tailored on the basis of genetic information. This has treatment implications for all groups of smokers, but may be especially important in those who are pregnant. Wang et al. (2002) recently demonstrated that smoking mothers with poor nicotine-metabolizing genes are more than twice as likely to have low-birth-weight babies than are smoking mothers who metabolize nicotine and clear its toxic by-products more efficiently. The effects of fetal genotype on this process are unknown. This has obvious implications for the treatment of pregnant smokers and may alleviate concerns about the use of nicotine replacement therapies (NRTs) in pregnant women who are able to efficiently metabolize the compounds produced during nicotine breakdown.

viii) Effects of Smoking During Pregnancy

While genetic influences on smoking are important to consider, physical environmental factors are similarly influential. Some research has examined the effects of nicotine exposure in the womb on smoking behaviour later in life. Interestingly, Cornelius, Leech, Goldschmidt and Day, (2000) found that 10-year old children were 5.5 times more likely to experiment with tobacco if their mothers had smoked more than half a pack per

day during gestation, regardless of their mother’s current smoking status. This finding, coupled with evidence from animal studies documenting changes in the biological arrangement of fetal nicotine receptors and other effects resultant from nicotine exposure during gestation (e.g., Miao et al., 1998), indicates that the fetal environment can impact subsequent smoking behaviour.

As mentioned above, there are well-known effects of smoking on women’s health as well as on fetal, infant, and child health. Smoking during pregnancy is associated with adverse reproductive outcomes such as prematurity, low birth weight, sudden infant death syndrome (SIDS), and child behavioural problems. While the risks to fetal health are dose dependent, the precise mechanisms by which smoking harms the fetus are not well understood. However, there are a number of pathways through which smoking probably exerts its negative effect:

1. Nicotine is a toxin at the cellular level and also has vasoconstrictive properties. Uteroplacental insufficiency has been commonly cited as the mechanism by which smoking causes fetal growth retardation and placental abruption. It is hypothesized that nicotine causes vasoconstriction of uteroplacental blood vessels, which reduces blood flow to the placenta and decreases delivery of oxygen and nutrients to the fetus. However, the validity of this mechanism has been questioned recently (Dempsey and Benowitz, 2001).
2. In addition to nicotine, cigarette smoke contains carbon monoxide, cyanide, lead, arsenic, and 3,000 other potential toxins (Klesges et al., 2001). Carbon monoxide—a major by-product of cigarette smoking—binds to hemoglobin and decreases the blood’s oxygen-carrying capacity which results in hypoxia in fetal tissue.
3. There is evidence that nicotine exposure has direct effects on the fetus’ developing nervous system and that relatively small amounts of exposure can cause cell damage and reduced cell number. This effect can lead to problems with neonatal respiratory control. The placenta

does provide significant fetal protection and research suggests that episodic drug delivery produces less exposure to the fetus than continuous drug delivery (Slotkin, 1998).

4. Smoking may alter maternal/fetal nutritional status (Benowitz et al., 2000). It has been reported that women who smoke during pregnancy have lower and decreasing folate levels in pregnancy (Pagan, Hou, Goldenberg, Cliver, & Tamura, 2001; van Wersch, Jassens, & Zandvoort, 2002). While some think this may be due to smoking's influence on nutritional patterns (smoking alters appetite and taste), McDonald, Perkins, Jodouin, & Walker (2002) reported no dietary folate differences in smokers and non-smokers who had significantly different serum folate levels. They hypothesize

that there is a gene-environment interaction that accounts for this difference and suggest that pregnant women who smoke may benefit from higher doses of folic acid periconceptually.

It is likely that the mechanisms for the adverse effects of smoking in pregnancy are multifactorial and perhaps phasic (i.e., the timing and exposure of cigarette smoking may differentially affect pregnancy outcomes). Some studies suggest that negative outcomes are most pronounced with continued smoking during the second half of pregnancy (Slotkin, 1998). Although quitting smoking early in pregnancy is most desirable, quitting late in pregnancy also seems to have benefits when compared with continued smoking (Klesges et al., 2001).

2c. Relapse among Postpartum Women and Girls

Currently, there are no pharmacological or behavioural interventions that are truly effective at preventing smoking relapse (Piasecki, Fiore, McCarthy, & Baker, 2002). Relapse therefore presents a significant challenge for individuals engaged in smoking cessation and for clinicians supporting cessation efforts. In particular, the problem of smoking relapse among pregnant quitters is receiving increasing attention. Although pregnancy provides a strong inducement for many women to stop smoking, studies have revealed that up to 70% of the women who stop smoking for pregnancy resume smoking within the first six months of giving birth (Fingerhut, Kleinman, & Kendrick, 1990; Mullen, Richardson, Quinn, & Ershoff, 1997). These relapse rates are similar to the rates for other groups of quitters but, unlike other quitters, many pregnant women typically experience periods of prolonged abstinence before they relapse. Despite this, their vulnerability to relapse, especially during the immediate postpartum period, is, at least superficially, remarkably similar to that of early quitters (Stotts, DiClemente, Carbonari, & Mullen, 1996).

Studies of predictors of postpartum relapse have identified a variety of risk factors related to a

return to smoking including “taking puffs,” self-efficacy, types of coping strategies, and deciding not to breastfeed or to stop breastfeeding (McBride et al., 1992; Mullen et al., 1997). Understanding postpartum relapse is further complicated by the fact that the postpartum period represents a significant life change as women make the transition to new parenthood and that factors contributing to abstinence during pregnancy may either be absent or operate differently during the postpartum period (Klesges et al., 2001).

One of the most influential theories in the addictions field that addresses relapse after behaviour change and provides direction for preventing relapse is Marlatt's relapse model (Marlatt & Gordon, 1985). In this work, relapse is conceptualized as process influenced by cognitive and behavioural mechanisms rather than as a discrete, irreversible event. In addition, initial uses of the substance (lapses) are distinguished from a full return to regular use (relapse). Relapse prevention training based on this model includes skill training to anticipate and resist lapsing in high-risk situations and cognitive restructuring to deal with self-defeating attributions after the lapse. Although relapse prevention training may be a promising

approach for use with pregnant and postpartum women, questions are being raised about whether women's experiences with postpartum smoking relapse are congruent with the model's explanation of relapse.

For example, in a qualitative study focusing on the meanings that postpartum women ascribe to their experiences of smoking relapse, Bottorff, Johnson, Irwin, & Ratner, (2000) describe five narratives of relapse. Of particular note is that, in several of the narratives of relapse, women did not demonstrate the self-defeating attributions suggested as a key component of relapse in Marlatt's model. Rather, women looked forward to smoking again as a reward for temporary abstinence and described their relapse as a way to manage the stress of caring for a new baby. Because smoking was a coping strategy that had been effective in the past, they saw no other alternative but to return to smoking. Despite the fact that the stresses during the postpartum period are well documented and that stress is one of the main factors associated with smoking relapse, stress reduction has not been a strong component of relapse prevention interventions for pregnant and postpartum women. This may be in part because stress is not a prominent component in most relapse prevention models such as Marlatt's.

Stages and processes of behavioural change described in the Transtheoretical Model (Prochaska, DiClemente, & Norcross, 1992) have also been used to understand the process of pregnancy smoking cessation. Theoretically, according to the stages of behaviour change, pregnant quitters are considered to be in the action phase because they have quit smoking. It has been suggested, however, that the relatively high postpartum relapse rates may be an indication that women who have quit during pregnancy have not fully prepared themselves to quit and may, in fact, be more like those who are at earlier stages of the behaviour change process.

When the mechanisms that characterize smoking cessation are examined in groups of pregnant and non-pregnant women who are quitting smoking, important differences have been observed (Stotts et al., 1996). Pregnant quitters reported significantly lower levels of experiential and behavioural

change processes as well as significantly higher levels of confidence to abstain from smoking and lower levels of temptation compared to non-pregnant women in the action phase.

Stotts et al. (1996) conclude that the change mechanisms are very different for pregnant smokers. Low utilization of cognitive-affective and behavioural coping strategies appear to underlie the relative ease with which pregnant smokers stop smoking and lead to their exaggerated sense of confidence to remain smoke-free and resulting experiences of low levels of temptation to smoke. Using these findings to explain women's high rate of relapse in the postpartum period, these researchers suggest pregnancy smoking cessation is a case of "mistaken identity." They propose that, because pregnant women's cessation efforts are essentially an externally motivated (that is, for the baby) "stopping" rather than an internal, intentional process of change, smoking cessation during pregnancy should be considered as a time-limited restriction or suspension of behaviour.

As such, many pregnant quitters enter the postpartum period unprepared, and sometimes unwilling to maintain smoking cessation and consequently resume smoking soon after the baby is born. Since the Transtheoretical Model attempts to explain "intentional behavioural change," Stotts, DiClemente, Carbonari, & Mullen (2000) raise questions about the usefulness of this construct in guiding interventions for pregnant and postpartum women and call for further research to describe externally motivated or imposed cessation and its underlying mechanisms to provide a basis for more effective intervention strategies. A potentially useful tool for identifying pregnant quitters who are "truly" in the action phase of the smoking cessation process and those further behind in the process of change and, therefore, at high risk for postpartum smoking relapse has been developed by Stotts and her colleagues (2000). The three-item algorithm assesses personal goals, self-efficacy, and smoking behaviour and is used to categorize women's "suspended" tobacco use into four stages of change for postpartum smoking abstinence (i.e., precontemplation, contemplation, preparation, and action; see Appendix 8a, page 63).

Preliminary data support the use of this relatively simple tool for classifying abstinent pregnant smokers who were relatively light smokers of higher educational and socio-economic status levels. It also needs to be recognized that women's responses to the screening questions may be influenced in part by what it is possible for them to say. Analysis of the explanations provided by mothers who smoke suggest that dominant social discourses related to tobacco use and motherhood not only create dissonance for women but influence the way they respond to others (Irwin, Johnson, & Bottorff, in review).

Nevertheless, given the lack of tools for clinicians who interact with pregnant and postpartum quitters, this screening tool is an innovative and promising development that may provide a basis for tailoring interventions strategies. Finally, the implication arising from Stotts et al.'s research is that pregnant women who have "stopped" smoking for pregnancy need intensive interventions as they enter the postpartum period if we are to support them in converting their smoking cessation effort into a long-term commitment to cessation. In addition, such interventions will need to extend well into the postpartum period if we are to prevent late relapse.

In summary, successful relapse prevention strategies will depend on a better understanding of the factors that contribute to relapse and how they interact across the entire process of smoking cessation. Further exploration of the usefulness of emerging concepts such as relapse susceptibility and cessation fatigue, and reconceptualizing motivation to quit as a dynamic factor that can "wax and wane" over the cessation period is likely to generate novel directions for interventions (Piasecki, et al. 2002). Although there is increasing recognition that the relapse experiences of pregnant quitters are unique, there are important gaps in the literature. The focus on postpartum smoking relapse ignores any recognition of relapse experiences that occur prior to the birth of the baby. There is evidence that relapse prior to delivery may be as high as 21% to 25% among spontaneous quitters (Klesges et al., 2001; Quinn, Mullen, & Ershoff, 1991). In addition, the smoking relapse experiences of pregnant adolescents have not been documented even though there are potentially important factors specific to this age group that influence their relapse risk.

2d. Treatment Approaches

i) Treatment of Tobacco Dependence in Young Girls and Women of Reproductive Age

Traditional approaches to helping tobacco users have involved the provision of clinical treatments including pharmaceutical aids and counselling. However, a series of factors limits the potential of clinical treatments to make a population impact. Moreover, many attempts to treat lack a solid scientific foundation and are inaccessible and underutilized.

Social factors affecting many smokers such as poverty and low education, transportation, child care issues and other factors may reduce the accessibility of treatments. Part of a comprehensive

response to smoking among pregnant smokers could be policies that improve social determinants of health such as housing and income. At the intervention and social levels, victim-blaming must be avoided and the notion of smoking as a "lifestyle choice" must be replaced with the acknowledgment that smoking is a social structural issue.

The social environment can facilitate or inhibit quitting. For example, compared to smokers who received no support, those who received positive support were more likely to remain abstinent after a quit attempt while those who resided in a negative social situation were less likely to remain abstinent (Hill-Rice et al., 1996). Further, a history of either physical and/or sexual abuse is

associated with higher substance use both before and after pregnancy confirmation (McFarlane et al., 1996). Pregnant women have reported that abuse begins or increases when they refuse to use substances with the abuser (McFarlane et al. 1996).

A recent clinical trial involving more than 500 heavy US smokers found that the most powerful predictor of long-term abstinence was how much negative effect participants experienced, and their expectations of how well nicotine replacement products might ameliorate such symptoms (Kenford et al., 2002). The tendency to experience negative effects was not only a more accurate predictor of abstinence than traditional measures of nicotine dependence, but it accounted for most of the predictive validity of these measures (Kenford et al. 2002). This is part of a growing body of research demonstrating that how a quitter deals with negative emotions associated with their quit attempt (as opposed to pre-existing or coexistent affective and psychological distress) has a large impact on the ability to remain smoke-free (McDonald, 2003). Caggiula et al. (2001) have recently underscored the importance of psychological conditioning and reinforcement in the maintenance of smoking behaviour, and call for increased consideration of smoking-associated cues in cessation strategies. While many believe the primary difficulty in quitting rests with overcoming biological factors through pharmacotherapy and other treatments, the influence of cognitive, affective, and environmental factors is also substantial. Hence, an effective cessation strategy must extend well beyond the issues of human biology to address the social, economic, and physical environment issues as well as intrapersonal factors.

ii) Nicotine Replacement

The issue of nicotine dependence among girls and women who continue to smoke during pregnancy has been largely ignored in the practice setting. It is widely assumed that pregnant women will be motivated to quit for “the good of the child” and that consideration of the addictive nature of nicotine is therefore unnecessary. Addiction has been defined in a variety of ways, and it generally agreed that it can be characterized as the compulsive use

of a drug that has psychoactive properties and that may be associated with tolerance and physical dependence (Kalant, 2000). Most individuals who smoke every day are addicted to nicotine and will experience withdrawal symptoms once they stop smoking. It follows that the majority of pregnant women who smoke daily are addicted to nicotine. There is no demarcated threshold that is indicative of addiction: some individuals who smoke as few as five cigarettes per day can experience significant withdrawal symptoms (Kalant, 2000).

However, the adverse effects of smoking can be avoided if pregnant smokers quit smoking. Human and animal data indicate that the risk of cigarette smoking during pregnancy is far greater than the risk of exposure to pure nicotine (Dempsey & Benowitz, 2001). In those who cannot quit there is evidence that use of harm reduction approaches such as reducing the amount smoked or using NRT (thereby limiting CO exposure) have benefits to the mother and the child.

iii) The Role of Harm Reduction in Perinatal Smoking Cessation

Harm reduction in general refers to the application of policies, programs, methods, and products aimed at reducing or minimizing the impact of harm associated with certain behaviours (Poole & Robertson, 1999). Applied broadly, wearing a seatbelt or bicycle helmet, driving the speed limit, or using condoms are all considered harm-reduction practices. Applied specifically to the field of tobacco control, harm-reduction methods are intended to minimize the incidence of tobacco-related disease and death (Warner, 2002).

A harm-reduction approach within the field of tobacco control comprises a variety of methods including the implementation of tobacco control policies (e.g., increasing taxes and smoking bans), the prevention of smoking initiation, assistance with cessation, protection from environmental tobacco smoke, and the use of NRT products (Hatsukami et al., 2002; Warner, 2002).

While a harm-reduction approach is frequently adopted by the wider substance use field, there is resistance to applying a harm-reduction approach to tobacco use. Critics argue that the tobacco industry itself is spearheading the harm-reduction approach as a means of promoting alternate nicotine delivery systems that include tobacco, that a harm-reduction approach gives tobacco users false hope about the effectiveness of NRTs, that there is little evidence that a harm-reduction approach to smoking intervention leads to long-term quitting and, further, that such an approach serves to maintain, not reduce, harm (Fiore, Hatsukami, & Baker, 2002; Pierce, 2002; Warner, 2002).

The response to these criticisms is that harm reduction is a relatively new approach and it takes years for tobacco-related diseases to develop; therefore, the full impact of harm-reduction strategies are not known (Hatsumaki et al., 2002). Further, while the United States Public Health Service Clinical Practice Guidelines (Fiore et al., 2002) cite insufficient evidence to support harm reduction as an effective strategy, Fox and Cohen (2002) argue that the failure lies with health professionals who do not implement the guidelines systematically. Consequently, the effectiveness of a harm-reduction approach to tobacco use cannot be assessed without ensuring that the strategies are implemented fully and consistently.

The potential benefits of a harm-reduction approach for some groups of smokers (e.g., pregnant women, low-income individuals, individuals with a mental illness, and heavy smokers) are significant and need to be explored (Hatsumaki et al., 2002). There is evidence that a harm-reduction approach to tobacco use with pregnant women (especially heavy smokers or those who continue to smoke throughout their pregnancy) has the potential to reduce harm to both the woman and her fetus (Hanna, Faden, & Dufour, 1997; Li, Windsor, Perkins, Goldenberg, & Lowe, 1993).

Suggested harm-reduction strategies for pregnant tobacco users include reducing the number of cigarettes smoked, stopping smoking for brief periods of time at critical points in pregnancy and around delivery, engaging in health protection behaviours

such as taking vitamins and exercising, reducing ETS exposure, and addressing partner smoking (DiClemente et al., 2000). While complete smoking cessation during pregnancy would have the greatest positive health impact on the pregnant woman and the fetus, reduced exposure to the health-damaging effects of tobacco is a better alternative to no change in exposure. A recent study by England et al. (2001) indicates that the dose-response relationship between tobacco exposure and infant birth weight is nonlinear. As such, reduced tobacco exposure needs to be further explored as a feasible approach to addressing smoking among those pregnant women who find it particularly difficult to change their smoking behaviour.

iv) Smoking Cessation Models/ Programs in Substance Abuse Treatment

Substance use treatment programs are increasingly using harm-reduction strategies. In addition, nicotine addiction is beginning to find a place in the wider context of substance use treatment settings and interventions. Historically, nicotine addiction has largely been ignored by the wider substance abuse treatment field, despite the high rates of tobacco use among individuals with alcohol and other substance use problems. There is evidence that the combined effects of smoking and alcohol are even more detrimental to health than the effects of either substance alone (Blot, 1992; Castellsague et al., 1999). In the case of pregnancy, the combined health-damaging effects of tobacco and other substances have the potential to harm both the pregnant woman and her fetus.

Although cigarette smoking poses a serious threat to the health of substance-addicted women (including pregnant women), there has been resistance to considering nicotine a “problem drug” along with other substances in addictions treatment programs. This resistance stems from three major sources. The most significant barrier has been the perception that addressing cigarette smoking will interfere with, and have a negative impact on, treatment for alcohol and other drugs

(Hahn, Warnick, & Plemmons, 1999). Second, there has sometimes been resistance from staff members who may themselves be smokers to incorporating a smoke-free environment (Bobo and Davis, 1993). Finally, addictions treatment programs have mirrored the societal resistance to accepting cigarette smoking as similar to other problem substances such as alcohol, drugs, and caffeine.

Over the past decade, evidence has slowly emerged to indicate that treating nicotine addiction does not interfere with alcohol and other drug treatment (Hurt et al., 1994; Martin et. al., 1997). In addition, some studies have found that treating nicotine addiction in conjunction with alcohol and other drug addictions increases the chance of maintaining sobriety (Bobo, Schilling, Gilchrist & Schinke 1986; Orleans & Hutchinson, 1993; Trudeau, Isenhardt, & Silversmith, 1995). Treatment centres have addressed staff resistance by creating smoke-free work environments (e.g., Fishman and Earley, 1993). Among the strategies employed in implementing such measures include offering, supporting, and paying for staff to undergo smoking cessation programs themselves (Campbell, Krumenacker, & Stark, 1998). These measures are important as Campbell et al. report that success was greatest in treatment settings in which the smoking cessation program was staff-supported and integrated with substance abuse treatment.

Examples of settings where cigarette smoking is addressed in conjunction with other substances include CODA in Portland, Oregon (Campbell et al., 1998); the Counterpoint Unit at CPC Parkwood Hospital in Atlanta, Georgia (Fishman and Earley, 1993); the Minneapolis VA Medical Center (Pletcher, 1993) in the United States; and in Canada the Aurora Centre (Poole, Greaves & Cormier, 2003), the Centre for Addiction and Mental Health in Toronto (Bernstein & Stoduto, 1999), and through programming by the Ontario-based Action on Women's Addiction—Research and Education (AWARE). At the Aurora Centre in Vancouver, British Columbia, nicotine addiction is routinely addressed as part of the substance use treatment program. At the Aurora Centre, an additional important factor has emerged that affects the introduction of tobacco cessation into addictions treatment. When asked, 39% of the women in the residential treatment program and 48% of the women in the day treatment program identified nicotine as one of their top three problem substances. Given that the women themselves identify nicotine as a key “problem drug” it is imperative that addictions treatment programs respond to this perception and identification (Poole et al., 2003).

With the integration of the tobacco intervention field and alcohol and other substance use intervention field, it is clear that substance use treatment settings have the potential to intervene with pregnant tobacco users who may or may not have other substance use issues.

3 Methodology

Evidence in this Review is drawn from two main areas: literature describing smoking cessation interventions/strategies for pregnant and postpartum women and girls, and broader theoretical literature that contributes to our understanding of smoking and relapse in these populations. Chapter 3, describes the process by which the interventions and programs materials aimed at pregnant smokers were evaluated. In Chapter 4, these results are described, and in Chapters 4 and 5, the results are considered in light of other, broader evidence. Chapter 6 contains the final Better Practice Recommendations.

The interventions considered in this report are aimed directly at pregnant and postpartum women themselves, and are generally self-administered or given by health care professionals. The following is

a critical analysis of aspects of those interventions. However, there are other population-based strategies such as taxation and pricing policies, advertising campaigns and environmental tobacco smoke regulations which have not been evaluated here (see, for example, Ringel & Evans, 2001). Comprehensive tobacco control programs clearly affect pregnant women as a sub-group of the population.

It should be noted that the success of each of the interventions reviewed here is likely affected by factors, such as clinician adherence to intervention protocols or the type of provider or professional delivering the intervention.

3a. Target Population

Smoking cessation and reduction interventions targeted at women who are pregnant or postpartum have been reviewed. In addition, interventions and programs tested in or targeted at specific sub-populations of this group (i.e., teen girls [see Section 4c], Aboriginal women [see Sections 4e

and 4h], low-income women [see Section 4e], francophone women [see Section 4e], heavy smokers [see Section 4c], relapsers [see Sections 4c and 4g], continuous smokers [see Section 4c] and spontaneous quitters [see Section 4c]) have been reviewed.

3b. Body of Evidence

Information about smoking cessation and relapse-prevention models targeting pregnant and/or postpartum girls and women was collected from a variety of sources. The scope of the review focused primarily on evidence from Canada and the United States although smoking cessation and

relapse-prevention models for pregnant and postpartum girls and women from other developed countries such as Australia and the UK were also reviewed. See Appendix 8f for a list of search terms.

Two main sources provided evidence for the Review:

- 1) Studies evaluating the efficacy or effectiveness of a smoking intervention targeted at pregnant and/or postpartum girls/women were included in the Review. Evidence from peer-reviewed journals, government reports, books, book chapters, material presented at conferences, and material identified through expert consultation was retrieved for this Review. Eighty reports on the effectiveness of smoking interventions directed at our target populations were identified through this process. Additionally, organizations delivering smoking cessation and relapse-prevention programs targeting their services to pregnant and postpartum girls and women across Canada were contacted directly for existing evaluation data. Evaluation data from an additional four smoking cessation programs were obtained for the Review.
- 2) A comprehensive list of smoking cessation programs in Canada and abroad targeted at girls and women who are pregnant or postpartum has been distilled from over 100 programs listed in a variety of sources, including Health Canada's *Inventory of Smoking Cessation Programs* (1997 and 2001 update), a list of projects funded by CIHR in the area of tobacco control and pregnancy, various tobacco-related Web sites, and a contact list provided by team member Dr. David Aboussafy. Over 50 agencies have been contacted, via email, fax, and telephone in order to request program materials.

To be included in the review, studies had to be published (or conducted, if unpublished) after 1990. Additionally, the intervention had to be targeted at pregnant or postpartum women or girls with the intent to assist in the quitting or reduction of tobacco use. Search terms and databases used are described in Appendix 8f.

3c. Data Extraction

The first step in the review process was to extract information from each of the pieces of evidence identified above. A Data Collection Form was developed to record information about all smoking interventions. This form was divided into five sections:

- 1) **Identification Information.** This section included the name and location of delivery of the intervention, a description of the source of the evidence, and a general description of the program itself.
- 2) **Program or Intervention Information.** This section outlined more details about the intervention, including the setting of delivery, a description of the service providers, and more information about the intervention itself (e.g., the theory on which the intervention was based, the components of the program, length of the intervention, target population, and service fees).
- 3) **Evaluation—Participants.** When applicable, this section described the demographic characteristics and smoking behaviour of the participants in the study testing the intervention.
- 4) **Evaluation—Methodology.** For interventions that were evaluated, this section identified the general methodology, including design, measures, and timeline of the study.
- 5) **Evaluation—Outcome.** This section outlined the results of the study and described its limitations.

3d. Data Analysis: Rating the Strength of the Evidence

Separate processes were used to review studies evaluating smoking interventions and to review the potential of program materials with no accompanying evidence to have an impact on the smoking behaviour of the target population (see Figures 3.1-3.3, pages 23-25). This section describes the rating of interventions and programs materials with accompanying evaluation data. Program materials with no evaluation data are described in Section 3h.

The process of rating the strength of the evidence involved a multi-step scheme:

1. Any study examining the impact of a smoking cessation intervention aimed at pregnant or postpartum women was included in the review.
2. A rating system similar to the one adopted by Miller et al. (2001) for their Best Practices review of group smoking cessation was used in this review. Few models are available for designing a ratings system; Miller et al.'s model was deemed the most promising and most appropriate approach despite several limitations (discussed in Section 4b). Each study identified through Step 1 was designated as either a Randomized Controlled Trial ("experimental design with random assignment of participants to groups"), a Controlled Trial ("experimental design with comparable treatment and control groups"), or a Quasi-Experimental Design ("pre-test/post-test design or observational study").
3. Questions 1 through 7 of the Randomized and/or Controlled Trial Rating Scale (Questions 1 through 6 for the Quasi-experimental scale) were used to categorize studies which included the pregnancy period. Scores on all questions were summed. Scores ≥ 5 fell into the "A" category while scores < 5 fell into the "B" category (for the Quasi-experimental scale, scores ≥ 4 were classified as "A" and scores < 4 fell into the "B" category. Studies assigned a 0 or less did not receive a rating and were eliminated from the review.

Figure 3.1

Study Rating Scale—Randomized and/or Controlled Trials

1. Were the groups comparable at baseline with respect to demographic variables, tobacco use measures, and gestational week?

All (all variables measured; comparable on all variables) (1)

Some (all variables measured; comparable on some variables) (0)

None (some variables not measured) (-1)

2. Participants lost at follow-up considered smokers or adequate justification provided for why not? (Intent to treat)

Yes (1) No (0)

3. Attrition rate > 25%? (attrition due to factors other than loss of fetus)

Yes (-1) No (0)

4. Spontaneous quitters (i.e., women who quit prior to undergoing intervention) included in study?

Yes (-1) No (0)

5. Outcome assessment relies on corroboration of self-report or biochemical validation?

Yes, fully (2) Yes, partially (1) No (0)

6. Outcome assessment includes follow-up into postpartum period?

Yes (1) No (0)

7. Appropriate statistical test used for comparisons involving smoking outcome?

Yes (1) No (0)

Scoring: Scores on questions 1 to 7 were summed. Scores ≥ 5 fell into the "RCT A" or "CT A" category while scores < 5 fell into the "RCT B" or "CT B" category. Studies assigned a 0 or less did not receive a rating and were eliminated from the review.

Figure 3.2

Study Rating Scale—Quasi-Experimental Studies

- 1. Participants lost at follow-up considered smokers or adequate justification provided for why not? (Intent to treat)**

Yes (1) No (0)

- 2. Attrition rate > 25%? (attrition due to factors other than loss of fetus)**

Yes (-1) No (0)

- 3. Spontaneous quitters (i.e., women who quit prior to undergoing intervention) included in study?**

Yes (-1) No (0)

- 4. Outcome assessment relies on corroboration of self-report or biochemical validation?**

Yes, fully (2) Yes, partially (1) No (0)

- 5. Outcome assessment includes follow-up into postpartum period?**

Yes (1) No (0)

- 6. Appropriate statistical test used for comparisons involving smoking outcome?**

Yes (1) No (0)

Scoring: Scores on questions 1 to 6 were summed. Scores ≥ 4 fell into the “Quasi A” category while scores < 4 fell into the “Quasi B” category. Studies assigned a 0 or less did not receive a rating and were eliminated from the review.

4. For studies concentrating on the postpartum period only, questions 1, 2, 3, 5, and 7 (questions 1, 2, 4, and 6 for the Quasi-experimental scale) were used to categorize interventions. For controlled postpartum interventions, those scoring 4 or above were classified as “A” and those scoring less than 4 were classified as “B.” For quasi-experimental postpartum interventions, those scoring 3 or above were classified as “Quasi-A” and those scoring less than 3 were classified as “Quasi-B.” Studies assigned a 0 or less did not receive a rating and were eliminated from the review.

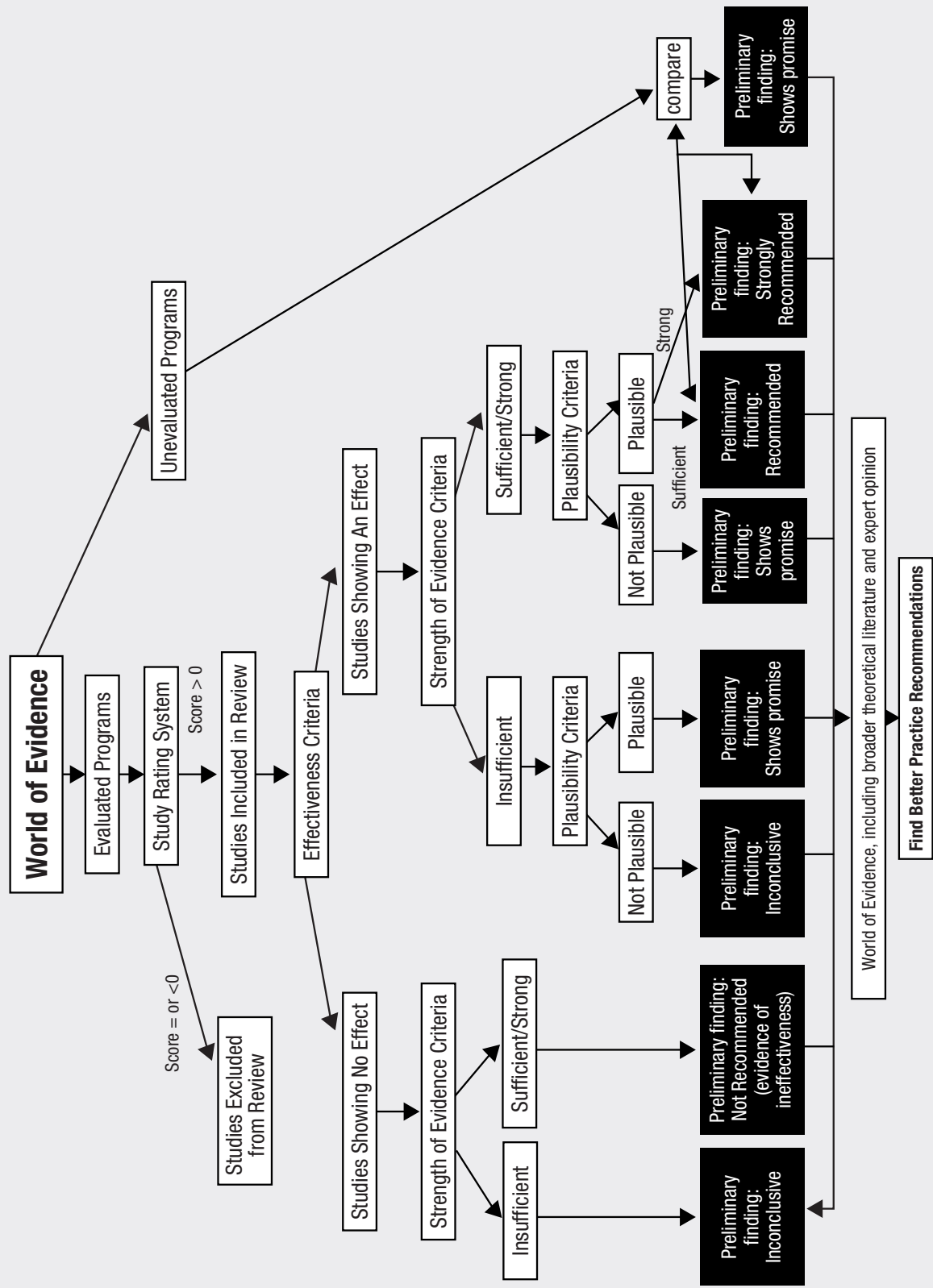
Studies scoring 1 or above fell into one of six categories, based on their score:

- 1) RCT A
- 2) RCT B
- 3) CT A
- 4) CT B
- 5) QUASI A
- 6) QUASI B

Studies scoring zero or less did not receive a rating and were eliminated from the review. (See Appendix 8f for a further description of the ratings process.) The results of the review are summarized in Appendices 8b and 8c.

Figure 3.3

Study Classification Scheme



3e. Identifying Effective and Ineffective Interventions and Program Components

Rated studies scoring 1 or above were divided into two groups, those showing a significant difference between treatment and control groups in smoking outcomes, and those not showing a statistically significant effect. Each study of an intervention was rated as either “strong evidence,” “sufficient evidence,” or “insufficient evidence,” based on the criteria outlined below.

Strong Evidence:

- 1) Design = RCT/CT A *and* Number of Studies = Minimum 2
- 2) Design = RCT/CT B *or* Quasi-Experimental A *and* Number of Studies = Minimum 5

Sufficient Evidence:

- 1) Design = RCT/CT A *and* Number of Studies = Minimum 1
- 2) Design = RCT/CT B *or* Quasi-Experimental A *and* Number of Studies = Minimum 3
- 3) Design = Quasi-Experimental B *and* Number of Studies = 5

Insufficient Evidence:

- 1) Design = RCT/CT B *or* Quasi-Experimental A *and* Number of Studies < 3
- 2) Design = Quasi-Experimental B *and* Number of Studies < 5

3f. Applying Plausibility Criteria

Interventions were evaluated against the following plausibility criteria:

- Time Sensitivity: Is the intervention current or still considered reliable?
- Replicability: Is there enough information about how to implement the intervention effectively?
- Generalizability: Is the intervention appropriate to the target population or sub-populations?
- Cost benefit: Is the intervention worth the cost of implementation?

3g. Preliminary Recommendations

Interventions and program components were recommended on the strength of the evidence and meeting the plausibility criteria. Interventions and components backed with strong evidence of effectiveness that met all of the plausibility criteria were strongly recommended as “Best Practices”; whereas interventions and components with sufficient evidence of effectiveness that met all of the plausibility criteria were recommended as “Better

Practices.” Intervention studies that showed a significant effect but where the strength of the evidence was insufficient were evaluated against the plausibility criteria. Those interventions rated as plausible were classified as “Showing Promise.” Those interventions backed by strong or sufficient evidence but which failed to meet the plausibility criteria were also designated as “Showing Promise.”

3h. Review of Program Materials

Smoking cessation methods that are primarily recognizable through their materials, rather than published academic literature, are classified as programs in this review. Programs may or may not have evaluation data—those with accompanying information on smoking cessation outcomes have been considered in the same way as interventions and have been subjected to the review process outlined above. The details of our review of evaluated program materials are summarized in Appendices 8b and 8c.

Programs for which there is no evidence have undergone a different review process. Program materials were reviewed for content and individual components of each program will be identified. Programs that use all, or the majority of, the components backed by evidence that also meet the plausibility criteria were classified as “Showing Promise.”

3i. Final Better Practice Recommendations

Preliminary recommendations generated by the Best Practices Model were considered in the context of broader literature (described in Chapters 4 and 5) to arrive at final Better Practice Recommendations, presented in Chapter 6. These Final Recommendations draw on available evidence regarding both interventions and program materials, and other theoretical work.

Results: Smoking Cessation Interventions and Programs for Pregnant/Postpartum Women and Girls

4a. Smoking Cessation Interventions

A total of 58 studies were included in our review, of which 20 showed statistically significant differences in smoking cessation outcomes between treatment and control groups. Based on evidence of their effectiveness and methodological strength (see page 26), six interventions were recommended, and 14 interventions were classified as “showing promise.” These interventions are listed in Tables 4.1 and 4.2 below. Program materials with no available evaluation data are considered separately in Section 4f (see page 38).

Of the interventions listed in Tables 4.1 and 4.2 below, approximately 14 interventions were tested in the ‘general’ pregnant smoking population and 10 were tested in pregnant sub-populations, including ethnic minorities, women of low socioeconomic status, and teenaged girls. Results for each of these pregnant groups are discussed separately in Sections 4c through 4f below. A summary of the details of our review of each intervention can be found in Appendices 8b and 8c. Please refer to Table 4.3 and Figure 4.1 for a detailed description of the numbers of studies that were included and eliminated from the review.

Table 4.1 Effective Interventions and Programs

Author/Year	Population	Description of Intervention	Strength of Evidence (Strong/Sufficient/Supported by Expert Opinion/Insufficient)	Plausibility (Implementation Plausible/Not Plausible)	Recommendation
Donatelle et al., 2000	Low-income Women (Attending WIC clinics)	Information; tailored information (Windsor Guide); social support (buddy); incentives.	Sufficient	Plausible	Recommended based on sufficient evidence of effectiveness
Ershoff et al., 1989, 1990; Mullen et al., 1990	General	Information; tailored information (Ershoff Guide)	Sufficient	Plausible	Recommended based on sufficient evidence of effectiveness
Hjalmarson et al., 1991	General	Information; tailored information (Windsor Guide); counselling	Sufficient	Plausible	Recommended based on sufficient evidence of effectiveness
O'Connor et al., 1992	Ethnically diverse, low income	Information; tailored information (Windsor Guide).	Sufficient	Plausible	Recommended based on sufficient evidence of effectiveness
Walsh et al., 1997	General	Information; tailored information; social support; counselling; incentives	Sufficient	Plausible	Recommended based on sufficient evidence of effectiveness
Windsor et al., 2000	Medicaid patients	Information; tailored information (Windsor Guide); counselling.	Sufficient	Plausible	Recommended based on sufficient evidence of effectiveness
Gebauer et al., 1998	Lower SES; Around 45% African-American	Tailored information (Windsor Guide); counselling; 4A approach	Insufficient	Plausible	Shows Promise

Table 4.1 Effective Interventions and Programs (cont'd)

Author/Year	Population	Description of Intervention	Strength of Evidence (Strong/Sufficient/Opinion/Insufficient)	Plausibility (Implementation Plausible/Not Plausible)	Recommendation
Gilles et al., 1990	General (75% with manual population)	Information, counselling, tailored biological information (optional)	Insufficient	Plausible	Shows Promise
Hartmann et al., 1996	~45% less than high school; 25% African-American	Tailored information (Windsor Guide); counselling	Insufficient	Plausible	Shows Promise
Haug et al., 1994	General	Information; tailored information	Insufficient	Plausible	Shows Promise
Jaakkola et al., 2001	General	Information; counselling	Insufficient	Plausible	Shows Promise
Lillington et al., 1995	53% African-American; 43% Hispanic; low-income WIC clinic attendees	Tailored information; information; counselling; incentives	Insufficient	Plausible	Shows Promise
Mayer et al., 1990	WIC clinic attendees (80% Medicaid)	Tailored information (Windsor Guide); counselling/information; counselling	Insufficient	Plausible	Shows Promise
Petersen et al., 1992	General	Information; tailored information; (follow-up)	Insufficient	Plausible	Shows Promise
Secker-Walker et al., 1997	White, educated	Tailored information; counselling	Insufficient	Plausible	Shows Promise

Table 4.1 Effective Interventions and Programs (*cont'd*)

Author/Year	Population	Description of Intervention	Strength of Evidence (Strong/Sufficient/Supported by Expert Opinion/Insufficient)	Plausibility (Implementation Plausible/Not Plausible)	Recommendation
Shakespeare, 1990	General	Information	Insufficient	Plausible	Shows Promise
Valbo & Nylander, 1994	General (Heavy Smokers)	Tailored information (Windsor Guide)	Insufficient	Plausible	Shows Promise
Valbo & Schioldborg, 1994	General	Tailored information (Windsor Guide)/ (self-help booklet)	Insufficient	Plausible	Shows Promise
Valbo & Schioldborg, 1991	General	Counselling/information	Insufficient	Plausible	Shows Promise
Windsor et al., 1990, 1993; Anonymous, 1997	50% African-American; ages 14—40	Information; tailored information (Windsor Guide)	Insufficient	Plausible	Shows Promise

Table 4.2 Ineffective Interventions and Programs

Author/Year	Population	Description of Intervention	Strength of Evidence (Strong/Sufficient/Supported by Expert Opinion)	Plausibility (Implementation Plausible/Not Plausible)	Recommendation
Gielen et al., 1997	Low-income, African-American	Tailored information (Windsor Guide); social counselling; social support (buddy).	Sufficient evidence of ineffectiveness	Plausible	Not Recommended based on sufficient evidence of ineffectiveness
Lowe et al., 1997	General (spontaneous quitters)	Social support; counselling	Sufficient evidence of ineffectiveness	Plausible	Not Recommended based on sufficient evidence of ineffectiveness
Solomon et al., 2000	Caucasian Medicaid patients	Counselling	Sufficient evidence of ineffectiveness	Plausible	Not Recommended based on sufficient evidence of ineffectiveness
Tappin et al., 2000	General	Information; counselling	Sufficient evidence of ineffectiveness	Plausible	Not Recommended based on sufficient evidence of ineffectiveness

4b. Methodological Limitations

There are several methodological limitations in the studies that have been reviewed so far. The studies often vary on the definitions of “smoker and non-smoker” utilized, creating a lack of precision and lack of comparability among studies. There are also differences in the approaches taken to the issue of spontaneous quitting. Some studies measure spontaneous quitting, and some do not. Therefore, assessing whether the quit rates during pregnancy are due to the intervention or are independent of the intervention is sometimes difficult. Another issue concerns those women who drop out of the study. Are these women counted as smokers or not? We found that this aspect was not always clear in the studies we reviewed, but if such women are not counted as smokers, this could have a significant effect on the absolute rates of cessation reported in the studies.

Many tobacco cessation interventions for pregnant smokers are deliberately tailored to meet the perceived needs of pregnant women. A tailoring process is commonly used in many of the interventions, but is often not defined or explained in any useful detail and the criteria for tailoring components of interventions remain obscure. So while tailoring is clearly an important component of cessation interventions, the precise nature of the tailoring, and the theoretical context in which it is done, is often difficult to identify.

There is also the general issue of effectiveness and efficacy. Interventions may be valid and supported in research settings but fail the test of “real-world” applicability. This issue is difficult to assess in reviewing the literature on interventions at the best of times, but is exacerbated by little discussion of

applicability issues and little description of how programs are applied or delivered. For example, some studies report assessments of clinical efficacy and adherence to clinical protocols, but the wider assessment of whether or not the intervention would pass the “real-world” test is often left undone.

Assessment of program materials is hampered by the general lack of evaluation data and, where available, inconsistent evaluation data. This is particularly troublesome when attempting to establish Better Practices as many programs and program materials exist or are adapted in real-life situations across Canada, but suffer from a lack of research and evaluation. In some cases, we found that components of an intervention study were such program materials, but again, the effects of the program material component were not often assessed separately from the whole intervention, contributing further to a lack of clarity about the effects of program materials. A final problem is the lack of an updated general registry of such programs for both clinical and research purposes.

The most significant overall methodological concern is over the specific roles of various components in the interventions, and how they are difficult to assess independently. Most interventions contain several elements or components. As the field of tobacco cessation for pregnant smokers has evolved and expanded, multi-component programs appear to have become the rule rather than the exception. However, the various components are often not tested independently, so their impact in these interventions is difficult to assess.

4c. Interventions Aimed at the Pregnant Population, including Heavy Smokers and Teenaged Girls

Both successful and unsuccessful interventions targeted at pregnant smokers involved multiple components, but in most cases, the effectiveness of individual components was not tested. It is therefore not possible to recommend with certainty any particular intervention components as efficacious. However, some components appear repeatedly in successful interventions for pregnant smokers, notably tailored information in the form of a self-help guide. Self-help guides may be important for supporting cessation efforts in the “general” pregnant smoker population.

The pregnant population is not a uniform target group. In addition to socio-economic and cultural differences among pregnant smokers, considered in Section 4e, women vary considerably in the amount of nicotine they use. Heavy smokers, defined as those women who smoke 10 or more cigarettes per day during their pregnancies, and women who quit spontaneously early in their pregnancies obviously require different types of clinical support during cessation/maintenance attempts. Yet each group is often subsumed under the general heading of pregnant smoker. Although in many studies they are treated separately in statistical analyses, the degree to which interventions are tailored to meet their specific needs is unknown.

Comparatively little attention has been directed exclusively towards spontaneous quitters; and none of the six studies we reviewed which provided an intervention to this population showed any significant effects. Various combinations of standard health information, tailored information, counselling, social support, and tailored biological feedback were tested (Ershoff, Quinn, & Mullen, 1995; Lowe, Windsor, Balanda, & Woodby, 1997; McBride et al., 1999; Hajek et al., 2001; Secker-Walker, Mead et al., 1995; Secker-Walker, Solomon, Flynn, Skelly, & Mead, 1998). Based on our methodology and the evidence to date, it is possible to say that a combination of social support and counselling, as tested by Lowe et al (1997) is ineffective in helping women who had quit in early

pregnancy maintain their abstinence. Further exploration in this area is desperately needed, given that a significant proportion of women who quit during their pregnancies are smoking again soon thereafter (Lowe et al., 1997).

Women smoking more than 10 cigarettes per day, even late into their pregnancies, also represent a distinct target for tailored smoking cessation interventions. Again, interventions specifically targeting women in this group are lacking, but several strategies have been tested in this area. One intervention, using a self-help guide (Valbo and Schioldborg, 1994) shows promise. Nicotine replacement therapies have been tested almost exclusively in this population (see Section 4d), but to date no studies allow us to comment definitively on their utility. From a harm reduction perspective, the use of NRT to facilitate smoking cessation late in pregnancy in heavy smokers may be especially advantageous.

Very few studies exist that specifically target smoking cessation among pregnant teens, and no studies met our methodological and outcome criteria upon which a recommendation could be based. Indeed, few cessation programs exist for adolescents in general, the majority of smoking interventions for this age group being school-based initiatives to prevent initiation. It is unlikely that cessation strategies for pregnant women can be applied directly to pregnant teens, given their vastly different contextual environments and life circumstances. Components of teen cessation interventions have included group information sessions, one to one counselling from a nurse, and buddy support from a non-smoking female peer. However, there is no indication that they are more effective than usual care in achieving cessation. Given the abundance of literature to suggest that peer influence is a major predictor of smoking behavior among teenaged girls, strategies that incorporate a peer support component may warrant further investigation.

4d. Pharmacological Interventions for Pregnant Smokers

While the efficacy of pharmacological interventions including the use of NRTs and other drugs such as Bupropion (Zyban) is well established in adult populations, there is no clear evidence of the efficacy of these interventions to assist pregnant women who smoke. In non-pregnant smokers, when used as directed, NRTs in any form and Bupropion are generally safe. Studies have demonstrated that the use of pharmacological interventions can increase successful quit rates as much as twofold (Benowitz et al., 2000). These drugs are used to help minimize withdrawal symptoms, although the mechanism of Bupropion's effect is not well understood. While men and women appear to quit smoking at similar rates, women may experience more withdrawal symptoms than men do. There has been some suggestion that NRT is more effective in men than in women (Okuyemi, Ahluwalia, & Harris, 2000).

There is beginning research that examines the use of pharmacological interventions during pregnancy. Almost no efficacy research related to the use of NRT by pregnant women has been conducted. The research that has been conducted suggests that, while fetal growth is not adversely affected by the use of the nicotine patch (Schroeder et al., 2002; Wisborg, Henriksen, Jespersen, & Secher, 2000), its use does not appear to improve cessation rates (Ogburn et al., 1999; Wisborg, et al., 2000; Wright et al., 1997). The level of nicotine to which the fetus is exposed with the patch or gum has been demonstrated to be lower than that from cigarettes (Benowitz et al., 2000; Oncken, Pbert, Ockene, Zapka, & Stoddard, 2000). There is a clear need for efficacy trials of NRT as adjuvant

therapy for smoking cessation during pregnancy. Based on the state of research in the field the following recommendations can be made:

- 1) Behavioural therapy should be encouraged before pharmacological intervention. It is preferable to have women quit on their own. Therapies such as NRT and Bupropion have potential side effects and these should be explained to the woman.
- 2) NRT should be used with women who are unable to quit during pregnancy. It has been suggested that intermittent formulations of NRT (such as NRT gum) might be preferable in that these formulations minimize the harm the constant exposure to nicotine might cause the fetus (Benowitz et al., 2000; Dempsey & Benowitz, 2001). Some have suggested that the patch should be discontinued during sleeping hours so that nicotine levels at night might be no higher than they would be with regular smoking (Hackman, Kapur, & Koren, 1999).
- 3) There are currently no data available on the use of Bupropion during pregnancy. Research on animals suggests that there are no risks, but these findings have not yet been confirmed in humans. Currently, clinicians suggest that Bupropion can be used with pregnant smokers (Okuyemi et al., 2000).
- 4) Minimal amounts of nicotine are excreted into breast milk (Dempsey and Benowitz, 2001). Continued smoking and use of NRT are not contraindications for breastfeeding.

4e. Smoking Cessation Interventions for Pregnant Sub-populations (Ethnic Groups, Low SES women)

While there have been many interventions in which low-income and minority women are the population under study, it is not always clear whether the intervention has been specifically tailored to meet the needs of these sub-populations. An important distinction can be made between for whom an intervention is designed, and to whom the intervention is administered. By virtue of the fact that the determinants of smoking in pregnancy are linked to poverty and low socio-economic status, it should not be surprising that these are the women who comprise the intervention populations. Ideally, best practices should arise from those interventions targeted *and* administered to low-income and minority sub-populations.

It is difficult to establish the most effective interventions, given the differences seen in study methodologies, intervention components, study populations, and program delivery settings. In the United States, one-quarter of pregnant women receive their prenatal care in health departments, federally funded health initiatives, or academic clinics, and interventions have been targeted to these predominantly low-income sub-groups. Women in these settings have elevated rates of late enrolment for prenatal care, use and abuse of substances other than tobacco, and low literacy. Existing staff are often relied upon to implement the intervention. However, challenges such as competing priorities and limited time to engage in research tasks can have negative repercussions on the intensity and consistency of the intervention provided.

Interventions among socially and economically disadvantaged sub-groups have largely been based on materials and methods originally designed by Windsor and colleagues for use in publicly funded health care settings such as the Women, Infants, and Children (WIC) program in the United States. The intervention builds off of four standard practice behaviours: ask, advise, assist, and arrange. Components of the most recent version

of the intervention (Windsor et al., 2000) include a 14-minute video, a self-help manual with a seven-day cessation plan, and a patient-centred counselling session of less than five minutes during which an action plan is prepared.

The transfer of an intervention from one setting to another may reduce its effectiveness if elements are changed or aspects of the materials are culturally inappropriate. For example, the Windsor program was shown to be effective in Birmingham, Alabama (Windsor et al., 1985; Windsor et al., 1993), but not in Baltimore, Maryland (Gielen et al., 1997). However, it is unclear whether this difference was because the women enrolled in Baltimore were a particularly disadvantaged inner-city sub-group, because the intervention used peer counsellors with minimal training rather than trained health educators, or because of some other factor. There is only one Canadian study in the literature based on Windsor's program, undertaken in an antenatal clinic with a diverse socio-economic population, including francophone women. Women in the intervention group were offered the option of a 20-minute counselling session, based on the Windsor guide, with a public health nurse and telephone follow-up. The intervention group had statistically significant higher quit rates at one month after entry (14.9% vs 5%) and at six weeks postpartum (13.8% vs 5.2%) (O'Connor et al., 1992).

The use of appropriate monetary incentives for disadvantaged sub-groups merits further exploration. Donatelle, Prows, Champeau, & Hudson (2000) reviewed the results of several studies, including two meta-analyses on reinforcement, and concluded that they provided compelling evidence that positive reinforcement provides positive behavioural change. In an intervention based in the WIC program (Donatelle et al., 2000) with predominantly white, partnered, low-income women in their early 20s, cessation rates of 32% (versus 9% in the control group) were documented at eight months -

gestation. Unlike other interventions with relatively trivial rewards, ten \$50 vouchers were provided to women who were biochemically confirmed quitters on a monthly basis. Buddy supporters also received vouchers. While there could be concern about the ethics of an intervention based on monetary reward when used among a low-income group, the converse argument is that monetary rewards are empowering for these women. Indeed, it may be viewed as worthy compensation for an extremely difficult task.

Harm reduction may also be an approach to consider for socially and economically disadvantaged pregnant women who cannot or will not quit. It has been well established that women who reduce smoking by 50% during pregnancy give birth to infants with a higher average birthweight than do women who not change their smoking behaviour (Li et al., 1993). Windsor has suggested using a halving of the cotinine level at baseline as a measure of smoking reduction (Windsor et al., 1993). It has been suggested that a correction for weight gain and volume of distribution effects needs to be applied (Selby, 2003, personal communication). Other studies have considered significant reduction as 50% reduction in biochemically validated exposure to tobacco smoke from baseline using saliva cotinine (Gielen et al., 1997; Windsor et al., 1993) or CO (Hartmann, Thorp, Pahel-Short, & Koch, 1996). Reduction has been recommended as a strategy for future studies (Windsor, Boyd, &

Orleans, 1998), but should not be exclusively fetus-centred. In addition to the positive effects on the fetus, smoking reduction provides an opportunity to support, encourage, and empower the woman herself.

In summary, despite the consistently high rates of smoking documented among socially and economically disadvantaged sub-populations of pregnant women, few tobacco cessation programs in Canada have been targeted at this group. (See Appendix 8e for a list of programs aimed at Aboriginal women and other sub-groups of women which could potentially be adapted for use with pregnant women.) There is some evidence to suggest that smoking cessation interventions can be effective for these women, but the relative effectiveness of specific components remains unclear. A panel of experts previously reviewing best practices concluded that almost all benefits of brief counselling occur in light to moderate smokers (Melvin, Mullen, Windsor, Whiteside, & Goldenberg, 2000). Minimal contact programs have been documented to be less successful in women of lower SES than those in higher socio-economic strata. Interventions that target disadvantaged sub-populations of women likely require more intensive and focused interventions with multiple components resulting in a higher “dose” of the intervention. The use of monetary incentives and the inclusion of harm-reduction strategies are promising avenues for further investigation.

4f. Smoking Cessation Interventions/Programs within Substance Abuse Treatment Settings

Of the studies included in our review, only two reported evaluations of smoking cessation interventions that were incorporated into programs for women with substance abuse (Ker, Leischow, Markowitz, & Merikle, 1996; Waller, Zollinger, Saywell, & Kubisty, 1996). Both evaluations were preliminary studies and showed some promising effects. Importantly, these studies suggest that smoking cessation interventions that are carefully tailored for substance abuse settings are feasible

and acceptable to women who smoke and also to the staff who work in these settings. These findings are supported by a recent survey of Canadian addiction programs in which over half of the 223 programs responding to the survey report providing some assistance with quitting smoking (Currie, Nesbitt, Wood, & Lawson, 2003). The emphasis on smoking cessation in these programs and the strategies used, however, varies considerably.

Experiences of implementing a smoking cessation program within a residential substance abuse program for pregnant and postpartum women indicates that traditional smoking cessation programs designed for individuals who are already motivated to quit smoking are ineffective in this setting (Ker et al., 1996). Their efforts to design an “involuntary smoking cessation program” included a carbon monoxide monitoring system, positive reinforcement for reducing or quitting smoking, and education focused on helping women achieve a higher readiness to quit.

Positive responses to the program, even from previously resistant smokers, suggest that the approach has potential application to women at varying levels of readiness to quit. Although specific recommendations for smoking cessation interventions offered in the context of other substance abuse await the results of well-designed studies, it is clear that tailored cessation interventions should be offered to pregnant and postpartum women in substance abuse settings—to those women requesting assistance to stop smoking as well as to those who are unmotivated to quit.

4g. Interventions for Postpartum Smokers

Our review of the literature reveals that there have been relatively few programs or interventions developed to support the maintenance of cessation among postpartum women or girls who quit smoking during pregnancy. Increased interest in helping pregnant women with long-term smoking cessation has stimulated the development of interventions and programs focused on preventing postpartum smoking relapse that include: 1) providing information and advice to women about the benefits of long-term cessation both for their children and themselves, and 2) skill-building to manage high-risk situations and slips (Dunphy, 2000; Johnson et al., 2000/Ratner, Johnson, Bottorff, Dahinten, & Hall, 2000; Van't Hof, Wall, Dowler, & Stark, 2000; Wall and Severson, 1995/Severson, Andrews, Lichtenstein, Wall, & Akers, 1997; Secker-Walker et al., 1995; McBride et al., 1999; DiClemente et al., 2000/Mullen, DiClemente, & Bartholomew, 2000). The interventions have included a variety of self-help materials (in printed or video formats), tailored letters or newsletters, one-to-one brief counselling sessions (either in person or by telephone), and chart reminders. With one exception, these interventions have been individually focused on the women themselves. Project PANDA, however, specifically targets the partners as well as the women with the newsletters and videos during the final weeks of pregnancy and the first six weeks postpartum to help prevent transition back to smoking (DiClemente, Muller, & Windsor, 2000/Mullen, DiClemente, & Bartholomew, 2000).

Some of the postpartum interventions to prevent smoking relapse have been more intensive than others. However, they have not extended beyond the first 3–4 months postpartum. Although some short-term benefits have been observed in cessation or tobacco reduction (e.g., at six months postpartum), in most studies this effect has been observed to decrease over time, suggesting the postpartum interventions may simply slow down or delay relapse (McBride et al., 1999; Ratner et al., 2000; Secker-Walker et al., 1995; Severson et al., 1997). There is some evidence to suggest that the interventions have not been successful with some kinds of pregnant quitters in the postpartum period (e.g., women who have partners who smoke; those who were heavy smokers; those with poorer mental health). The Project PANDA video and print materials tailored to the male perspective are a promising new development in postpartum relapse prevention interventions. Men appeared to use and read the materials and it appeared that the materials may have influenced their smoking to some degree (DiClemente et al., 2000). This is an area that clearly needs further development and evaluation.

There is insufficient evidence to recommend any particular intervention or program components to prevent postpartum smoking relapse. However, important considerations for supporting continued abstinence during the postpartum periods include: 1) the length of time for which support may be needed to maintain long-term abstinence (support beyond the immediate postpartum

period appears to be necessary), and 2) addressing other factors that influence women's ability to remain smoke free (e.g., partner smoking, women's mental health). Because adolescents have not been the focus of any postpartum smoking relapse prevention initiatives, it remains unclear how postpartum interventions should be tailored specifically for this group.

As far as we know, there have been no postpartum interventions developed for women and girls who continued to smoke during pregnancy or who resumed smoking prior to delivery. A different

set of interventions will be required for this subgroup. Although difficulties may be encountered in promoting smoking cessation among this subgroup of postpartum women and girls, tobacco reduction and assisting women/girls in creating smoke-free homes for their children are important goals. One group of researchers has demonstrated some preliminary but very modest support for a one-to-one motivational intervention for "resistant" smokers during late pregnancy (Stotts, DiClemente, & Mullen, 2002). Their approach may provide a basis for developing innovative interventions for postpartum smokers.

4h. Smoking Cessation Programs for Pregnant Women and Girls

"Program" in this Review constitutes a smoking cessation method primarily identifiable through its materials, rather than a method identifiable through academic literature evaluating its efficacy. As described on pages 29 and 34, programs without accompanying data on smoking outcomes have been considered separately. The components of these unevaluated programs were compared with the components of recommended interventions (see page 25), and those programs with similar content were classified as "showing promise."

In total, nine programs that specifically target pregnant and postpartum women were examined. Four of these programs had evaluation data, and were analyzed according to the same criteria as the smoking cessation interventions described on page 26. All four of the evaluated programs scored zero or lower on our study rating scale and were consequently eliminated from the Review (described in Appendix 8c). The remaining five programs, lacking evaluation data, are presented in Table 4.4.

The programs described in Table 4.4 are generally based on self-help, Prochaska and DiClemente's Transtheoretical Model (e.g., Prochaska et al., 1992), and motivational interviewing techniques. While it is impossible to say for certain which, if any, of these components could potentially affect cessation, based on the available evidence (summarized in Section 4a) self-help programs seem to be a promising avenue of intervention. However, the majority of self-help guides examined in this review were presented and explained to women by health professionals during a prenatal visit, which may have accounted for some of the treatment effect.

Only three programs were identifiably targeted at sub-groups of pregnant and/or postpartum women; two with evaluation data, both eliminated due to insufficient evidence; and one video listed in Table 4.4. As outlined in Section 4e, interventions presented in alternative, more intensive formats may be more appropriate for sub-populations of pregnant women including ethnic minorities and women of low socio-economic standing. Consequently, no unevaluated programs targeted at sub-groups of pregnant smokers can be recommended as "showing promise."

Table 4.3 Studies Included in the Review

Stage of Review	Number of Studies (n)
Data collection	70
Study rating system	58 (12 studies scored ≤ 0)
Effectiveness criteria	20 (38 studies showed no effect)
Strength of evidence criteria	6 (14 studies had insufficient evidence)
Plausibility criteria	6 (0 studies lacked plausibility)
Recommended studies	6

Figure 4.1

Studies and Program Materials Included in the Review

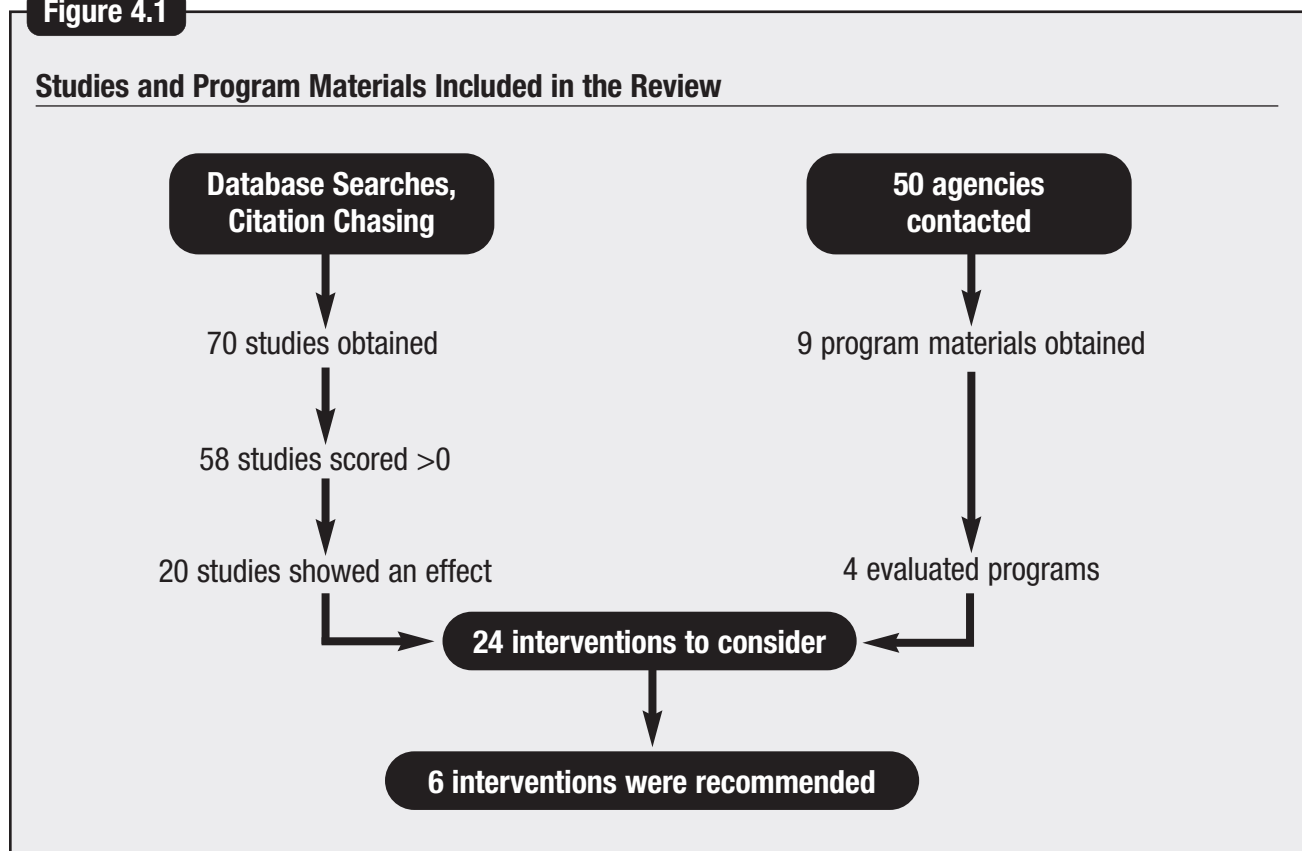


Table 4.4 Unevaluated Programs Targeted at Pregnant/Postpartum Women

Program	Country	Target Population	Provider	Intervention Components
Baby's Coming, Baby's Home*	Canada	Pregnant Smokers ("low-income")	Health professionals, educators and other resource people	Information; tailored information (video); to be used in conjunction with counselling
Great Start*	US	Pregnant Smokers	Self-help	Tailored information (Great Start Self-Help Guide)
Holding Our Own*	Canada	Pregnant Aboriginal Women/Women of colour Smokers	Video (encourages use of peer support group)	Tailored information (video)
New Start*	Canada	Pregnant Smokers	Self-help (available online)	Tailored information (self-help guide)
Start Quit, Stay Quit* Technical Report Available: Edwards et al., 1997	Canada	Pregnant Smokers	Self-help	Tailored information for partners and pregnant smokers; designed to be used in conjunction with counselling

*see Appendix 8e for Contact Information

Over 50 agencies were contacted across Canada in an effort to uncover relevant program materials, yet only nine cessation programs for pregnant women were obtained for review. This stems in part from historically unstable funding of cessation programs and in part from the lack of an updated and regularly maintained registry of cessation resources. Even more scarce are evaluation data for these programs—only four of the nine programs were evaluated and, in each of those cases, the evaluation design rendered any results moot.

5 Discussion and Conclusions

The evidence examined so far has been the literature focused specifically on the issue of intervening during pregnancy (and postpartum) with women who smoke. The published literature on intervention studies with pregnant women plus the assessment of tobacco cessation program materials has comprised the data to this point. Despite the methodological limitations, conclusions regarding these interventions have been presented.

The next step in this Review is to contextualize and critically examine the findings in the wider relevant literatures. In this light, this section will critically assess and identify the components of programs that independently show promise, identify and describe important sub-populations of pregnant smokers that are relevant and, finally, identify some promising approaches to tobacco cessation during pregnancy that have emerged during the course of this review.

5a. Components of Interventions

In this Review we were able to identify 12 components of interventions and programs for pregnant smokers that commonly appeared in the literature. While it is impossible to isolate and measure the impact of each one independently, it was possible to identify these 12 as important and to isolate them as important elements in tobacco cessation for pregnant smokers. It is not possible, based on the literature, to give precise values to each of these or to prioritize them.

1. **Quit Guides:** Many interventions used some form of take-home, patient-focused guide to quitting, usually incorporating some skill building, tips on reduction and cessation and advice.
2. **Counselling:** Many interventions included some form of counselling, however brief, delivered by a range of practitioners from obstetricians to peers.
3. **Buddy Support:** Many interventions encouraged the identification and involvement of a “buddy” for the pregnant woman to assist with providing social support during the cessation process.
4. **Partner counselling/social context:** Some interventions included identification of the smoking patterns of the partner and friends and family as key aspects of the assessment process.
5. **Information:** Many interventions included some education about pregnancy and smoking in the form of pamphlets or videos.
6. **Nicotine Replacement Therapies:** Pharmacological components existed in some interventions to complement other approaches.
7. **Human Follow-up:** Human follow up was incorporated into several interventions, with a view to sustaining the impact of the other components and offering encouragement.
8. **Other Follow-up:** Other forms of follow up were a distinct component, including paper-based communications to assess the effect of the intervention.
9. **Incentives:** Both financial and symbolic rewards were incorporated into some interventions.

10. Feedback about Biological Changes: Ultrasound images, stress tests, or other biological data were delivered back to the pregnant woman to illustrate the effects of smoking on the fetus.
11. Groups: Some interventions included support groups or group counselling to deliver and/or sustain the intervention.

It seems clear that multi-component approaches are the best approaches in this field (US Department of Health and Human Services, 2001, p.555). However, it is not at all possible to identify which of these components matters most and with which population of pregnant smokers. But it is possible to list those that appear most often in the effective interventions, as the list above reflects.

5b. Sub-Populations of Pregnant Smokers

Equally important is the delineation of the sub-populations of smokers that have been separately addressed in the interventions. Clearly, the factors and variables affecting the prevalence of smoking in girls and women in general, such as poverty, socio-economic status, education, and some minority statuses, also play out in affecting the success of the interventions with pregnant smokers. In addition, there are sub-classes of pregnant smokers, probably linked to the level of addiction or length of smoking career that also affect the effectiveness and approach of the interventions. While these sub-populations are identifiable, there is not always adequate or convincing scientific evidence available at this point to determine how various approaches affect these groups.

For example, heavy smokers (those smoking more than 10 cigarettes per day during pregnancy) receive different approaches than light smokers do in some of the intervention studies. However, it is not clear what the best interventions might be for this group, based on the existing literature. Similarly, spontaneous quitters are an identifiable, and sizeable, sub-population of pregnant smokers. But again, the correct approach has not been determined to deal with the patterns in this group and to maintain their non-smoking status for the duration of the pregnancy, postpartum, and beyond. In fact, spontaneous quitters, as noted above, are often ignored in the study design, and remain similarly obscure in the intervention and programming.

Women who relapse (i.e. pregnant women who quit and relapse during the pregnancy and/or postpartum), are similarly obscure in intervention

studies and programming. While they may be counted as smokers (or not, depending on the study design), they constitute a separate group of pregnant smokers that could benefit from a dedicated approach. Finally, those pregnant smokers with partners who smoke constitute an important and identifiable group whose cessation is often lower and, when it does occur, easily compromised.

Populations including pregnant teens, low SES women, Aboriginal women, and various ethnic groups are all important groups to differentiate in research and practice. There has been significant attention paid to low SES women, with several interventions designed for and directed specifically at this group. In addition, as seen in Chapter 4, there are several interventions described as general interventions that, in practice, were applied solely or mostly to low SES women. However, there is sparse attention paid to pregnant teens, Aboriginal women, or Canadian ethno-cultural groups, substance-using women, and women experiencing relationship violence.

There is no available evidence to judge exactly which components work best in relation to the others or, if appropriate, in which particular balance or combination. More importantly, there is no clear evidence to date that indicates which sub-populations would benefit from which components and in which balance or combination. Finally, as indicated above, there are several key under-researched and potentially under-treated sub-populations of pregnant women smokers who need immediate study.

5c. Better Practice Approaches

Several wider literatures were consulted to frame the results of the assessment of intervention evidence presented in Chapter 4. From the wider literature in women's health, women-centred care, and teenaged girls and women's smoking and substance use, it is possible to name several approaches or perspectives that could either be applied immediately to the field of tobacco cessation with pregnant smokers, or that could be integrated into future intervention development and research. These approaches are described below with their corresponding clinical implications.

i) Tailoring

While tailoring of intervention components does take place as discussed above, there needs to be significantly increased effort to tailor programs more effectively. Much of the existing tailoring appears to be confined to Stages of Change identification (which may not accurately reflect readiness to change in pregnant smokers), with little specific tailoring to the social and economic contexts of sub-populations of pregnant smokers identified above. It is clear from this Review that there is not just one generic type of pregnant smoker. Indeed, similar to intervention trends with smokers in general, there ought to be increased emphasis on the specific characteristics of sub-groups of smokers who have special features or experiences affecting their ability to quit.

Clinically, various methods may need to be incorporated to properly address these needs. Increased tracking of smoking patterns, including spontaneous quitting both during pregnancy and postpartum, is required. This tracking should also include a mental health and/or multiple diagnosis perspective, as many smokers experience other forms of substance use and/or mental health/violence issues along with smoking. Finally, these more elaborate and targeted approaches to tailoring will allow for more precise and effective matches between the interventions, components, and the pregnant smokers' circumstances.

ii) Women-centred Care

Women-centred care is a perspective from the women's health literature that identifies an approach to the provision of care that focuses on the woman's needs in the context of her life circumstances. This includes an assessment of women's diversity that demands an understanding in the context of health. It also prescribes a holistic or comprehensive view of, and approach to, health, including mental and physical health considerations.

This approach, when applied to pregnant smokers, would indicate the need for developing a focus on *women's health* pre- and during pregnancy, and during and beyond the postpartum year. As we have seen, both historically and in the current Review, a focus on *fetal health* is much more common. This approach is insufficient not only as it diminishes the value of women's health and treats the woman primarily as a reproductive vessel, but also because it fails to address a more long-term motivation for becoming and remaining abstinent from tobacco.

Clinically, this would mean that the motivation for tobacco cessation be shifted from fetal- and "other-" centredness, to the woman's own health. This would necessitate and imply different information, different follow-up procedures, and different counselling and biological feedback information. It represents a shift in thinking and practice that would de-emphasize the focus on cessation during pregnancy for pregnancy-related reasons and make the motivations for cessation for girls and women more universal and long-lasting.

Adopting a women-centred perspective also means that the cessation intervention would be more focused and cognizant of the woman's social, psychological, and economic context. A key, but often overlooked, question surrounding pregnancy is to determine whether or not the pregnancy was planned and wanted and whether there is conflict surrounding it. Answers to these questions would

immediately texture the notion of pregnancy as a time of hope and a key opportunity for change. In addition, this question would also illuminate some of the contextual life circumstances surrounding the pregnant woman, such as whether she is experiencing violence, and offer insight to the practitioner about the priorities and realities in the woman's life.

iii) Reducing Stigma

Stigma reduction is rarely considered when intervening with pregnant smokers and did not emerge in the Review in any of the interventions. However, increasingly restrictive smoking policies, coupled with an overt goal towards denormalization in the current Canadian Tobacco Strategy, create an atmosphere where smokers, particularly pregnant smokers, are specifically and increasingly stigmatized.

Over the last decade in particular, the status of the fetus has risen and has resulted in more public recognition of the effects on the fetus of behaviours such as smoking, drug taking, and drinking alcohol. All of these behaviours are associated with negative social and legal attitudes to pregnant women and these attitudes and discourses trickle down into the self-image and consciousness of the pregnant smoker. Further, when a woman is visibly pregnant and smoking, she will be affected by public responses to her. Similarly, mothers of infants and small children who smoke experience stigma. Indeed, the discourses surrounding mothering while using substances of any kind clearly indicate the powerful effects of evolving social norms and attitudes on mothers (Greaves et al, 2002).

This suggests that, in order to engage pregnant smokers and to assist them, the effects of these increased pressures must be addressed and dealt with in clinical interventions. For example, one way to do this would be to integrate awareness of stigma into the four As (ask, advise, assist, arrange follow up) when dealing with pregnant smokers. At the moment there is no evidence of any consideration of stigma and its effects on pregnant smokers.

iv) Relapse Prevention

Relapse is a significant problem for pregnant smokers who quit. However, this has often been measured postpartum, not during pregnancy. More importantly, relapse prevention did not emerge as a key component of interventions in the Review and, indeed, was not generally applied to the spontaneous quitters in the interventions. This requires that tracking of spontaneous quitters be undertaken and interventions designed for spontaneous quitters developed. It also means that, after giving birth, women who have quit need to be remotivated to deal with the new pressures to relapse once the fetus is no longer present and serving as a daily motivation.

Finally, it suggests that, since relapse is delayed while women are breastfeeding, support for breastfeeding may be useful in extending the woman's experience of non-smoking post-pregnancy. Ultimately, however, as mentioned above, the motivation for cessation and maintaining cessation has to be focused on the woman's health and her own reasons. Therefore, the ultimate intervention is to either begin by using the woman's health as the motivation or intervene postpartum to shift the motivation from the fetus to the woman herself.

v) Harm Reduction

Harm reduction is a concept and practice from the wider substance use field that is gaining more and more attention in developing interventions in drug use and alcohol use. It has never been fully applied to tobacco use, although some elements do appear in the interventions in the Review. For example, reduction of consumption of tobacco is a feature in some of the self-help guides and in some of the counselling. However, a broad-based harm-reduction approach is missing from these interventions.

Clinically, this means that *all* measures would be taken to reduce the harm to the woman and the fetus from the effects of smoking. For example, screening for physical abuse of pregnant women would assist in reducing a potentially significant source of harm to both the woman and the fetus.

More specific to tobacco, an emphasis on smoking reduction during pregnancy and postpartum would become a focus in programming. Also, nutritional improvements should be introduced into interventions, to ameliorate the effects of smoking in the contexts of women's social and economic lives. Further, the potential benefits of monitoring and supplementing folate levels of pregnant smokers should be explored. In addition, NRTs should be integrated more fully into interventions as a way of reducing the level of nicotine and lessen the harmful effects of smoking cigarettes. It also means that other health producing improvements be included in the interventions, such as encouraging more physical activity and stress reduction techniques.

vi) Partner/Social Support

As seen in the Review, most interventions neither target the partner of the pregnant woman nor focus on her social environment. However, both cessation and relapse are affected by the presence of smokers in close proximity to the pregnant woman. Therefore, in intervening, it is necessary to acknowledge the presence of smokers in the lives of pregnant smokers and to determine the dynamics of those relationships. Women smokers, in general, use smoking to organize, bind, cement, and sometimes disengage from their social relationships (Greaves, 1996). Pregnant women will have these and other complicating factors overlaid on their use of tobacco, compounded by their views regarding fetal health and whether or not these views coincide with those of their partners and friends.

Because these dynamics and differences could be significant, it is imperative to examine the issues of partner smoking using a de-linked approach—i.e., to deal with the woman and the partner separately and to create interventions that do the same. It is necessary to pursue information about partner smoking behaviour and to try to intervene, but it is crucial to do so in a way that respects the complex power dynamics within couples and between friends. It is critical to acknowledge power, control,

and abuse issues between partners in a way that ensures women's safety. There are a few interventions that target partners and thereby acknowledge that pregnant smokers do not smoke in a social vacuum, but more de-linked interventions need to be developed. There appears to be an absence of intervention literature that reflects on the dynamics regarding smoking in same-sex relationships.

vii) Social Issues Integration

Most pregnant smokers in the Canadian population, especially those who do not spontaneously quit, are experiencing multiple social and economic pressures. Better clinical practice would acknowledge this and build an awareness of it into interventions and program materials destined for pregnant smokers. It is imperative to pay more than lip service to this central fact about pregnant smokers who do not quit, or who find it very difficult to quit. It is also essential to apply it to relapse prevention and harm-reduction approaches.

For many pregnant women in “high priority” or “hard-to-reach” groups, issues such as unemployment, violence, poverty, multiple roles, and stress are critical and, to some extent, blur or bury the importance of tobacco cessation and other health-seeking behaviours while pregnant. It is essential to note, for example, that up to 40% of first incidents of domestic violence occur while the woman is pregnant (Rogers, 1994), but no interventions addressed this probability in our Review. Similarly, issues of poverty, income adequacy, unemployment, and low education cluster to create survival pressures on pregnant smokers, where tobacco cessation is not only a low priority, but where smoking serves multiple purposes or “benefits” the woman in mediating her existence. These issues are real to many pregnant smokers but not as real to those creating and testing interventions.

For women who have multiple stressors and issues in their lives, it is difficult clinically to request tobacco cessation in a vacuum, without acknowledging the difficulties involved and the factors that challenge successful cessation. Ethically, it is

incumbent upon clinicians to offer some social or perhaps economic exchange in return for cessation. Clinically, as a starting point, interventions should include steps to gain awareness and acknowledgement of these issues. Second, the offer of free cessation aids, including NRTs, should be made available to pregnant smokers. Finally, and most difficult, clinicians need to reframe their cessation interventions with pregnant smokers in these types of circumstances in an integrated framework, where the entire context of social and economic factors is considered and a similarly wide range of solutions and aids is offered.

6 Recommendations

The following recommendations span practice, research and structural issues.

6a. For Practice

1. Ensure public health messages are framed in a sensitive, non-judgemental way that is relevant to the social and economic circumstances of women's daily lives.
2. Encourage harm reduction among pregnant smokers by recommending a decrease in the number of cigarettes smoked, brief periods of cessation at any point in pregnancy and around delivery, encouraging health promoting behaviours such as exercising, and addressing partner smoking.
3. Recognize that motivation to quit is a dynamic factor that changes throughout the cessation period, and incorporate increased support in interventions for women throughout the postpartum period.
4. Integrate tailored treatment of nicotine addiction for pregnant smokers into substance abuse treatment programs in recognition of women's identification of nicotine as a problem drug
5. Encourage women to use behavioural methods before pharmacotherapy, in order to avoid potential teratogenic side effects that can result from use of drugs such as Bupropion and NRTs.
6. Offer nicotine replacement therapies to women who are unable to quit smoking during pregnancy after 12 weeks gestation to reduce damage caused by inhaled smoke to both the mother and the fetus.
7. Encourage women to continue breastfeeding even if they smoke or are using NRTs to aid their cessation.
8. Increase surveillance and tracking of tobacco use patterns, including spontaneous quitting, in clinical settings.
9. Use individualized information on smoking patterns to construct highly tailored cessation strategies.
10. Assess smokers for concurrent mental health issues/other diagnoses, since many smokers experience multiple forms of substance use and/or other mental health issues.
11. Emphasize cessation and the importance of the woman's own health, rather than primarily the health of her fetus, to foster motivation to remain smoke free pre-and postpartum.
12. Create specific interventions for the postpartum period that address motivational and stress related issues for post partum women.
13. Create specific interventions for women who quit spontaneously during pregnancy and post partum.
14. Screen all women and girls of childbearing age for tobacco use.

6b. For Research

15. Develop more comprehensive measures of harm reduction and lowered consumption to better illuminate the relationship between dosage and fetal health outcomes.
16. Develop more comprehensive measures of outcomes that extend beyond quit and relapse rates to include reduction, attitudinal, and behavioural changes and other context-specific issues.
17. Develop and test more interventions that are specifically targeted to young pregnant smokers.
18. Conduct research exploring the genetic factors associated with nicotine metabolism with the aim of developing better tailored approaches to cessation.
19. Develop and implement intensive postpartum-specific relapse prevention interventions for women who have quit smoking during their pregnancies.
20. Conduct research examining the safety and utility of Bupropion during pregnancy.
21. Develop and test more interventions for disadvantaged populations using monetary incentives to encourage cessation.
22. Develop and test smoking cessation interventions for the partners of pregnant smokers.
23. Design and test interventions tailored for women and girls who continue to smoke during their pregnancies, and for those who stop smoking but relapse before delivery.
24. Examine the efficacy of particular program materials and intervention components to elucidate precisely which aspects influence cessation.
25. Examine comprehensive tobacco control strategies with respect to their specific impact on pregnant women, particularly denormalization initiatives.

6c. Structural Changes

23. Allocate more resources to address the structural factors which influence women's smoking, in order to reduce the burden that tobacco-related disease among disadvantaged groups places on women and their fetuses and infants.
24. Increase awareness and influence public attitudes about tobacco use among disadvantaged groups as not "lifestyle choice" but a reflection of social and economic circumstances, as a way to reduce stigma associated with smoking during pregnancy and post partum.

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8

Appendices

8a. Appendix A: Staging Postpartum Smoking Abstinence

Staging Postpartum Smoking Abstinence
(at 28th week):

1. At this time, which of the following best describes your personal goal with regard to smoking after pregnancy? 1) to stay off cigarettes, 2) to control where and when you smoke, 3) to go back to smoking, 4) you are not sure what your goal is right now.
2. How likely are you to smoke in the first 6 months after the baby is born? 1) extremely likely to smoke, 2) very likely, 3) somewhat likely, 4) not very likely, 5) not at all likely to smoke.
3. Since your prenatal visit, have you smoked a cigarette, even a puff? 1) yes, 2) no

From: Stotts et al. (2000). Postpartum return to smoking: Staging a "suspended" behavior. *Health Psychology*, 19, 324–32.

8b. Appendix B: Table of Studies Included in the Review

Table 8.1 Studies Included in the Review (Post-1990)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Buchanan, 2002 CT-B Rating=1	US	T=20 C=28	General—HMO	~4.6 month gestation	8	Advanced Practice Nurse, Physician; Nurse	Information; tai- lored information; counseling	2 weeks postpartum	T=13.0% C=5.7%	
Burling et al., 1991 RCT-B Rating=4	US	T=70 C=69	Urban poor, stable working class; almost half African-American	~ 24 weeks gestation	1	Nurse	Information; tai- lored information.	~34 weeks gestation	T=80% C=61%	
Cinciripini et al., 2000 RCT-B Rating=3	US	T=42 C=40	Recruited from community	~15 weeks gestation	6 self-help sessions/ follow-up phone calls	Self-help	Information; tai- lored information	1 month postpartum	T=7% C=5%	
Donatelle et al., 2000 RCT-A Rating=6	US	T=112 C=108	Attending WIC clinics (low income)	~ 16.5 weeks gestation	1, plus 9 monthly follow-up visits	“trained WIC or SOS staff member”	Information; tai- lored information (Windsor Guide); social support (buddy); incentives.	~2 months postpartum	T=21%* C=6%*	
Dunphy, 2000 RCT-B Rating=2 POSTPART	US	T=30 C=32	81% African- American	Delivery	1	Nurse	Information; counseling; incentive.	4-8 weeks postpartum	T+C=31% maintained cessation	

Table 8.1 Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Ershoff et al., 1989; Ershoff et al., 1990; Mullen et al., 1990 RCT-A Rating=5	US	T=126 C=116	~26% Black; 64% Caucasian; 10% other	At or before 18 weeks gestation	1, plus 8 weekly self-administered booklets	Health Educator; self-administered	Information; tai- lored information (Ershoff Guide).	Delivery 6 months postpartum	T=22.2%* C=8.6%* Of those who quit, main- tained cessation: T=33.3% C=42.8%	
Ershoff et al., 1995; Mullen et al., 1990 RCT-B Rating=4	US	T=87 C=84	Smokers who quit before pregnancy	At or before 18 weeks gestation	1, plus 8 weekly self-administered booklets	Health educator; self-administered	Information; tai- lored information (Ershoff Guide)	6 months postpartum	T=38.3% C=36.4%	
Ershoff et al., 1999 RCT-B Rating=2	US	T ₁ =111 T ₂ =120 T ₃ =101	Between 15-20% African-American; 15-20% Hispanic; remainder Caucasian. Mean age older=~30	Primarily first trimester	T ₁ =1/none T ₂ =1/none T ₃ =1/4-6 weekly phone calls	T ₁ =self-help T ₂ =health educator T ₃ =nurse	T ₁ =tailored information T ₂ =tailored information T ₃ =tailored information; counseling.	34 weeks gestation	T ₁ =22.5% T ₂ =16.7% T ₃ =20.8%	
Ford et al., 2001 QUASI-B Rating=1	New Zealand	T=209	21.6% of interested participants (not all enrolled) were Maori	Variable	Ranged from 1 to 14, up until 6 months postpartum	Health educator	Tailored informa- tion; counselling	6 months postpartum	T=3.3% (of those who completed at least 4 sessions)	
Gebauer et al., 1998 CT-B Rating=4	US	T=84 C=94	Around ~45% African-American; "lower SES"	~17 weeks	1/phone interview 7-10 days after	Nurse; self- administered	Tailored informa- tion (Windsor Guide); counseling; 4A approach	~24-30 weeks	T=15.5%* C=0%*	

Table 8.1

Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Gielen et al., 1997 RCT-A	US	T=193 C=198	~85% African-American, low income (of those with follow-up data)	~28 weeks	1/"reinforcement" at subsequent clinic visits	Peer health counsellor; physician; nurse; self-administered	Tailored information (Windsor Guide), counselling; social support (peer).	Delivery (Postpartum data available for few women)	T=6.2% C=5.6%	
Gillies et al., 1990 CT-B Rating=2	UK	T=474 C=407	General; ~75% with a 'manual' occupation	Variable	3 counselling sessions	Researcher	Information; counselling; tailored biological information (optional)	6 months postpartum	T=22%* C=11%*	
Haddow et al., 1991 RCT-B Rating=3 SMOKING OUTCOMES NOT FULLY REPORTED	US	T=1423 C=1425	Women smoking more than 10 cigarettes per day, many low income	Variable	1/1 at one month later	Physician	Tailored information; tailored biological information	One month after initial visit	T=15.8% C=not reported	T=17.5% reduced consumption by 50%
Hajek et al., 2001 RCT-B Rating=4 RELAPSE	UK	Spontaneous quitters: T=114 C=135 Smokers at intake: T=431 C=440	General	~12 weeks	1/reinforcement at subsequent prenatal visits	Midwife; self-administered	Information; tailored information; counselling; tailored biological information	6 months postpartum	Maintained Abstinence Spontaneous quitters: T=23% C=25% Smokers at intake: T=3% C=3%	

Table 8.1 Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Hartmann et al., 1996 RCT-B Rating=4	US	T=107 C=100	~45% less than high school education; ~25% African-American	~14.6 weeks	Unspecified	Physician; volun- teer counsellor; self-administered	Tailored informa- tion (Windsor Guide); counselling	Unspecified (last prenatal visit)	T=20%* C=10%*	
Haug et al., 1994 RCT-B Rating=3	Norway	T=252 C=98	General	Variable	1/5 between 1 month and 18 months post- intervention	Physician	Information; tai- lored information	18 months post- intervention	T=6%* C=0%* (continuous abstinence for 15 months)	No differences between T and C
Hjalmarson et al., 1991 RCT-A Rating=6	Sweden	T=492 C=231	General	"first visit"— before 12 weeks	1	Obstetrician; midwife; self- administered	Information; tai- lored information (Windsor Guide)	8 weeks postpartum	T=10.4%* C=5.2%*	
Hughes et al., 2000 RCT-B Rating=4	Canada	T=56 C=54	Both pregnant and infertile women	Around 20 weeks gestation	1/follow-up throughout pregnancy	Unspecified	Tailored informa- tion (One Step at a Time Guide); tailored biological information	12 months after initial visit	No change in cessation rates in preg- nant patients in treatment or control group	
Jaakkola et al., 2001 CT-B Rating=2	Finland	T=306 C=152	Pregnant and postpartum smokers	1 st prenatal visit (gestational time unspecified)	During regular prenatal visits	Public Health Nurse	Information; counselling	Delivery	T=19.0%* C=14.5%*	Average reduction rate similar
Johnson et al., 2000/ Ratner et al., 2000 RCT-B Rating=3 POSTPARTUM	Canada	T=125 C=126	General	Delivery	1/8 phone sessions and 1 6 month interview	Nurse	Information; tai- lored information; counselling	12 months postpartum	T=21.0% C=18.5%	Daily smoking rates similar

Table 8.1

Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Kapur et al., 2001 RCT-B Rating=4	Canada	T=17 C=13	Heavy smokers	~17 weeks gestation	1/3, plus weekly phone calls	Unspecified/ (researcher- physician for phone calls)	Counseling; pharmacologic product (control received coun- selling and usual care)	Gestational time unspecified (8 weeks after the beginning of treatment)	Unspecified	
Kendrick et al., 1995a, 1995b RCT-B Rating=1	US	T=2508 C=3064	Mostly Caucasian; 42% had less than a high school education; 33.5% made <\$500/month	around 18-20 weeks gestation	1/none	Physician; nurse; self-administered	Information; counseling	12 weeks postpartum	T=6.1% C=5.9%	
Ker et al., 1996 CT-B Rating=1	US	T=14 C=8	14% African American, 21% Hispanic; preg- nant and postpar- tum smokers in a chemical depend- ency treatment program	Variable	Daily/throughout stay at treatment centre	Nurse	Information; tai- lored biological information	At least 61 days post-entry	Unspecified	Intervention clients reduced CO levels to nearly non- smoker levels
Lillington et al., 1995 RCT-B Rating=2	US	T=155 C=400	53% African American; 43% Hispanic; "low income"—WIC clinic attendees	Variable	1/postcard sent after 1 month	Bilingual health education counsellor	Tailored informa- tion; counselling; incentives	6 weeks postpartum	T _{Black} =26.6%* C _{Black} =8.5%* T _{Hispanic} = 20.0% C _{Hispanic} = 16.6%	

Table 8.1 Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Lowe et al., 1997 RCT-A Rating=5 SPONTANEOUS QUITTERS	Australia	T=52 C=54	General; those who had quit in the three months prior to pregnancy	Initial prenatal visit	1/reinforcement as subsequent visits	Health educator; nurse; physician	Social support; counselling	End of pregnancy	Maintained Abstinence: T=80% C=76	
Mayer et al., 1990 RCT-B Rating=3	US	T ₁ =72 T ₂ =70 C=77	WIC clinic attendees; ~80 Medicaid	Variable	1	Health educator	T ₁ =tailored information (Windsor Guide); counselling T ₂ =information; counselling	About 4.7 weeks postpartum	T ₁ =6.9%* T ₂ =7.1%* C=0%*	
McBride et al., 1999 RCT-B Rating=3 RELAPSE	US	T ₁ =297 T ₂ =294 T ₃ =306	"Predominately white, married, and well educat- ed"; had quit during pregnancy	Variable (fewer than 20 weeks pregnant)	Variable	Trained counselors; self- administered	T ₁ =tailored information T ₂ =Tailored information; counselling T ₃ =tailored information; counselling (longer)	12 months postpartum	Maintained cessation: T ₁ =42% T ₂ =42% T ₃ =43%	
Moore et al., 2002 CT-B Rating=3	UK	T=724 C=803	General	11.8 weeks	1/none	Midwife; self- administered	Tailored informa- tion (based on Ershoff and Windsor Guides)	End of 2 nd trimester	T=18.8% C=20.7%	
Neil-Urban et al., 2002 QUASI-B Rating=2	US	T=22	General	Before 20 weeks gestation	2/monthly phone calls until end of pregnancy	Nursing students	Tailored informa- tion (Windsor Guide); counselling	6 months post-intervention	T=18%	T=40%

Table 8.1

Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
O'Connor et al., 1992 RCT-A Rating=5	Canada	T=115 C=109	Ethnically diverse, low income population	~14 weeks gestation	1/follow-up call	Public Health Nurse	Information; tailored information (Windsor Guide)	6 weeks postpartum	T=13.8%* C=5.2%*	
Panjari et al., 1999 RCT-B Rating=2	Australia	T=476 C=537	General	Before 20 weeks gestation	1/3 between 16 and 28 weeks gestation	Trained midwife	Information; tailored information; counselling	'late pregnancy'	T=11.9% C=9.8%	
Petersen et al., 1992 RCT-B Rating=1	US	T ₁ =71 T ₂ =75 C=78	Mostly Caucasian; general	Variable	T ₁ =1/none T ₂ = 1/letters at 8th month and 1 month postpartum	Self-administered; obstetricians; nurse-practitioners	T ₁ =information; tailored information T ₂ =information; tailored information (+follow-up)	8 weeks postpartum	Baseline Smokers: T ₁ =29.0% T ₂ =35.6% Treatment* C=9.7%* Spontaneous Quitters: T ₁ =61.3% T ₂ =79.3% Treatment* C=57.1*	
Rush et al., 1992 RCT-B Rating=2	UK	T=175 C=144	General	~15 weeks gestation	2/brief counselling until 1 month pre-delivery	Psychologist	Counselling	Delivery	T=10.6% C=4.7%	
Schroeder et al., 2002 QUASI-A Rating=5	US	T=21	Heavy smokers (20 per day in 3 rd trimester)	3 rd trimester	4 days in hospital/ 8 weekly sessions after	Patch administration: unspecified; "counsellor"	Pharmacologic product; counselling	1 year post-intervention	T=10%	

Table 8.1 Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Scott & McIvain, 2000 RCT-B Rating=4	US	T=114 C=119	WIC clinic attendees; mostly White	~14 weeks	2	Self-administered	Tailored information	Delivery	T=10.1% C=4%	
Secker-Walker et al., 1994 RCT-B Rating=3	US	T=300 C=300	General	~13 weeks	5 (including postpartum)	Nurse-midwife	Tailored information; counselling.	54 months postpartum	T=10.8% C=9.7%	
Secker-Walker et al., 1995 RCT-B Rating=3 SPONTANEOUS QUITTERS	US	T=68 C=65	General	~13 weeks	5 (including postpartum)	Nurse-midwife	Tailored information; counselling	54 months postpartum	Maintained cessation: T=50.9% C=50.0%	
Secker-Walker et al., 1992, 1998a; Solomon et al., 1996 Rating=3	US	T=135 C=141	~70% on Medicaid	~15 weeks	5 (including postpartum)	Nurse; nurse-midwife	Tailored information; counselling	1 year postpartum	T=21% C=12%	
Secker-Walker et al., 1997 RCT-B Rating=4	US	T=30 C=30	White, educated	At 1 st prenatal visit	5	Nurse-midwife	Tailored information; counselling	36 weeks gestation	T=20%* C=0%*	
Secker-Walker et al., 1998b RCT-B Rating=4 SPONTANEOUS QUITTERS	US	T=44 C=48	~65% on Medicaid	~16 weeks	5 (including postpartum)	Nurse; nurse-midwife	Tailored information; counselling	1 year postpartum	Maintained cessation: T=68% C=78%	

Table 8.1

Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Shakespeare, 1990 RCT-B Rating=1	UK	T=157 C=150	Unspecified	Before 17 weeks gestation	1/1, 3-4 weeks after intake	Midwife	Information	34 weeks gestation	Cessation and reduction combined: T=48.4%* C=28.7%*	
Solomon et al., 2000 RCT-A Rating=5	US	T=77 C=74	~75% on Medicaid; ~95% Caucasian, mean education less than high school	~11 weeks	3/weekly phone calls for those who quit	Physician; midwife; peer supporter	Counselling.	Delivery	T=18.2% C=14.9%	
Stotts et al., 2002 RCT-B Rating=1	US	T=134 C=135	Mostly white, still smoking at 28 th week— “resistant”	28 weeks	1/2 phone calls and 5 newsletters and a video	Professional and Nurse Health Educators	Tailored informa- tion; counselling	6 months postpartum	No significant differences	
Strecher et al., 2000 RCT-B Rating=3	US	T=88 C=85	General	~17 weeks gestation	1/subsequent prenatal visits	Self-administered	C= tailored information (Windsor Guide) T=tailored information (computer generated guides)	3 months postpartum	T=9.6% C=9.2%	
Tappin et al., 2000 RCT-A Rating=5	UK	T=50 C=50	General	~14 weeks gestation	4/1	Midwife	Information; counselling	Late pregnancy	T=4% C=8%	T=6% C=10%
Valanis et al., 2001 CT-B Rating=1	US	T=2055 C=1028	General	1 st prenatal visit	At each prenatal visit	Nurse	Information; tai- lored information; social support (letter for partner) counselling	1 year postpartum	T=38.8% C=28.9%	

Table 8.1

Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Valbo & Schioldborg, 1991 CT-B Rating=4	Norway	T ₁ =50 T ₂ =50 T ₃ =50 C=50	General	~18 weeks gestation	T ₁ =6 T ₂ =1 T ₃ = 1 -materials by mail	T ₁ =psychologist T ₂ =physician	T ₁ =counselling (group) T ₂ = information (verbal) T ₃ =information (print)	12 months post-intervention	T ₁ =16%* T ₂ =6% T ₃ =8% C=6%*	
Valbo & Schioldborg, 1994 RCT-B Rating=3	Norway	T ₁ =98 T ₂ =101 C=101	General	~18 weeks gestation	1/none	Midwife	T ₁ =tailored information (Windsor Guide) T ₂ =tailored information (Norwegian Cancer Society booklet)	Delivery	T ₁ =12%* T ₂ =5%* C=3%*	T ₁ = more reduction than other groups*
Valbo & Nylander, 1994 RCT-B Rating=2	Norway	T=54 C=50	Heavy smokers (still smoking 10+ cigarettes per day at 18 th week)	~18 weeks gestation	1/2 letters mailed	Obstetrician/ Midwife	T=tailored information (Windsor Guide)	Delivery	T=20%* C=4%*	
Valbo et al., 1996 RCT-B Rating=3	Norway	T=52 C=78	General	~20 weeks gestation	2	Anaesthesiologist; hypnotist	Other (hypnosis)	Delivery	T,C=8%	
Van't Hof et al., 2000 RCT-B Rating=2 POSTPARTUM RELAPSE	US	T=141 C=146	Mostly Caucasian	Post-delivery hospital stay	1/3	Nurse; pediatrician	Counselling	6 months postpartum	Maintained Cessation: T=58% C=62%	

Table 8.1

Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Wakefield, 1998 CT-B Rating=3	Australia	T=110 C=110	About half had 'high status jobs'	~11 weeks gestation	1/1	Nurse	Information; social support (partner info); tailored biological information	6 months postpartum	T=4.3% C=3.8%	
Walsh et al., 1997 RCT-A Rating=5	Australia	T=127 C=125	General	Before 32 weeks gestation	1/letter by mail, 1 counselling visit	Physician; midwife; self- administered	Information; tai- lored information; social support; counselling; incentives	6-12 weeks postpartum	T=6%* C=1%*	
Windsor et al., 1993, 1997; Anonymous, 1990 RCT-B Rating=4	US	T=400 C=414	About half African-American; ages 14-40	~4 months gestation	1/during prenatal visits	Counsellor; nurse	Information; tai- lored information (Windsor guide)	"End of pregnancy"	Black patients: T=18.1%* C=10.7%* White patients: T=10.0%* C=5.2%*	Black: T=12.9%* C=11.6%* White: T=21.1%* C=13.4%
Windsor et al., 2000 RCT-A Rating=5	US	T=139 C=126	Medicaid patients	2-3 months gestation	1/ at subsequent prenatal visits	Nurse; "primary patient educators and professional clinic staff"	Information; tai- lored information (Windsor Guide); counselling	60 days post- intervention	T=17.3%* C=8.8%*	T=21.7% C=15.8%
Wisborg et al., 1998 CT-B Rating=2	Denmark	T=527 C=2629	General	14-16 weeks gestation	1	Midwife	Information; counselling; incentive	30 weeks gestation	T,C=2%	
Wisborg et al., 2000 RCT-B Rating=2	Denmark	T=124 C=126	Heavy smokers	1 st prenatal visit	1/3	Midwife	Information; counselling; pharmacologic product	1 year postpartum	T=15% C=14%	

Table 8.1 Studies Included in the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population (Pregnant...)	Timing of Intervention	Sessions/ Follow-up	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Wright et al., 1996 QUASI-B Rating=2	US	T= ~3291	General	Unspecified	Unspecified	Nurse/physician/ social worker (varied)	Tailored informa- tion (Windsor Guide)	Last prenatal visit	T= (range from 0% to 45% by clinic)	

8c. Appendix C: Table of Studies Eliminated from the Review

Table 8.2 Studies Eliminated from the Review (Post-1990)

Author/Year Study Rating	Country	N _{sample}	Study Population	Timing of Intervention	Sessions	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Albrecht et al., 1998 Rating=0	US	T ₁ =26 T ₂ =29 C=29	Pregnant teens	(4-28 weeks)	8	Nurse, peer support group	Information; tai- lored information; counselling; incentives.	8 weeks post-partum	T ₁ =30%; T ₂ +C=16%	T ₁ = 4 fewer per day
Browne et al., 1999 (Smoke Free Journey)	Canada	T=57	Low SES; ~35% Aboriginal	Variable	Unspecified	Trained counsellors	Information; counselling	34 weeks gestation	T=50% (of the 28% that completed follow-up)	
Bullock et al., 1995 Rating=0	New Zealand	T=59 C=63	About 10% Maori, 2% Pacific Islander	(less than 20weeks)	24	Trained volunteers	Social support (weekly calls from volunteer)	34 weeks gestation	Decrease in number of smokers T=4% C=8%	n/a
Campion et al., 1994 Rating=0	UK	Pre=607 Post=625	All	Variable	3 ads, run for 10 days	Mass Media	Information	Variable	Unspecified	n/a

Table 8.2

Studies Eliminated from the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population	Timing of Intervention	Sessions	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Dunkley, 1997 Rating=0	Unspecified (Probably UK)	T=48 C=46	Unspecified	11-18 weeks	Unspecified	Midwife	Unspecified	1 year postpartum	No difference between groups	T=greater reduction than C
LeFevre et al., 1995 Rating=-1	US	T=7812 C=7718	General	18-20 weeks	2/home	Sonographer	Tailored biological information	Delivery	T and C=46%	
Manfredi et al., 2000a, 2000b Rating=-2	US	T=1349 C=911	General	Unspecified	1/1 phone call	Physicians; nurses; researchers (follow-up)	Information; tailored information	5-8 weeks post-intervention	T=14.5%* C=6.7%*	
McNeil, 1999 (Stopping When You're Ready Booklets) Rating=-1	Canada	106	General (Pregnant and Postpartum)	Variable	Variable	Mostly public health nurses; variable	Tailored information (Stopping When You're Ready Booklets); counselling	2-4 months post-intervention	89% of clients reported that they had changed their smoking behaviour in some way	
Pletsch, 1999; Pletsch & Morgan, 2002 Rating=0	US	T=21 C=22	African-American women	Before 26 weeks gestation	2/monthly telephone follow-up	Nurse	Information; tailored information (Living Smoke Free—Ershoff); counselling; tailored biological information	Delivery	T=10% C=18%	
Price et al., 1991 Rating=0	US	T ₁ =71 T ₂ =52 C=70	Low SES population	Variable	1/1 at one month after initial session	T _{1,2} =health educator C=physician	T ₁ : information; tailored information; counselling. T ₂ : ALA "Freedom from Smoking for You and Your Baby"; counselling	2-3 weeks prior to delivery	T ₁ =8.7% T ₂ =5.1% C=4.2%	T ₁ =48% T ₂ =38% C=42%

Table 8.2 Studies Eliminated from the Review (Post-1990) (cont'd)

Author/Year Study Rating	Country	N _{sample}	Study Population	Timing of Intervention	Sessions	Provider	Intervention Components	Final Measurement	Results *stat sig	
									Cessation	Reduction
Severson et al., 1997 ; Wall et al., 1995 Rating=0 POSTPARTUM	US	T=1682 C=1219	General; mostly Caucasian	~2 weeks postpartum	1/3	Physician	Information; tai- lored information	1 year postpartum	Smokers quit at 6 months: T=5.5% C=4.7% Non-smokers maintained cessation: T=42.9% C=39.1%	
Waller et al., 1996 Rating=-1	US	T=513	Substance abusing women	Unspecified	1/yes-number unspecified	Health educators	Information; counselling	Unspecified	T=54.7%	T=35.9%

8d. Appendix D: Bibliography of Smoking Cessation Interventions Published in Academic Journals

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8e. Appendix E: A List of Smoking Cessation Programs for Pregnant and Postpartum Women and Girls

Table 8e.1 Programs for Pregnant and/or Postpartum Women and Girls

Program	Target Clients (Pregnant..)	Country of Origin	Contact Institution
A Pregnant Women's Guide to Quit Smoking	General	US	University of Alabama at Birmingham (Dr. Richard Windsor)
Asking to Listen	Perinatal health care providers	Canada	Canadian Public Health Association
Baby's Coming, Baby's Home	General		NFLD Lung Association
Born Free	General	Canada	PEI Lung Association
Freedom from Smoking for You and Your Baby	General	US	Any Provincial Lung Association
Great Start	General	US	www.greatstart.org
Holding Our Own	Aboriginal women; general	Canada	Walpole Island Health Unit
Kick Butt for 2	Teenage/Young women	Canada	St. Mary's Home, Ottawa, ON
New Start	General	Canada	Canadian Cancer Society
PREGNETS	General	Canada	CAMH; www.pregnets.org
Smoke Free Journey	Aboriginal women; general	Canada	Northern Family Health Society, Prince George, BC
Start Quit, Stay Quit	General	Canada	Windsor-Essex Health Unit, ON
Stopping When You're Ready	General	Canada	Windsor-Essex County Health Unit

Table 8e.2 Programs for Women and Girls (possibly suitable for adaptation)

Program	Target Clients	Country of Origin	Contact Institution
Sacred Plant, Sacred Ways	Aboriginal men and women	Canada	National Association of Friendship Centres
Kichi Chistemaw Pimatisiwin	Aboriginal women	Canada	Native Women's Transition Centre, Winnipeg
Well Being for Women: A LifeStyle Change Program	Low-income women	Canada	YWCA
How to Make \$1000 By Doing Nothing	Teenaged girls	Canada	University of Toronto Centre for Health Promotion
Stop Smoking: A Program for Women	Women	US	Health Canada
Protecting Our Families	Aboriginal families	Canada	National Indian and Inuit Community Health Representatives Organization
Catching Our Breath	Women	Canada	Women's Health Clinic, Manitoba
Helping You Quit: A Smoking Cessation Guide for Aboriginal Women in Canada	Aboriginal women	Canada	Native Women's Association of Canada

8f. Appendix F: List of Search Terms and Description of Ratings Process

Table 8f.1 List of Databases Searched and Keywords Used

Database	Keywords
Silver Platter: Psycinfo, All yrs, SWK abstracts, Clinical Reg., Books In and Out of Print	Smok* and cessation and pregnan*
Medline, all years	(tobacco or smok) and mother and (cessation or quit)
Medline, all years	pregnancy and tobacco and (cessation or quit)
Medline, all years	Pregnancy/ and smoking cessation/ and intervention
Web of Science, all years	Pregnan* and smok* and cessation and (program or intervention)
Medline	Teen and pregnant and smoking
Medline	Pregnant and relapse and smoking
Medline	Pregnancy and bupropion
Medline	Pregnant and nicotine replacement
Medline	Postpartum and relapse and smoking
Medline	Pharmacotherapy and pregnant and smoking

*also used author searches, and interventions cited in various review articles

Description of Ratings Process

Interventions were rated independently by two reviewers. When disagreement occurred, the particulars were discussed until agreement was reached. These formed the basis of the preliminary recommendations. The Team discussed the interventions in some detail in the context of the theoretical literature, and identified the various components, approaches and sub-populations that were important.

