Promoting Smokefree Pregnancies: A Review of International and New Zealand Literature Summary

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"I'm an obstetrician and my approach to practice is evidence based. Smoking is one of the most modifiable risk factors in pregnancy that can change pregnancy outcomes."

(McCowan, L., personal communication, February 22, 2005)

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Promoting Smokefree Pregnancies: A Review of International and New Zealand Literature - Summary[1]

This literature review analyses research and literature on smoking in pregnancy and interventions for pregnant smokers. The overall goal is to inform the delivery of smoking interventions to New Zealand women in their childbearing years.

Research and evaluations published in peer reviewed academic journals between 1995-2004 make up the bulk of the literature reviewed. [2] However, the main emphasis of the review is on literature from 2000 onwards, particularly for evaluations and research on pregnancy interventions. This is to ensure a focus on interventions from New Zealand and other countries reported since the development of best-practice guidelines.

The use of tobacco in pregnancy and postpartum poses a major threat to the health of the developing fetus, the infant and the mother. The health impact is greater for Māori and those in lower socio-economic groups.

Some women, 'spontaneous quitters', modify their health practices once they discover they are pregnant and before their first antenatal visit (although they relapse postpartum at very high rates). Smokers who do not spontaneously quit smoking early in pregnancy are likely to be less motivated and/or more addicted to nicotine, making intervention more challenging.

Smoking interventions are often developed based on cognitive and behavioural models of behaviour change and much of the literature identified for this review depicts pregnant smokers as being in a *process* of change.

Findings

Brief interventions

By the late 1990s, studies had demonstrated the efficacy of brief counselling interventions of 5-15 minutes by a trained health care provider, with pregnancy-appropriate self-help materials, for light to moderate pregnant smokers (up to 20 cigarettes per day). This appears to increase typical cessation rates of 5-10%, achieved with usual care, to about 16-17%. However, even after receiving a best-practice brief intervention, approximately 80% of women will continue to smoke during pregnancy. These smokers are considered to be more resistant to smoking interventions.

New Zealand research is of particular interest and one study integrated a cessation and reduction initiative into routine midwifery care in a New Zealand setting. Midwives used motivational interviewing techniques in brief sessions to encourage women to stop or reduce smoking and make other positive changes, such as establishing smokefree areas. Reduction was considered an important goal for women who felt unable to quit, and the intervention included an extra funded visit. This study achieved an encouraging 22% cessation rate at 28 weeks and 25% at 36 weeks.

[1] Insert URL to full doc on website when available

[2] For more detailed information on the scope and methodology of this literature review refer to Appendix. For bibliography see full Literature Review.

Specialist counselling services to supplement interventions delivered within routine care

Brief interventions delivered within routine antenatal care are unlikely to be effective for smokers who are more resistant to change. These smokers are more likely than spontaneous quitters to be from lower socio-economic groups and have partners and friends who smoke.

For the general population there is evidence that individual counselling increases the likelihood of cessation compared to less intensive support. However, it is not clear to what extent these results are relevant to pregnant populations. One approach to improving the impact of pregnancy interventions has been to try to design more powerful behavioural and cognitive treatments. However, effective programmes are scarce and those that have shown encouraging results have not been consistently replicated. Despite some advances in building an evidence-base for intervention, much is still unknown about intervening effectively with those women who continue to smoke during pregnancy. There is some evidence to suggest that the New Zealand *SmokeChange* programme may be an effective intervention in encouraging pregnant women to quit smoking. However, limitations in the *SmokeChange* research methodology, and the very limited success of counselling interventions for pregnant women in other countries, suggests that a comprehensive and rigorous evaluation of New Zealand specialist intervention programmes is required.

Telephone counselling offers the ability to reach larger numbers of pregnant women (possibly in combination with a mass media campaign). Investigation may be warranted into the current level of pregnancy-specific information available from the Quitline, and whether this can be enhanced.

Lead maternity carers need guidelines on when specialist counselling is appropriate and the information to assess whether smokers are likely to be more resistant to a brief counselling intervention. Risk factors might include a pregnant woman smoking more than 20 cigarettes a day and a partner and/or other whānau members who smoke. Lead maternity carers also need to be able to assess the motivation of pregnant smokers to quit.

Strategies to support behavioural interventions.

A number of strategies have been identified that may support smoking cessation interventions for pregnant women.

- Self-help materials tailored to pregnancy may be useful when they support a brief counselling intervention. There is no evidence to suggest they are effective on their own.
- There are promising results from interventions that use financial incentives and social support with low-income and high-risk pregnant smokers. There is some concern from researchers that internal motivation for change should be enhanced through counselling at the same time as external motivations are being addressed.
- There are indications that biomarker feedback, which gives quantitative validation of smoking intensity, may be a useful tool to support smoking interventions for pregnant women.

The use of nicotine replacement therapy in pregnancy

There is debate and a lack of strong evidence about the safety of nicotine replacement therapy (NRT) use in pregnancy, particularly the impact on the fetus. Most researchers identified in this review agree with the New Zealand National Committee on Smoking Cessation that the risks for the mother and fetus associated with smoking are greater than those associated with NRT use.

Because of limited research in this area, there is, as yet, no evidence to show that nicotine replacement therapy in pregnancy is effective, particularly in the group of more heavily addicted smokers that it is likely to be used for. Recommendations from the literature included: the lowest dose of NRT that is effective for cessation should be used; nicotine gum may need to be considered before the use of patches and it may be sensible to recommend use of NRT patches for 16 hours a day rather than 24.

Addressing the barriers to smoking cessation

Smoking in pregnancy is linked to lower socio-economic status and smokers in lower socio-economic areas are likely to be harder to reach. Smoking may be more accepted in their communities and they are probably exposed on a daily basis to more people who smoke, including those with whom they live. A community-based approach to smoking cessation in pregnancy, based on national guidelines, may mean practitioners can be used who are already involved with the pregnant woman and her whānau in other capacities. There may also be potential to incorporate dialogue with participants when planning interventions.

Pregnant smokers tend to have partners who smoke and more smokers among their whānau and friends. Currently, there is no evidence of successful interventions to encourage partners of pregnant women to quit smoking. There is limited evidence of interventions that could increase successful partner attempts to quit smoking.

Harm reduction is a developing science and there is debate about its use in smoking interventions in pregnancy.

There is limited evidence that smoking reduction interventions are effective in increasing birth weights and there is disagreement on what level of smoking reduction is required to impact on birth weight. No evidence was found in the literature on the effect of smoking reduction on other adverse health outcomes for the fetus, such as reduced lung function.

However, a harm reduction approach, viewed from a stages of change perspective, may open up a wider range of approaches to smokers who are not yet at the preparation or action stages. Offering smoking reduction or other harm reduction strategies (such as creating smokefree areas, more physical exercise, better nutrition) may be enough to move smokers through the process of change and provide smokers with another indicator of success, increasing self-esteem as they reach more achievable targets.

In light of the limited empirical data on the impact of harm reduction, it may be prudent to take a cautious approach to its use in New Zealand. Research needs to be rigorous enough to compare the effects of both reduction and cessation initiatives on the health outcomes for infants. It may also need to take a broad approach to assessing the benefits of harm reduction approaches.

There is no evidence of long term postpartum effectiveness for successful pregnancy interventions

Research suggests that many women who stop smoking during pregnancy may not be at the maintenance stage of change, and possibly have no intention of quitting for good, resulting in high relapse rates within pregnancy and postpartum.

Motivational strategies in pregnancy and postpartum interventions, that emphasise the importance of quitting for the woman's long term health and the negative effects of tobacco smoke on children, may be more effective than simply emphasising the health of the fetus or infant. In addition, successful interventions may need to be reinforced over a longer period, including before birth, to maintain success rates.

A system-wide approach to delivering smoking cessation interventions

Whether delivered by lead maternity carers or smoking cessation specialists, interventions will only decrease the high rates of smoking in pregnancy if they can be integrated into New Zealand's antenatal care system. An intervention framework and guidelines for health practitioners could provide national consistency while allowing for innovative and appropriate interventions. However, having a framework does not necessarily ensure compliance with it. Evaluations of its use would help to identify the areas in which health practitioners need more information or training.

A potential goal may be to ensure that all pregnant women in New Zealand are screened for smoking, and that all pregnant and postpartum smokers receive current best-practice cessation counselling as part of their usual care.

Population-level interventions

Pregnancy-specific smoking interventions do not occur in a vacuum. At a population level in New Zealand and in other countries, there are numerous other tobacco control interventions in place which will impact on women in their childbearing years and their families.

Taxation is known to be effective in decreasing youth smoking rates; this strategy may also be useful in reducing smoking initiation in women before they become pregnant. However, an increase in tobacco price could increase the financial hardship of Māori and low-income families and needs to be balanced by investment in cessation initiatives to ensure these families have support to quit smoking.

While women are aware of some adverse effects of smoking in pregnancy, it appears they are not fully aware of the health consequences. However, an increase in awareness does not necessarily translate to a change in behaviour. While specific messages about the health effects of smoking in pregnancy may broaden understanding, women may also require strategies to help them in any cessation attempts. Embedding the issues within a larger general health campaign may help build a community consciousness that smoking in pregnancy and the health of children are interconnected. This is particularly relevant to Māori and Pacific peoples where female relatives are an important source of information and advice for pregnant women.

The success of New Zealand's Quitline service for both Māori and non-Māori clients in the *general* population suggests it is likely to be acceptable to a broad group of pregnant women.

Moving forward

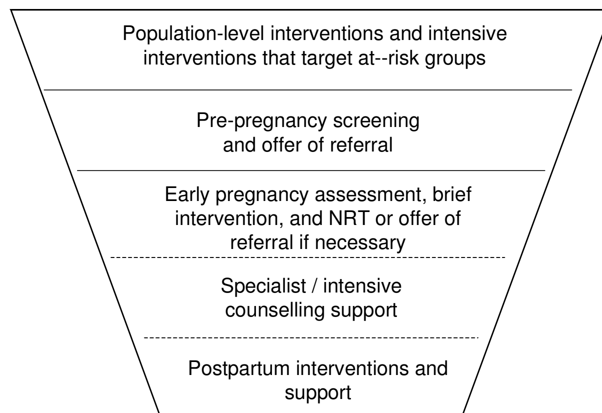
The window of opportunity to intervene in pregnancy is relatively short and is likely to begin only when a pregnant woman makes contact with the health system (usually not until at least the second trimester). While pregnancy may be an opportune time to intervene, there is no proven intervention for the majority of pregnant women. For those who do stop smoking for pregnancy there is a high chance they will resume smoking postpartum.

Evidence-based smoking interventions that target adolescent females and women in the childbearing years may contribute to a reduction in the numbers of women who need intervention during pregnancy. Women who are still smoking when they discover they are pregnant could receive best-practice cessation counselling as part of their usual care, with a focus on increasing motivation to stop smoking for the long-term.

If a brief smoking cessation intervention is not effective (or earlier if a woman has multiple risk factors), health practitioners should consider the use of nicotine replacement therapy (NRT) or the offer of a referral to specialist counselling services. Specialist services may utilise NRT, telephone support, self-help resources, partner and family support, harm reduction approaches, and may also have a community level approach. However, further evaluation is needed to clarify the potential of specialised approaches.

Postpartum support may come from specialist counselling services or Well Child providers. However, there is currently little information to inform the development of such interventions.

Health practitioners will require information, training, support, and resourcing if they are to deliver best-practice brief cessation interventions within routine antenatal care for those women who continue to smoke during pregnancy. Pregnancy-specific smoking cessation guidelines for health practitioners could provide national consistency, while allowing for innovative and appropriate interventions.



An intervention funnel where women smokers are targeted in adolescence and their childbearing years by population-level interventions and targeted intensive interventions. Those who continue to smoke should be identified as early as possible in pregnancy and receive a brief intervention from their lead maternity carer and, if necessary, more intensive counselling and support. Postpartum intervention and support would address the risk of relapse.

The 5 A's

Frameworks for smoking cessation are usually based on the 5 A's - Ask, Assess, Advise, Assist, Arrange. These could be broadened in guidelines for pregnant smokers, reflecting the unique factors that impact on this group. Additional features could include:

- screening for smoking with a warning that some women may not accurately disclose their smoking status
- questions about the motivation for change (the health of the fetus or the woman's general health)
- factors that may impact on the woman's ability to quit, e.g. level of partner or social support, whether this is a first pregnancy, levels of stress
- assessment of stage of change
- information on the factors that may hinder a woman from addressing her smoking
- examples of motivational statements tailored to stage of change
- guidance for health practitioners on self-help resources and their use at different stages of change
- clear information on the appropriate use of NRT in pregnancy
- guidelines for referral to specialist counselling if women fail to respond to a best-practice intervention in routine care
- relapse prevention strategies
- information on the predictors for relapse
- a post-delivery plan.

The aim would be to provide consistent information based on best-evidence of what an effective brief counselling session would look like in routine primary care (including the fact it is not just advice to quit).

Having a framework does not necessarily ensure compliance with it. Training and resourcing issues would need to be addressed on an ongoing basis. Evaluation of compliance and use of such a framework would help to identify the areas in which health practitioners need more information or training.

Designing intensive/specialist smoking cessation interventions for smokers resistant to change

For service providers in New Zealand who want to design effective, innovative and appropriate interventions for smokers who are resistant to change, the evaluations detailed in Appendix A of the full report do not make encouraging reading. There is little evidence to suggest what may work in interventions that attempt to go further than brief advice by a health provider. However, the literature reviewed here does suggest some points that should be considered when designing intervention for pregnant women smokers.

- Self-help materials, including brochures and videos, are unlikely to be effective unless they are supported with advice or counselling from a health provider.
- Financial incentives may be a useful way to encourage women in lower socio-economic groups to register and participate in interventions. However, they should be used in conjunction with counselling that targets internal motivation to quit smoking.
- Pregnant women smokers and health providers can provide valuable input into the design of interventions and resources. They can be a particularly useful source of information on barriers to cessation and effective provision of interventions.
- Māori researchers emphasise that support and services targeting pregnant Māori women and their whānau need to be kaupapa Māori driven, acknowledging and facilitating whānau and community resources.
- Tailored approaches may be required for subpopulations of pregnant smokers, e.g. Māori, Pacific peoples, teenagers and heavy smokers.
- Interventions should address the important role that partners and the wider family/whānau play in a pregnant woman's decision to quit or continue smoking. Interventions that aim to change the smoking behaviour of partners and support people may need to consider broader approaches that incorporate marital theory and other research on the behaviour of couples and communal constructs.
- Nicotine replacement therapy (NRT) should be used in conjunction with counselling to target internal motivation where behavioural approaches alone have not worked. Health providers should inform women of the risks of NRT and ensure that the dose women are exposed to does not exceed the nicotine they were receiving from smoking.
- Interventions should be rigorously evaluated early in their lifespan. Methodological issues must be reported fully in evaluations to ensure research results are credible and comparable. Evaluations should clearly describe the costs, demographics of participants, goals of the intervention (e.g. reduction or cessation) and the approaches used, e.g. nicotine replacement therapy. Reporting on a more comprehensive range of outcome indicators, such as changes in attitudes, movement in stage of change and reduction would broaden understanding of the role of different approaches.
- Where interventions view reduction in smoking as an important milestone towards the goal of cessation, particular attention should be paid to methodology when evaluating such programmes. In particular, as pregnant women may reduce their smoking during pregnancy without intervention, use of a control group in evaluations may help to determine baseline rates of smoking reduction during pregnancy and the effects of reduction on birth weight.
- If interventions aim for lifelong abstinence, then evaluations should include postpartum measures. Smoking cessation interventions could include a relapse prevention component for those who have stopped smoking before the first antenatal visit, with health practitioners encouraged to identify and support spontaneous quitters. Relapse messages should also address the risks of returning to smoking postpartum.

Future research

The findings of this review suggest a number of avenues for further research.

- Development and evaluation of targeted and innovative ways to motivate and assist pregnant women and women in their childbearing years to stop smoking.
- Smoking interventions for pregnant women need a better understanding of the role of partner and family/whānau support and smoking status in affecting women's ability to change their dependency on nicotine.
- A comprehensive and rigorous evaluation of New Zealand specialist intervention programmes is required.
- Research on whether women at different stages of change require different messages/stage specific material would inform future interventions, and stage of change profiling of the pregnant population would inform decisions about the ideal mix of those interventions.
- In light of the limited empirical data on the impact of smoking reduction and other harm reduction strategies, it may be prudent to take a cautious approach to its use in New Zealand. However, given that a harm reduction approach may open up a wider range of approaches to smokers who are not yet at the preparation or action stages, this data may have some value with this population. A range of intervention types should be researched, with the ability to compare results from reduction and cessation initiatives, particularly on the health outcomes for infants.
- A critical review of self-help materials available in New Zealand, and whether they are likely to meet the needs of health practitioners working in routine care and specialist settings, would help to establish the need for additional publications and resources.
- Future research may consider financial incentives that can be used to maintain participation in behavioural interventions.
- Investigation may be warranted into the current level of pregnancy-specific information available from the Quitline and whether this can be enhanced. Evaluation would also be useful to assess the effectiveness of Quitline in its counselling of adolescent girls (who may be encouraged to contact Quitline as a result of mass media campaigns) and pregnant women, including Māori.
- Further research would help to determine the acceptability of biochemical validation to pregnant women and the factors that improve or impair the validity of self-reporting in New Zealand. It could also further clarify the accuracy of self-reports in pregnancy.
- Accurate data on current levels of smoking during pregnancy will help to strengthen the evidence base for interventions and allow better monitoring of health targets.
- In depth cost analysis in New Zealand will help to pinpoint the costs of smoking in pregnancy and give a benchmark against which to assess smoking interventions. Researchers evaluating interventions should be encouraged to give details of the cost of the intervention, so the costs of different interventions can be compared.

Policymakers have a variety of issues to consider when planning future approaches to reducing smoking in pregnancy. Pregnant smokers are a diverse group. For many, smoking is entrenched in their social networks and their socio-economic group and can be perceived to be a coping mechanism. It may not be easy to give up during pregnancy when other stresses may arise. Interventions to address smoking in pregnancy are likely to be as varied as this group of smokers.

In order to reach smokers who are more resistant to quitting smoking, it is likely that more targeted and innovative specialised approaches will be needed. Research into the effectiveness of specialist counselling services for pregnant smokers in New Zealand will help to assess the potential of this approach both in smoking cessation and reduction. Other innovative approaches may also need to be considered to address the needs of these smokers.

Converting cessation during pregnancy into *sustained* cessation is an area which urgently needs investigation. All smoking cessation and reduction programmes for pregnancy should have a strategy to maintain gains postpartum. Placing pregnancy interventions into a broader strategy of addressing smoking in all women may be an effective way of reducing the number of women who are smoking at the time they become pregnant.

Appendix

The scope of this review

Research and evaluations published in peer reviewed academic journals make up the bulk of the literature reviewed. However, where available, conference presentations and reports were also used to broaden the scope of the review. Only material written in English was sourced.

The material used for this literature review encompasses research, evaluations and studies of smoking cessation and reduction issues for pregnant and postpartum women. It also includes relevant material on demographics, health impacts of smoking on women and their families, health-behaviour change models and approaches, and methodological approaches to evaluation. Non-pregnancy or non-smoking related material is included where appropriate.

The literature search looked broadly at the years 1995-2004. Older material is referred to occasionally, particularly if cited in literature reviews that fell into the time-period of this review. However, the main emphasis of the review is on literature from 2000 onwards, particularly for evaluations and research on pregnancy interventions. This is to ensure a focus on interventions from New Zealand and other countries reported since the development of best-practice guidelines.

Interventions that focus on decreasing children's exposure to second-hand smoke were not included in the scope of the review, unless part of a postpartum relapse intervention.

An assumption underpinning this review is that the majority of readers will already have some knowledge of smoking cessation issues. For those readers wanting background information on smoking, nicotine addiction, and legislation, the following New Zealand websites may be useful:

- Ministry of Health (NZ) http://www.moh.govt.nz
- ASH (NZ) http://www.ash.org.nz
- The Quit Group (NZ) http://www.quit.co.nz.

Methodology

In completing this review, we took the following steps to source information.

1. An initial literature search was conducted using the following databases: Google Scholar (1990-2005); Te Puna (1990-2005); INNZ - Index New Zealand (1990-2005); PsycInfo (2000-2005); Cinahl (1995-2005); Medline (1995-2005); Cochrane Database of Systematic Reviews (2000-2005); ACP Journal Club (2000-2005); Dare (2000-2005); Cochrane Controlled Trials (2000-2005); and HealthPromis (2000-2005). Combinations of the following search terms were used to identify relevant material: pregnan*; smok*; women; tobacco; smoking prevention; smoking cessation; evaluation; literature review; meta-analysis; New Zealand; Māori; Pacific; Tonga; Samoa; Nuie; Fiji.

2. Items found in the initial literature search were checked for additional references.

3. A search was done on the websites of key New Zealand and international tobacco control programmes, government departments, and web portals, including:

    - Ministry of Health (NZ) http://www.moh.govt.nz
    - ASH (NZ) http://www.ash.org.nz
    - The Quit Group (NZ) http://www.quit.co.nz
    - CDC - Centers for Disease Control and Prevention (U.S.) http://www.cdc.gov
    - Department of Health (UK) http://www.dh.gov.uk
    - Department of Health and Ageing (Australia) http://www.health.gov.au
    - Smoke Free Families (USA) http://www.smokefreefamilies.org
    - BIOME http://www.biome.ac.uk.

4. An internet search was undertaken to find additional material.
5. New Zealand researchers and practitioners were asked to identify relevant literature and research.