

*rivm*

National Institute  
for Public Health  
and the Environment

Report 260601006/2009

L. Tariq | B.M. van Gelder | M. van Zutphen | T. L. Feenstra

# Smoking cessation strategies targeting people with low socio-economic status

A first exploration of the effectiveness of available  
interventions

RIVM report 260601006/2009

## **Smoking cessation strategies targeting people with low socio-economic status**

### **A first exploration of the effectiveness of available interventions**

L. Tariq, B.M. van Gelder, M. van Zutphen, T.L. Feenstra

Contact:

B.M. van Gelder

Centre for Prevention and Health Services Research (PZO)

Boukje.van.Gelder@rivm.nl

This investigation has been performed by order and for the account of the Dutch Ministry of Health, Welfare and Sport, Welfare and Sport, within the framework of project V/260601, 'Tobacco control'

© RIVM 2009

Parts of this publication may be reproduced, provided acknowledgement is given to the 'National Institute for Public Health and the Environment', along with the title and year of publication.

## Rapport in het kort

### **Stoppen met roken maatregelen gericht op groepen met een lage sociaaleconomische status**

Een eerste verkenning van de effectiviteit van beschikbare interventies

Om rokers met een lage sociaaleconomische status te helpen met stoppen blijken een telefonische hulplijn of gratis verstrekte ondersteuning en farmaceutische middelen het meest effectief. Dit laatste kan bijvoorbeeld via de zorgverzekering. Mogelijk effectief zijn advies en ondersteuning op de werkplek, massamediale campagnes, schoolprogramma's voor de jeugd en maatregelen voor zwangere vrouwen. Dit blijkt uit een internationale literatuurstudie van het RIVM naar het effect van elf typen maatregelen om juist deze categorie rokers te helpen met roken te stoppen. Het is van belang dat beleidsmakers kennis hebben van maatregelen die goed werken bij groepen met een laag inkomen of een lage opleiding. Deze bevolkingsgroepen roken namelijk relatief veel en daarom valt bij hen veel gezondheidswinst te behalen.

De effectiviteit van reclamebeperkingen en promotie, accijnsverhogingen, geldelijke beloningen (*quit contests*) en rookverboden op de werkplek voor deze rokersgroep is nog onduidelijk. Hiervoor is onvoldoende bewijslast aangetroffen. Voor effecten van zogeheten *community* interventies, die gericht zijn op een bepaalde gemeenschap in de samenleving zoals een buurt of dorp, ontbreekt in de huidige literatuur bewijs

In het onderzoek is gekeken naar maatregelen die specifiek gericht zijn op groepen met een lage sociaaleconomische status. Daarnaast zijn maatregelen onderzocht voor rokers in de gehele bevolking als daarvan bekend was wat het specifieke effect of bereik was in de groep met een lage sociaaleconomische status. Op basis van de onderzoeksresultaten gaat het RIVM scenario's voor beleidsmaatregelen ontwikkelen en doorrekenen.

Trefwoorden: lage sociaaleconomische status; roken; tabaksontmoediging; effectiviteit

# Abstract

## **Smoking cessation strategies targeting people with low socio-economic status**

A first exploration of the effectiveness of available interventions

Telephone counseling and free cessation support are found to be most effective in helping smokers with a low socio-economic status (SES) stop smoking. Cessation support can, for example, be reimbursed through the healthcare insurance. Some evidence of effectiveness is available for cessation support at the workplace, mass media campaigns, school based programs and interventions for pregnant women. This is the result of an international literature study performed at the RIVM into the effectiveness of eleven different stop smoking interventions. It is important for policymakers to have knowledge of the effectiveness of interventions to reduce smoking in people with low SES. Smoking is more common in low SES groups. Therefore, smoking cessation interventions can achieve many health benefits especially in this group.

The effectiveness of advertisement bans, tobacco tax increase, quit contests and smoking prohibition at the workplace is unclear, as no evidence/insufficient literature is found for these interventions. Evidence of no effect is found for community interventions, which are complex interventions, usually aiming at many risk factors at once and carried out in disadvantaged communities.

This study focuses on interventions either tailored to reach low SES groups or with a specific effect in low SES groups. Also, interventions aiming at a general public while also reaching people with low SES are included. Based on the results of this study, the RIVM will develop and simulate scenario's in order to estimate the health gains and healthcare costs of policy measures.

Key words: low socio-economic status; smoking; smoking cessation; tobacco control; effectiveness

## Preface

Smoking bears considerable health risks and the socio-economic differences in smoking can be related to a large part of socio-economic differences in (healthy) life expectancy. The Dutch Ministry of Health, Welfare and Sport aims to reduce socio-economic differences in (healthy) life expectancy. One possible way forward would be the reduction of smoking in lower socio-economic classes. Therefore, the Dutch Ministry of Health, Welfare and Sport has asked the National Institute for Public Health and the Environment (RIVM) to provide insights into the effectiveness of possible policies to reduce smoking in lower socio-economic classes.

This report contains a quick scan on the available evidence of the effectiveness of interventions to reduce smoking in persons with a lower socio-economic status (SES).

Several colleagues participated in writing this report. We would like to thank Mariël Droomers, Linda Kok and Annemarie Ruijsbroek (all from the RIVM) for critically reading and commenting on the early concepts of this report. Moreover, we would like to thank the experts in this field who were approached during the consultation round that was included to provide feedback on the conclusions drawn in this report. Of course, any remaining errors and omissions are our own responsibility.



# Contents

<b>Samenvatting</b>	<b>9</b>
<b>1 Introduction</b>	<b>11</b>
1.1 Background	11
1.2 Interventions reaching groups with lower socio-economic status	13
<b>2 Methods</b>	<b>15</b>
<b>3 Results</b>	<b>19</b>
3.1 Review articles on smoking cessation and lower SES	19
3.2 Overview of the effectiveness of smoking cessation interventions among groups with a lower SES	19
3.3 Advertisement bans	20
3.4 Tobacco tax increase	20
3.5 Free cessation support	21
3.6 Telephone helplines	22
3.7 Community based interventions	23
3.8 Quit contests (monetary rewards)	24
3.9 Workplace interventions	25
3.10 Mass media campaigns	26
3.11 School-based programs	27
3.12 Interventions for pregnant women	28
<b>4 Discussion and conclusions</b>	<b>31</b>
<b>References</b>	<b>33</b>
<b>Appendix A Summary of results from individual studies</b>	<b>41</b>
<b>Appendix B List of experts</b>	<b>57</b>
<b>Appendix C Consultation round experts</b>	<b>58</b>



## Samenvatting

Deze overzichtsstudie beoordeelt voor elf typen maatregelen gericht op stoppen met roken het bewijs uit Nederlandse en internationale literatuur voor de effecten bij groepen met een lage sociaaleconomische status (SES). Er is gekeken naar maatregelen specifiek gericht op groepen met een lage SES en naar maatregelen voor de algemene bevolking, met informatie over de effecten of het bereik in de groepen met een lage SES.

Voor de Nederlandse situatie zijn gratis ondersteuning en telefonische counseling het meest effectief om het roken bij groepen met een lage sociaaleconomische status (SES) te verminderen. De interventies stoppen-met-rokenondersteuning op de werkplek, massamediale campagnes, schoolprogramma's en maatregelen gericht op zwangere vrouwen zijn mogelijk effectief. Onvoldoende bewijslast is gevonden voor reclamebeperkingen en -promotie, accijnsverhogingen, geldelijke beloningen ('quit contests') en rookverbod op de werkplek. Geen effect is gevonden van community interventies.

Voor deze studie is op basis van drie bestaande internationale review studies een zoekleutel opgesteld en zijn de reviews aangevuld met literatuur uit de periode 2000 tot 2007. Daarnaast is de Nederlandse overzichtsstudie van Bouwens et al. 2007 geraadpleegd. Voor tien typen maatregelen is gezocht naar zowel Nederlandse als internationale literatuur. Alle losse studies zijn beoordeeld als effectief of niet-effectief om het roken bij personen met een lage SES terug te dringen en ingedeeld naar a), interventie gericht op groepen met een lage SES, of b), interventie gericht op de algemene bevolking, maar met informatie over bereik en/of effecten in groepen met een lage SES. In overzichtstabellen zijn de resultaten uit de internationale literatuur samengevat. Deze tabellen zijn te vinden in Appendix A.

Vervolgens zijn alle typen maatregelen beoordeeld, gebaseerd op de volgende criteria over de 'hardheid van het bewijs' en 'relevantie voor de Nederlandse situatie'.

Tabel 1. Criteria over de 'hardheid van het bewijs' en 'relevantie voor de Nederlandse situatie'

1) <b>Geen bewijs/geen geschikte literatuur</b>	Geen Nederlandse studies en < 3 Internationale studies
2) <b>Bewijs voor ontbrekend effect/waarschijnlijk niet effectief</b>	Meerdere studies ( $\geq 1$ Nederlandse en/of $\geq 3$ Internationale), waarbij de meerderheid van de studies geen effecten toont
3) <b>Mogelijk effectief</b>	Of $\geq 1$ Nederlandse studies, waarbij de meerderheid van de studies effecten toont, of $\geq 3$ internationale studies, waarbij de meerderheid van de studies effecten toont
4) <b>Effectief</b>	$\geq 1$ Nederlandse studies, waarbij de meerderheid van de studies effecten toont
	+
	$\geq 3$ internationale studies, waarbij de meerderheid van de studies effecten toont

Daarna zijn alle typen interventies voorzien van de eindscores gebaseerd op de criteria hierboven beschreven. Alvorens een definitieve conclusie te trekken over de interventies, zijn 25 experts benaderd

op het gebied van stoppen-met-roken-interventies om feedback in te winnen over de gegeven eindscores. In totaal gaven tien experts feedback over de getrokken conclusies. De reacties van de experts zijn meegenomen in de eindbeoordeling. Bij twee van de tien interventies leidde de feedback van de experts tot het wijzigen van de getrokken conclusie. Verdere details staan vermeld in het rapport. Tabel 2 geeft een samenvatting van de uitkomsten van de literatuurstudie weer.

Tabel 2. Samenvatting van de uitkomsten van de literatuurstudie

Type interventie	Hardheid van het bewijs in lage SES groepen	Beleidsmogelijkheden in Nederland?
Reclamebeperkingen en -promoties	Geen bewijs/geen geschikte literatuur	Nee*
Accijnsverhogingen	Geen bewijs/geen geschikte literatuur	Ja
Gratis ondersteuning	Effectief	Ja
Telefonische counseling	Effectief	Ja
Community interventies	Bewijs voor ontbrekend effect/waarschijnlijk niet effectief	Ja
Geldelijke beloningen	Geen bewijs/geen geschikte literatuur	Ja
Maatregelen gericht op de werkplek – stoppen-met-rokenondersteuning	Mogelijk effectief	Ja
Maatregelen gericht op het werkplek – rookverbod op de werkplek	Geen bewijs/geen geschikte literatuur	Nee**
Massamediale campagnes	Mogelijk effectief	Ja
Schoolprogramma's	Mogelijk effectief	Ja
Interventies voor zwangere vrouwen	Mogelijk effectief	Ja

\* Deze interventie is reeds ingevoerd in Nederland

\*\* Ook deze interventie is reeds ingevoerd in Nederland. Echter, de maatregel wordt niet in alle sectoren van de werkende Nederlandse samenleving even goed nageleefd

Het bewijs is als afwezig, of zeer zwak beoordeeld voor reclamebeperkingen en -promotie, accijnsverhogingen, geldelijke beloningen en rookverbod op de werkplek. Voor vier maatregelen is enig bewijs van effect bij groepen met een lage SES, namelijk voor stoppen-met-rokenondersteuning op de werkplek, massamediale campagnes, schoolprogramma's, en maatregelen gericht op zwangere vrouwen. Bewijs voor ontbrekend effect is gevonden voor community based interventies. Ten slotte is er sterker bewijs voor de effectiviteit van gratis ondersteuning en telefonische counseling om specifiek groepen met een lage SES te laten stoppen. Rekening houdend met de studies in Nederland en bestaand Nederlands beleid kan worden geconcludeerd dat vooral gratis ondersteuning, telefonische counseling, maar ook stoppen-met-rokenondersteuning op de werkplek, massamediale campagnes, schoolprogramma's, en maatregelen gericht op zwangere vrouwen aandacht verdienen als maatregelen gericht op groepen met een lage SES.

Samenvattend, deze studie geeft aan dat er lang niet altijd voldoende aandacht is voor de effecten van maatregelen gericht op de algemene bevolking in groepen met een lage SES en dat er relatief weinig bekend is over stoppen-met-rokenmaatregelen die specifiek gericht zijn op groepen met een lage SES. Dit is wel van belang, juist omdat in groepen met een lage SES relatief veel wordt gerookt, roken tot geaccepteerd gedrag behoort en er daardoor relatief moeilijk gestopt kan worden, terwijl er veel gezondheidswinst te behalen valt.

# 1 Introduction

In the Netherlands, as in most Western countries, persistent socio-economic differences in smoking behaviour exist since the first decreases in smoking occurred during the sixties. Socio-economic status (SES) is assessed on the basis of income, education and occupational status. People with a low SES, that is, a low education and/or a low income, smoke more often than people with a high SES<sup>1</sup>. While in the beginning these differences could be explained by differences in information about the health risks of smoking, this is no longer the full explanation. Other possible explanations, for instance differences in time preference or in self efficacy do not fully explain the size and persistence of these differences<sup>2</sup>. Higher quit ratios are observed in countries with more developed tobacco control policies than countries with less developed tobacco control policies. High and low educated smokers benefit about equally from the nation-wide tobacco control policies, but the amount of attempts to stop smoking are less successful in groups with a low SES<sup>3</sup>.

Smoking bears considerable health risks and the socio-economic differences in smoking can be related to a large part of socio-economic differences in (healthy) life expectancy. The Dutch Ministry of Health, Welfare and Sport aims to reduce socio-economic differences in (healthy) life expectancy. One possible way forward would be the reduction of smoking in lower socio-economic classes. For these reasons, insight into the possible policies to reduce smoking in lower socio-economic classes is worthwhile.

The current report contains the results of a first exploration of the literature into the effectiveness of tobacco control policy that is especially targeted at lower socio-economic classes. The aim is to review the effectiveness of interventions to reduce smoking among groups with a lower socio-economic status. The current report gives a first exploration of the effectiveness of two types of interventions: interventions directly targeting groups with a lower SES, and interventions aiming at a general public while also reaching people with low SES. Because the current research is a first exploration within the given time restraints, and not a full systematic review or meta-analysis, the results should be interpreted with some caution.

This introduction continues with some background data on smoking and socio-economic status, followed by a description of the type of policies that were reviewed. Then section 2 describes the methods used, while section 3 contains the results of the review. Finally section 4 is a discussion and conclusion section.

## 1.1 Background

In the Netherlands, in 2006, 31 % of the persons who had received lower education smoked against 22 % of the persons who received higher education (Figure 1). The differences in smoking between SES categories are more prominent in men than in women.

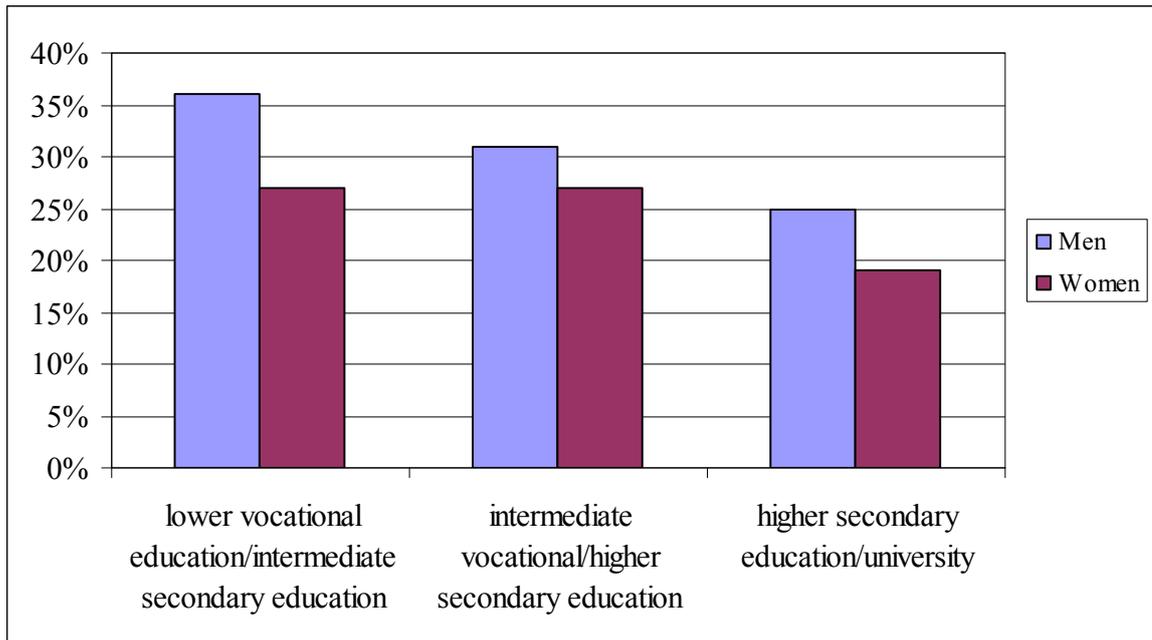


Figure 1: The percentage of adult male and female smokers in 2006 according to their education.  
Source: [www.STIVORO.nl](http://www.STIVORO.nl)

The association between educational level and smoking behaviour is already present among adolescents (Figure 2).

Fifty-seven percent of the youth who received lower vocational education smoked during the last four weeks versus 12 % of the youth who received pre-university education (vwo).

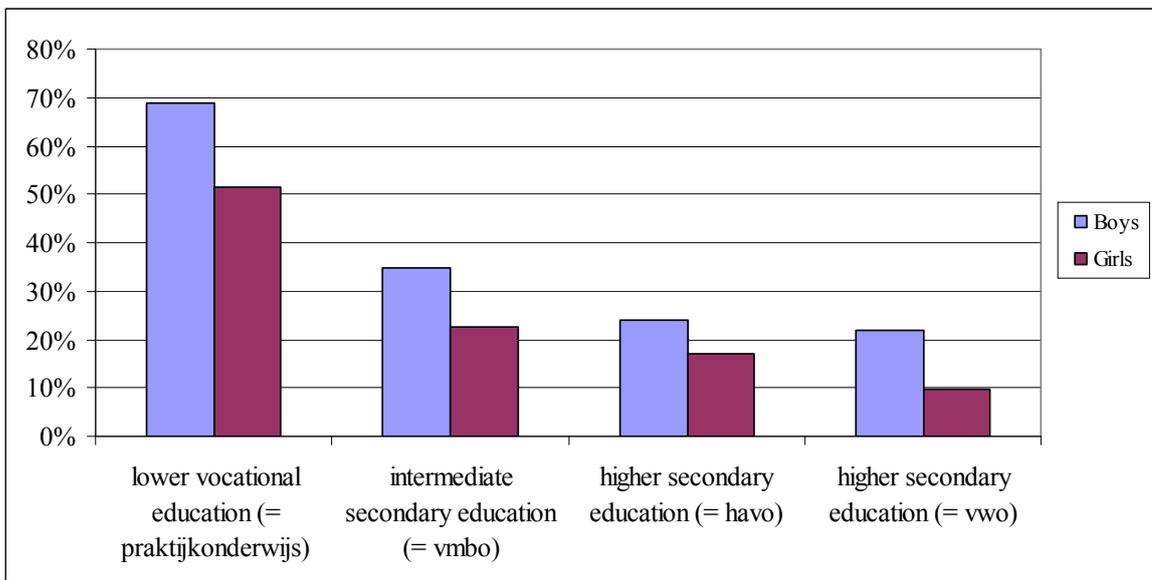


Figure 2: The percentage boys and girls (aged 10-19 years) who smoked at least once during the past four weeks according to their educational level in 2006.  
Source: [www.STIVORO.nl](http://www.STIVORO.nl)

## 1.2 Interventions reaching groups with lower socio-economic status

Two different types of interventions may be distinguished that can reach groups with a lower SES. First, interventions directly targeting groups with a lower SES, such as community based interventions within a disadvantaged community. These interventions will mainly reach and possibly affect people with a low SES. Second, interventions aiming at a general public while also reaching people with low SES. In the case that they attract relatively more low SES smokers or are more effective among this group than among high SES smokers they can also be categorized as interventions aimed at reducing socio-economic differences in smoking. Both types of interventions may reduce health disparities, because they have a larger impact among low SES smokers.



## 2 Methods

The following strategy was used to identify as much relevant publications as possible within the given time constraints.

Review articles on smoking cessation and lower SES were searched. Three relevant publications were found with an overview of the effectiveness of smoking cessation interventions among groups with a lower SES. One publication<sup>4</sup> identified five relevant tobacco control measures which have been shown to have a large potential to reduce inequalities in smoking between socio-economic groups by having the greatest effects among lower SES groups. Another review described available policy and research done in the Netherlands<sup>5</sup>, while a third publication described international studies published until 2000<sup>6</sup>. Then, the international overview by Platt and co-authors<sup>6</sup> was updated, because the other two publications were not systematic reviews. This was done for the literature published between 2000 to 2007, using the following search strategy:

1. Smoking\*:ME
2. Tobacco-use-disorder\*:ME
3. Tobacco-use-cessation\*:ME
4. Nicotine\*:ME
5. Smoking and Cessation
6. Antismok\*
7. Quit\*:TI
8. Smok\*:TI
9. Cigar\*:TI
10. Tobacco:TI
11. Nicotine:TI
12. Combine 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11
13. Exp socio-economic factors
14. Income: TI
15. Education: TI
16. Socio-economic in TI or socio-economic: TI
17. Combine 13 or 14 or 15 or 16
18. Exp randomized-controlled-trial: ME
19. RCT
20. Community intervention trial or community-based intervention or communit\*: TI
21. Exp program evaluation
22. price\*: TI
23. tax\*: TI
24. Combine 18 or 19 or 20 or 21 or 22 or 23
25. PY: 2000 – 2007
26. Combine 12 and 17 and 24 and 25

This search strategy resulted in 285 references. Abstracts and full-text papers (n=78) were checked for relevance based on the following criteria:

- The smoking cessation intervention or policy was evaluated on effectiveness by establishing smoking cessation, smoking prevalence, starting smoking or in the case of tax policies price elasticity.
- Studies were excluded when a specific patient population was the target group, when the intervention was aimed at smokeless tobacco or passive smoking and when the language of the paper was not English, Dutch or German.

This resulted in 42 relevant papers describing 39 studies.

The recent Dutch overview of smoking cessation interventions<sup>5</sup> ignored interventions aimed at the general population examining the effectiveness on different socio-economic groups. Therefore, such studies conducted in the Netherlands were included when we were aware of them.

Three other studies were mentioned by experts during the consultation round, while providing feedback. One of these studies was a review on mass media campaigns to promote smoking cessation, performed by Niederdeppe et al.<sup>7</sup>. Another study was a trial on the effect of smoke-free workplaces on smoking behaviour. The third study was a trial on the effect on nation-wide tobacco control policies on smoking cessation in high and low educated groups in different countries. All of them are also included in this study<sup>3;7;8</sup>.

Final results of the review for all interventions were scored on evidence for effectiveness and relevance for Dutch policy, based on the following criteria.

**Tabel 3. Criteria for the evidence for effectiveness and relevance for Dutch policy**

<b>1) No evidence /insufficient literature</b>	No Dutch studies and < 3 International studies
<b>2) Evidence of no effect</b>	Several studies ( $\geq 1$ Dutch and/or $\geq 3$ International) with the majority of studies demonstrating no effects
<b>3) Some evidence</b>	Either $\geq 1$ Dutch studies with the majority of studies demonstrating effects, Or $\geq 3$ International studies with the majority of studies demonstrating effects
<b>4) Evidence</b>	$\geq 1$ Dutch studies with the majority of studies demonstrating effects  + $\geq 3$ International studies with the majority of studies demonstrating effects

We felt reluctant however, to base these scores on literature review only. That is why a consultation round was included to allow experts in the field to comment on our scores. In total, 25 experts were approached of which 10 did respond to our request, and gave their opinion about the conclusions drawn for every intervention. We made a document which was sent to the experts, as shown in Appendix C.

The final scores of the interventions were reviewed again, based on the comments received from experts. When experts disagreed with our conclusion, and when this was based on a scientific study, we reviewed our conclusion. In eight out of ten interventions, our conclusions were supported by the experts.

The next sections of this report describe the effectiveness of eleven interventions on smoking cessation (advertisement bans, tobacco tax increase, free cessation support, telephone helplines, community based interventions, quit contests, cessation support at the workplace, smoking prohibition at the workplace, school based programs, interventions for pregnant women and mass media campaigns). For every intervention, contents will be described, evidence of the Dutch and international literature found will be shown, it will be described whether or not the intervention is already implemented in the Netherlands, expert opinion will be shown, and our final conclusion drawn will be given. Some of the interventions show considerable overlap, for instance free cessation support and telephone helplines, or

mass media campaigns and telephone helplines, and therefore, some studies will be discussed under more than one heading. For every intervention, if sufficient literature is found, the outcomes of individual studies are summarized in tables that can be found in Appendix A.



## **3 Results**

### **3.1 Review articles on smoking cessation and lower SES**

Kunst et al.<sup>4</sup> identified five relevant tobacco control measures which have been shown to potentially reduce SES differences in smoking behaviour by having the greatest effects among low SES groups: banning of marketing, rising tobacco prices, work place interventions (especially bans), free supply of nicotine replacement therapy (NRT) and similar cessation aids, and counselling (especially telephone helplines). Bouwens et al.<sup>5</sup> concluded that the interventions available to reduce smoking, specifically aimed at lower socio-economic groups in the Netherlands, are limited to community interventions and interventions with the prospect of (monetary) rewards. Platt et al. concluded that the first priority must be the reduction of smoking rates in the poorest and least powerful sections in the society. ‘The regressive impact of raising taxes on the poorest who are unable to stop smoking must be counteracted by active promotion of the availability of free nicotine replacement therapy and other cessation services. At the same time, the underlying economic and psychosocial processes that enhances the risk of smoking, smoking dependence and unsuccessful cessation attempts need to be addressed in policies<sup>6</sup>. Finally, Niederdeppe et al.<sup>7</sup> concluded that there remains a need to conduct research that examines the effectiveness of media campaigns by SES. This is because there is considerable evidence that media campaigns to promote smoking cessation are often less effective, sometimes equally effective, and rarely more effective among socio economically disadvantaged populations relative to more advantaged populations.

### **3.2 Overview of the effectiveness of smoking cessation interventions among groups with a lower SES**

Table 4 below summarizes the results for all eleven intervention types and additionally if the intervention is currently implemented in the Netherlands.

Table 4. Summary of outcomes of the literature review

Type of intervention	Evidence of effect in low SES groups	Implementation of policy possible in the Netherlands?
Advertisement bans	No evidence/insufficient literature	No*
Tobacco tax increase	No evidence/insufficient literature	Yes
Free cessation support	Evidence	Yes
Telephone helplines	Evidence	Yes
Community based interventions	Evidence of no effect	Yes
Quit contests (rewards)	No evidence/insufficient literature	Yes
Workplace – cessation support	Some evidence	Yes
Workplace – smoking prohibition	No evidence/insufficient literature	No**
Mass media campaigns	Some evidence	Yes
School based programs	Some evidence	Yes
For pregnant women	Some evidence	Yes

\*This policy is already implemented in the Netherlands

\*\*This policy also has already been implemented in the Netherlands, but is not always observed in practice

### 3.3 Advertisement bans

The first policy mentioned by Kunst et al. is banning advertisement and promotion of tobacco<sup>4</sup>. However, this policy will not be specifically examined within this report, mainly because in the Netherlands banning of advertisement and promotion of tobacco is already implemented. In addition, the international literature review did not reveal any study on the effectiveness of this policy. To conclude, advertisement bans may specifically address groups with a low SES, but there is almost no evidence. This policy has little relevance for the Netherlands because since 2002 there is already a rather exhaustive ban on many kinds of tobacco advertising. All the experts approached supported our conclusions drawn for this intervention.

Type of intervention	Evidence	Effective	Conclusion evidence of effect in low SES groups
Advertisement bans	Dutch studies: 0 International studies: 0	Dutch studies: 0 International studies: 0	No evidence/insufficient literature

### 3.4 Tobacco tax increase

This policy is about raising the price of cigarettes. This would reduce socio-economic differences in smoking if low SES groups have a higher price elasticity of demand for cigarettes than the general population. To our knowledge no Dutch studies exist which evaluate the effectiveness of rising tobacco prizes on smoking cessation or initiation among low SES groups. Our search in the international literature did not yield any appropriate studies. However, we were aware of two relevant papers published before 2000<sup>9,10</sup>. These two papers were also referred to in Kunst et al.<sup>4</sup>. Townsend et al.<sup>9</sup> reported that men and women in lower socio-economic groups were more responsive than were those in higher socio-economic groups to changes in the price of cigarettes. Price elasticities

of demand for cigarettes (percentage change in cigarette consumption for a 1% change in price) were highest in the most disadvantaged groups (-1.0 for men and -0.9 for women), and lowest (not significantly different from zero) in the most affluent group.

Farrelly et al.<sup>10</sup> also reported that lower-income groups were more likely to reduce or quit smoking than those with higher incomes after cigarette price increases. The total price elasticity was -0.29 for lower-income persons compared with -0.17 for higher income persons.

To phrase Kunst: ‘The extent to which smokers can afford to purchase cigarettes has a major impact on their consumption, especially during adolescence. There is some evidence that, as compared to higher socio-economic groups, lower socio-economic groups are more likely to decrease their amount of cigarettes consumed or to stop smoking in response to rising tobacco prices<sup>9;10</sup>. Therefore, in many settings, increasing the price of tobacco products through taxation might be one of the most effective measures to reduce levels of tobacco consumption in the population at large, and in lower income groups in particular’<sup>4</sup>.

However, the effectiveness may depend on current price levels: ‘Rising tobacco prizes is most effective in countries where tobacco prizes are still low. In countries with high tobacco prizes, further rises may have large side effects that would particularly affect the poorest smokers. Evidence from the United Kingdom and the United States shows that further rises in tobacco prices would stimulate the smuggling of cigarettes, which is viewed positively by low-income smokers as a way to deal with high prices and cope with economic hardship<sup>11;12</sup>. In addition, further increases in tobacco prices would decrease the amount of money that poor smokers have available to purchase the essentials of daily life’<sup>4</sup>.

Considering the criteria used in this study to score interventions, we conclude that there is insufficient literature for rising tobacco taxation. Since tobacco prices in the Netherlands are relatively low<sup>13</sup>, rising taxes may be an effective way to reduce smoking in low SES groups. Nine out of ten experts supported our conclusion, only one expert disagreed. This person stated that while the evidence on the effectiveness of rising tobacco prices on smoking cessation or initiation among low SES groups is low, it is present.

Type of intervention	Evidence	Effective	Conclusion evidence of effect in low SES groups
Tobacco tax increase	Dutch studies: 0 International studies: 2	Dutch studies: 0 International studies: 2	No evidence/insufficient literature

### 3.5 Free cessation support

This policy is about reimbursing smoking cessation support, for instance free supply of nicotine replacement therapy (NRT). Although some exceptions exist, most health insurances currently do not reimburse smoking cessation support in the Netherlands. A pilot project in Utrecht will start to evaluate the effects of reimbursement. A previous trial with reimbursement of costs of cessation aids has been carried out in the Dutch Friesland region<sup>14</sup>. It was found that more smokers from the lowest income group used the reimbursements than smokers from higher income groups, although this was not significant (p= 0.6). However, this difference was significant for smokers with low education level compared to smokers from higher educational levels. After six months 40 % of low educated smokers

did an attempt to quit smoking while 26 % of the control group did. Among higher educated smokers this difference was not seen. After six months 38 % of low educated smokers actually quit smoking while 20 % of the control group did. Among higher educated smokers this difference was not seen. After 12 months there was a significant difference in the number of smokers between the experimental and control group (3.7 %, OR=1.7; CI [1.1 – 2.5]) for all SES groups combined. In conclusion, reimbursement of cessation aids seems to reach more lower educated than higher educated persons and is effective in helping them to quit smoking. These results are less pronounced for the lower income groups compared to higher income groups.

In the international literature NRT therapy is often combined with counseling. It was not always clear whether the cessation support was provided free, however in trial settings this is often the case. All ten studies using NRT and/or counseling and aiming at low socio-economic groups were included in Table A1 in Appendix A. Of these, five studies found evidence of effectiveness, whereas five studies did not find evidence.

Furthermore, thirteen studies were found, which, although not targeted at low socio-economic groups, have produced findings about differential impact according to socio-economic status. In eleven studies the interventions were at least as effective in low as in high socio-economic groups, whereas in two studies the intervention was shown to be less effective in low than in high socio-economic groups.

‘Meta-analyses of controlled trials have demonstrated that the use of NRT increased the likelihood of abstaining from smoking among the general population. Because smokers from low socio-economic backgrounds are less likely to be successful quitters, their success rates may considerably be increased by full access to, and adequate use of, NRT. Where the poor experience financial and other barriers to the use of NRT, provision of free or subsidized NRT to this group may help them to overcome these barriers and achieve higher quit rates’<sup>4</sup>.

To conclude, the Dutch Friesland experiment as well as the international literature seems to give evidence that free supply of cessation support is effective to reduce smoking in low SES groups. It was not quite clear whether the support was provided free of charge in the international studies. In the Netherlands there is a pilot study ongoing to evaluate the effects of reimbursement. Eight out of ten experts supported our conclusion, only two experts disagreed. These two experts both questioned whether the support was provided free of charge in all studies. And argued that free support of NRT is only one of the interventions used for smoking cessation; that is why the specific effect of free support on smoking cessation should be explored in the future.

Type of intervention	Evidence	Effective	Conclusion of evidence of effect in low SES groups
Free cessation support	Dutch studies: 1 International studies: 23	Dutch studies: 1 International studies: 16	Evidence

### 3.6 Telephone helplines

Telephone helplines are a specific form of cessation support that may be relatively well accessible for groups with a low SES<sup>4</sup>.

The Dutch mass media millennium campaign ‘Dat kan ik ook!’ included the use of a telephone helpline. It was shown that this helpline reached more people with a low income<sup>15</sup>. This campaign is described in more detail in the mass media campaign section. There is no data available about the social status of the more than 600,000 smokers who tried to stop smoking at the turn of the millennium. The smokers who subscribed for the attempt to break a record could use several supportive stop smoking aids: a stop smoking kit, the kit and tailored advice, the kit and the TV course or the kit and telephone counseling. The smokers who chose telephone support had a lower income than people in the other groups. There were no significant differences in educational level, occupational level or income between smokers and successful quitters after three and twelve months<sup>15</sup>. Thus it may be concluded that the different cessation aids are at least as effective in low as in high socio-economic groups. The evaluation of the effectiveness of the overall campaign did not include information about socio-economic status.

Table A2 (Appendix A) summarizes information of five international interventions on telephone counseling. Of the four studies targeted at low socio-economic groups, two have demonstrated effectiveness and two have not. The remaining study was not targeted at low socio-economic groups, but produced findings about differential impact according to socio-economic status. In this study the intervention was found to be at least as effective in low as in high socio-economic groups.

Telephone-based quit lines have been shown to promote smoking cessation<sup>16</sup> and one study showed that a telephone help line was more effective in reaching disadvantaged social groups<sup>17</sup>. Also among young adults telephone lines were effective in reaching social disadvantaged groups<sup>18</sup>. ‘Such helplines may be more effective among lower SES groups when they are promoted by national campaigns, given proactively<sup>1</sup>, and provided free of charge<sup>4</sup>’.

To conclude, like for the other forms of cessation support, evidence of effectiveness in reducing smoking in groups with a low SES is present. Furthermore, there was some evidence that telephone helplines were at least as effective in low as in high socio-economic groups. In the Netherlands, telephone helplines are current policy for cessation support. Nine out of ten experts supported our conclusion, only one expert disagreed. This expert stated that because the evidence of effectiveness of telephone helplines is found in international studies, and not in Dutch studies, we should conclude that there is insufficient literature found for this intervention.

Type of intervention	Evidence	Effective	Conclusion of evidence of effect in low SES groups
Telephone helplines	Dutch studies: 1 International studies: 5	Dutch studies: 1 International studies: 3	Evidence

### 3.7 Community based interventions

Community based interventions are complex interventions, usually aiming at many risk factors at once and carried out in disadvantaged communities. In the Netherlands, community based interventions are

<sup>1</sup> Pro-active suggest that telephone helplines actively approach people from low SES groups by calling them, for example, weekly to stop smoking.

mainly carried out in disadvantaged communities on an experimental basis. In theory this strategy may therefore be effective in groups with a low socio-economic status. However, there were only two community studies carried out in the Netherlands which were evaluated. These two studies were both not proven effective in producing higher quit rates in disadvantaged communities than in control communities<sup>5</sup>. Information about these two interventions is summarized in Table A3 (Appendix A)<sup>19</sup>.

Table A3 summarizes information of sixteen international community based interventions. Of the thirteen international studies targeted at low socio-economic groups, six have demonstrated effectiveness and seven have not. There are also three studies which, although not targeted at low socio-economic groups, have produced findings about differential impact according to socio-economic status. In one study the intervention was at least as effective in low as in high socio-economic groups, whereas in two studies the intervention was shown to be less effective in low than in high socio-economic groups.

To conclude, evidence on community interventions is very mixed and would lead to the conclusion that these interventions are proven to be ineffective in reducing smoking prevalence in Dutch low SES groups. Eight out of ten experts supported our conclusion, two experts disagreed. Both experts indicated that it is important to note that community interventions were not always carried out in the right manner (as they are meant to be). This could be the main reason for them not being effective in reducing the amount of smokers, especially in disadvantaged communities.

Type of intervention	Evidence	Effective	Conclusion of evidence of effect in low SES groups
Community based interventions	Dutch studies: 2 International studies: 16	Dutch studies: 0 International studies: 7	Evidence of no effect

### 3.8 Quit contests (monetary rewards)

This policy is about rewarding smokers (monetarily) who quit smoking. In 1998 it was the first time that the Netherlands participated in the international Quit & Win contest<sup>20</sup>. Through the main local radio station in the province of Utrecht 400 people were recruited to participate in the Quit & Win contest. Fifty-two percent of the smokers from the lowest SES group had interest in this contest compared to 24 % of the smokers from the highest SES (p=0.05). Among women a lower SES was associated with a higher chance to participate in the contest. Among men there was no association between SES and participation. For 82 % of the participants the contest was the immediate cause to quit smoking. This percentage was highest in the lower SES group and lowest in the highest SES group (96 % versus 78 %, p < 0.05). There was no difference in quit rate between SES groups. In conclusion, this study shows that interest in the contest was higher among low SES groups and for more persons in the low SES group the contest was an immediate cause to quit. Furthermore, actual participation and effectiveness did not differ between low SES groups compared to high SES groups.

One paper was found to evaluate the effectiveness of a Quit & Win contest for different socio-economic groups in Canada<sup>21</sup>. In terms of reach it was found that participants were higher educated and more often white-collar employees than in the general Canadian population (p < 0.001). In terms of effectiveness it was found that after 1 year 20 % reported to be smoke free, compared with 1 % in

general population, while SES was not predictive of cessation. Thus this intervention aimed at the general population was reported to be less effective in low than in high socio-economic groups. This is in contrast to Dutch results.

To conclude, Dutch evidence points out that intervention with a monetary reward seem effective in reducing smoking prevalence in groups with a lower SES. This is however not supported by international evidence; in contrast, the only international study identified was reported to be less effective in low SES-groups. In the Netherlands, several interventions with (monetary) rewards have already been used for cessation support, but on an experimental basis. In the first place, we concluded that there is ‘some evidence’ for quit contests. But only six out of ten experts supported our conclusion, four experts disagreed. Those who disagreed stated that the amount of studies found for this intervention is too low to conclude that there is some evidence. Considering the feedback from the experts, we changed our conclusion to ‘no evidence/insufficient literature’.

<b>Type of intervention</b>	<b>Evidence</b>	<b>Effective</b>	<b>Conclusion evidence of effect in low SES groups</b>
Quit contests (rewards)	Dutch studies: 1 International studies: 1	Dutch studies: 1 International studies: 0	No evidence/insufficient literature

### 3.9 Workplace interventions

#### a) Cessation support at the workplace

This policy is about reducing smoking in (all) workplaces through cessation support offered at the workplace. To our knowledge, in The Netherlands, smoking cessation courses are offered at workplaces, but no consistent policy exists to support this, and no evaluations have been published which demonstrate the effects of this policy. That is why there are no Dutch studies which evaluated the effectiveness of workplace interventions targeted at low SES groups on smoking cessation at workplaces. Table A4 (Appendix A) summarizes information on seven workplace interventions, found in the international literature. Of the five studies targeted at low socio-economic groups, four have demonstrated effectiveness and one has not. The remaining two studies were not targeted at low socio-economic groups, but have produced findings about differential impact according to socio-economic status. In both studies the intervention was at least as effective in low as in high socio-economic groups.

To conclude, the international evidence shows that workplaces are a good channel to reach groups with a low SES. Supporting Dutch evidence was not present. Nine out of ten experts supported our conclusion; one expert did not provide his/her opinion about our conclusion.

<b>Type of intervention</b>	<b>Evidence</b>	<b>Effective</b>	<b>Conclusion evidence of effect in low SES groups</b>
Workplace: cessation support at the workplace.	Dutch studies: 0 International studies: 7	Dutch studies: 0 International studies: 6	Some evidence

### **b) Smoking prohibition at the workplace**

This policy is about prohibiting smoking in all workplaces. Since January 2004, there is a smoking ban for the workplace in the Netherlands. Since July 1<sup>st</sup> 2008, also the restaurants and bars are smoke-free. Nevertheless, several companies do not comply with the law (like the (building) industry, arable farming and fishing sector). Activities to support the legislation are still warranted. In the international literature, no evidence was found on prohibition of smoking at workplaces for low SES specifically.

To conclude, since January 2004, there is a smoking ban for the workplace in the Netherlands. In the Dutch and international literature, no evidence was found on prohibition of smoking at workplaces, specific for low SES groups. Nine out of ten experts supported our conclusion. Only one expert disagreed, who also provided us literature<sup>8</sup> about the effect of smoke-free workplaces on smoking behaviour. But according to the criteria to score interventions, our conclusion would remain the same.

<b>Type of intervention</b>	<b>Evidence</b>	<b>Effective</b>	<b>Conclusion evidence of effect in low SES groups</b>
Workplaces: prohibiting smoking in all workplaces.	Dutch studies: 0 International studies: 1	Dutch studies: 0 International studies: 0	No evidence/insufficient literature

## **3.10 Mass media campaigns**

Mass media campaigns are broad campaigns aimed at a vast majority of a population through mass media which include newspapers and other printed material, radio, television and billboards. Dutch mass media campaigns were executed around the turn to the new millennium (1999/2000). Parts of the campaign 'Dat Kan Ik Ook!' were presented in a television show called 'Koffietijd', promotional messages were shown in other TV shows and a smoking cessation course was broadcasted on the television. The show 'Koffietijd' was an entertainment program broadcasted at TV channel RTL4 and had eight episodes aiming to increase the number of people who try to stop smoking and to make smoking cessation more successful.

From the viewing figures it can be concluded that two thirds of TV viewers who saw parts of the campaign belonged to a low socio-economic group and that the show 'Koffietijd' and another program RTL-Live attracted the most viewers. From research among smokers it is concluded that people from lower socio-economic groups watched on average more to the show 'Koffietijd' and the smoking cessation course. Television, and the television show in particular, thus showed to be a good strategy to reach low SES groups<sup>22</sup>.

There is no data available about the social status of the more than 600,000 smokers who tried to stop smoking at the turn of the millennium. The smokers who subscribed for the attempt to break a record could use several supportive stop smoking aids: a stop smoking kit, the kit and tailored advice, the kit and the TV course or the kit and telephone counselling. The people in these four groups were similar according to educational level, while the smokers who chose telephone support had a lower income than people in the other groups. There were no significant differences in educational level, occupational level or income between smokers and successful quitters after three and twelve months<sup>15</sup>. Thus it may be concluded that the different cessation aids are at least as effective in low as in high socio-economic groups. The evaluation of the effectiveness of the overall campaign did not include information about socio-economic status.

Table A5 (Appendix A) summarizes information of five international studies of interventions including mass media campaigns that have produced findings about differential impact according to socio-economic status. In three studies the interventions were at least as effective in low as in high socio-economic groups, whereas in two studies the intervention was shown to be less effective in low than in high socio-economic groups.

To conclude, the evidence on the effectiveness of low SES groups in mass media campaigns is mixed and will of course highly depend on the type of campaign. The Dutch evidence seems to point to a relatively good reach for those elements specifically targeting low SES groups. Mass media campaigns are frequently used in the Netherlands for cessation support. We first concluded that there is ‘evidence’ for this intervention, but only five out of ten experts supported our conclusion. Other five experts disagreed. All experts who disagreed referred to the recent review by Niederdeppe et al.<sup>7</sup>, who conclude that mass media campaigns are often less effective, sometime equally effective, and rarely more effective among socio economically disadvantaged populations relative to more advantaged populations. Based on this review, and considering the feedback from the experts, we changed our conclusion to ‘some evidence’.

<b>Type of intervention</b>	<b>Evidence</b>	<b>Effective</b>	<b>Conclusion of evidence of effect in low SES groups</b>
Mass media campaigns	Dutch studies: 1 International studies: 5	Dutch studies: 1 International studies: 3	Some evidence

### 3.11 School-based programs

This policy is about providing anti-smoking education to reduce the smoking prevalence in low SES adolescents. There are two Dutch school-based interventions proven to be effective in reducing smoking prevalence among low-SES adolescents<sup>23</sup>. Both interventions, in-school and out of school, were evaluated in Dutch vocational schools and are described below.

#### *In-school*<sup>23;24</sup>

The in-school intervention consisted of three lessons, each lasting about 50 minutes, for which student and teacher manuals were available<sup>24</sup>. Smoking behaviour was measured using self-reports. This intervention was most effective in smoking cessation: after 1 year 29.4 % of all current smokers as measured at baseline continued smoking versus 42.2 % in the control group. The chance of continuing smoking is significantly smaller in the intervention than in the control group (odds ratio = 0.49 (0.29-0.84)). The odds of smoking initiation showed no significant difference (OR=0.52 (0.23-1.18)).

#### *Out of school*<sup>23;24</sup>

The out-of school intervention consisted of three tailored letters with smoking prevention messages. The content of the letters were tailored to individual characteristics, using a pre-test questionnaire on attitudes, social norms, self-efficacy, smoking intention, and smoking behaviour to create a database file containing personal information. This intervention was effective in smoking prevention: after 1 year 25 % started smoking and after 1.5 years 27.2 % (versus 40.9 and 47.9 % in the control group). These percentages can be interpreted as probabilities to initiate ‘experimental’ smoking. The chance of continuing smoking differs not significantly from the control group: (OR = 0.67 (0.29-1.56)). The

chance of starting experimental smoking is smaller compared to the control group (odds ratio = 0.42 (0.18-0.96)<sup>23</sup>.

Our literature review identified another Dutch study and an international study on SES based interventions<sup>25;26</sup>.<sup>26</sup>The Dutch study was aimed at adolescents in lower education<sup>25</sup>. They received three lessons on knowledge, attitudes, and social influence, followed by a class agreement not to start or to stop smoking for five months and a class based competition. The study found no evidence of effectiveness. Smoking in the intervention group compared to control group was OR 0.61 (0.41-0.90) directly after the intervention. One year later this effect was no longer significant.

The international study was carried out among young smokers of 15 years and older from New Zealand<sup>26</sup>. They received mobile phone text messaging. Results showed at least the same effects in groups with a low SES as in groups with a high SES. Smoking cessation at 6 weeks was more common in the experimental group (28 %) than in the control group (13 %) RR 2.20 (1.79-2.70). This treatment effect was consistent across subgroups defined by income level.

To conclude, two Dutch school-based interventions and an international study were proven to be effective in reducing smoking prevalence in low SES adolescents, while a third Dutch study found no evidence of effectiveness. This seems to point at the effectiveness of school based interventions, however more research seems warranted. In the Netherlands, school-based interventions are already used for cessation support. VMBO-schools are a useful channel to reach low SES groups in an early stage. Seven out of ten experts supported our conclusion, two experts disagreed, and one expert did not provide his /her opinion. Experts, who disagreed, mentioned that anti-smoking education is a small part of school-based programs, so the effects of such programs have a little impact on smoking cessation. But in our study, we base our conclusion on the specific effects of anti-smoking education on smoking cessation.

<b>Type of intervention</b>	<b>Evidence</b>	<b>Effective</b>	<b>Conclusion of evidence of effect in low SES groups</b>
School based programs	Dutch studies: 3 International studies: 1	Dutch studies: 2 International studies: 1	Some evidence

### 3.12 Interventions for pregnant women

This policy contains stop-smoking interventions targeted at pregnant women specifically. One Dutch review was found which discussed several interventions for pregnant women; however, it did not report on their effects on or reach of specific SES-groups<sup>5</sup>. One other study was found on the effects of smoking cessation counseling by midwives on Dutch pregnant women and their partners. This study concluded that smoking cessation counseling resulted in significant positive effects on smoking behaviour for pregnant women, but not for their partners. However, this study also did not report on the effects on or reach of specific SES-groups<sup>27</sup>. In the international literature we identified three studies targeting pregnant women. Of these three studies, all three were proven to be effective in low SES groups. In the Netherlands, stop-smoking interventions targeted at pregnant women are offered, but no consistent policy exists to support this. To conclude, interventions targeting pregnant women seemed to have similar effects over all SES categories. Eight out of ten experts supported our conclusion, one expert disagreed, and one expert did not provide his/her opinion. The expert who disagreed, stated that

the international studies found for this intervention could weigh more in our conclusion, which would suggest that there is evidence for this type of intervention.

<b>Type of intervention</b>	<b>Evidence</b>	<b>Effective</b>	<b>Conclusion of evidence of effect in low SES groups</b>
For pregnant women	Dutch studies: 2 International studies: 3	Dutch studies: 0 International studies: 3	Some evidence



## 4 Discussion and conclusions

This study presents a first exploration of available interventions on the effectiveness of smoking cessation interventions for groups with a lower socio-economic status. Many smoking persons in the Netherlands have a low educational level or a low income. To reduce smoking in these groups different types of stop smoking interventions were identified that could be tailored to reach low SES groups or have been evaluated for their specific effect in low SES groups. To overview existing tobacco control policy specifically targeting people with low socio-economic status, a literature review of articles appearing in the period 2000-2007 was performed to update the existing reviews<sup>6</sup>. This was combined with information from other overviews, one specifically for the Netherlands<sup>5</sup>, and another discussing the effectiveness for smoking cessation policy in low SES-groups<sup>4</sup>. Also, a consultation round was included to allow experts in the field to comment on conclusions drawn in this study. In total, 25 experts were approached, of which ten provided their opinion about the interventions reviewed.

For four of eleven interventions reviewed (advertisement bans, tobacco tax increase, quit contests and smoking prohibition at the workplace) we found (almost) no evidence of their effectiveness and potential to reduce smoking in low SES groups in the Dutch setting. That is, there was no evidence available or the available evidence was mixed and mostly negative. For four other interventions, namely cessation support at the workplace, mass media campaigns, school based programs and interventions for pregnant women, some evidence of effectiveness was available. Evidence of no effect was found for community based interventions. For two interventions, free cessation support and telephone helplines, the evidence was found to be relatively strong.

### Discussion of methods used

The current review categorized interventions as much as possible, using the common headings of interventions aimed at low SES groups and interventions aimed at general population. However, within each category interventions may vary considerably. For instance community interventions are often very specific and hard to standardize. Therefore, the general conclusions on the (in) effectiveness of each type of intervention should be interpreted with caution. While we can say that up to now community interventions were ineffective, this does not preclude that a new, better community intervention may be effective.

The review by Kunst et al. focussed on five interventions based on the criteria that the intervention was shown to be effective in decreasing the prevalence or amount of smoking in the general population, and its impact may substantially differ between SES groups<sup>4</sup>. However, the inclusion procedure was not very clearly described.

Our current review was explorative, which implies that we did not do a formal meta-analysis including quality scoring of studies and computing pooled effects. This would be a worthwhile topic for future research. Furthermore, tobacco tax increases are well known to have a different impact on people with low incomes. We expected a large literature on this topic, but our review showed none. This may be due to the databases searched, or the time span covered. We did not systematically search in the more economic literature or in the medical literature before 2000. Given more time, this will be a worthwhile exercise to perform. However, we included an expert consultation round. And most conclusions in this study were supported by most experts. Only for two interventions, feedback from experts led to a change in the final conclusion.

**Discussion and policy implications of findings**

As Kunst et al. remarks, the optimal mix of measures to reduce SES inequalities in smoking strongly depends on the national and local context, and is likely to change over time<sup>4</sup>. Two different types of interventions exist that can reach groups with a lower SES. First, interventions directly targeting groups with a lower SES. Second, interventions for a general public which reach relatively more people with low SES. The latter is often ignored in overviews, but may be very effective in reducing smoking in groups with a low SES, as our review showed for respectively free cessation support and telephone helplines.

Two out of eleven interventions/policies reviewed in this study are already implemented in the Netherlands. This leaves room to implement a range of additional interventions/policies with evidence of effect in reducing smoking in groups with a low SES. However, the review showed that for some of these, the evidence was quite limited, so that, implementation of promising policies would require carefully monitoring and evaluation. Especially for tobacco tax increases and quit contests we were surprised about the lack of evidence, while for cessation support at the workplace, mass media campaigns, school based programs and interventions for pregnant women the evidence base was small, but promising. Looking at the effectiveness of these interventions, and the fact that smoking more often occurs in low SES groups than in high SES groups, potentially many health benefits can be achieved.

## References

1. Lillard, DR, Plassmann, V, Kenkel, D, and Mathios, A. Who kicks the habit and how they do it: Socioeconomic differences across methods of quitting smoking in the USA. *Social Science & Medicine* 64(12), 2504-2519. 2007.
2. DeCicca, P, Kenkel, D, and Mathios, A. Putting out the fires: Will higher taxes reduce the onset of youth smoking? *Journal of Political Economy* 110, 114-169. 2002.
3. Schaap, MM, Kunst, AE, Leinsalu, M, Regidor, E, Ekholm, O, Dzurova, D, Helmert, U, Klumbeine, J, Santana, P, and Mackenbach, JP. Effect of nation-wide tobacco control policies on smoking cessation in high and low educated groups in 18 European countries. *Tobacco Control* . 2008.
4. Kunst, A, Giskes, K, and Mackenbach, J. Socio-economic inequalities in smoking in the European Union. Applying an equity lens to tobacco control policies. Rotterdam, Department of Public Health, Erasmus Medical Center. 2004.
5. Bouwens, J, Kleinjan, M, Peters, L, and van den Eijnden, R. Aanbevelingen onderzoek en implementatie op het terrein van de aanpak van roken; Adviesdocument. Woerden/Rotterdam, Nigz/IVO. 2007.
6. Platt S, Amos A, Gnich W, Parry O. Smoking policies. London : Routledge, 2002.
7. Niederdeppe, J, Kuang, X, Crock, B, and Skelton, A. Media campaigns to promote smoking cessation among socioeconomically disadvantaged populations: What do we know, what do we need to learn, and what should we do now? *Social Science & Medicine* 67, 1343-1355. 2008.
8. Fichtenberg, CM and Glantz, SA. Effect of smoke-free workplaces on smoking behaviour: systematic review. *BMJ* 325, 188-194. 2002.
9. Townsend J, Roderick P, Cooper J. Cigarette smoking by socioeconomic group, sex, and age: effects of price, income, and health publicity. *BMJ* 1994;309:923-7.
10. Farrelly, MC . Response to Increases in Cigarette Prices by Race/Ethnicity, Income, and Age Groups-United States, 1976-1993. *JAMA* 280(23), 1979-1980.
11. Wiltshire, S, Bancroft, A, Amos, A, and Parry, O. They're doing people a service - qualitative study of smoking, smuggling, and social deprivation. *BMJ* 323(7306), 203-207. 2001.
12. Shelley, D, Cantrell, M, Moon-Howard, J, Ramjohn, D, and Van Devanter, N. The \$5 Man: The Underground Economic Response to a Large Cigarette Tax Increase in New York City. *Am J Public Health* , *AJPH*.2005.079921. 2007.
13. Joossens, L and Raw, M. Progress in tobacco control in 30 European countries, 2005-2007. 2007.
14. Kaper, J, Wagena, EJ, and van Schayck, CP. Het effect van het vergoeden van ondersteuning voor stoppen met roken. Resultaten van een gerandomiseerd experiment. Maastricht, Universiteit Maastricht, CAPHRI. 2003.

15. Plas van der A, Hilberink S, Hermans M, Breteler M. Evaluatie van de Millennium Campagne 'Dat kan ik ook!' en regionale cursussen stoppen met roken. Resultaten en predictoren van succes [Evaluation of the Millenium Campagne and regional smoking cessation programmes. Results and predictors of success]. Nijmegen Institute for Scientifist-Practitioners in Addiction 2001.
16. Stead L, Perera R, Lancaster T. Telephone counselling for smoking cessation. Cochrane Database of systematic Reviews 2006.
17. Platt, S, Tannahill, A, Watson, J, and Fraser, E. Effectiveness of antismoking telephone helpline: follow up survey. *BMJ* 314(7091), 1371. 1997.
18. Cummins, SE, Hebert, KK, Anderson, CM, Mills, JA, and Zhu, S. Reaching Young Adult Smokers Through Quit Lines. *Am J Public Health, AJPH*.2006.101741. 2007.
19. Ronda, G, Van Assema, P, Candel, M, Ruland, E, Steenbakkens, M, Van Ree, J, and Brug, J. The Dutch Heart Health Community Intervention 'Hartslag Limburg': Effects on smoking behaviour. *Eur J Public Health* 14(2), 191-193. 2004.
20. Willemsen M, Zeeman G. Strategieën om rokers met een lage sociaal-economische status te bereiken. *Tijdschrift voor Gezondheidswetenschappen* 2000;78:223-9.
21. Bains, N, Pickett, W, Laundry, B, and Mecredy, D. Predeictors of smoking cessation in an incentive-based community intervention. *Chronic Diseases in Canada* 21(2), 54-61. 2000.
22. Op de Weegh J, Willemsen M. Dat Kan Ik Ook! De stoppen met roken milleniumcampagne. Stivoro, 2003.
23. van Baal, PHM, Vijgen, SMC, Bemelmans, WJE, Hoogenveen, RT, and Feenstra, TL. Potential health benefits and cost effectiveness of tobacco tax increases and school intervention programs targeted at adolescents in the Netherlands. Bilthoven, National Institute for Public Health and the Environment. 2005.
24. Ausems, M, Mesters, I, van Breukelen, G, and De Vries, H. Effects of in-school and tailored out-of-school smoking prevention among Dutch vocational school students. *Health Educ. Res.* 19(1), 51-63. 2004.
25. Crone, MR, Reijneveld, SA, Willemsen, MC, van Leerdam, FJM, Spruijt, RD, and Sing, RA Hira. Prevention of smoking in adolescents with lower education: a school based intervention study. *J Epidemiol Community Health* 57(9), 675-680. 2003.
26. Rodgers, A, Corbett, T, Bramley, D, Riddell, T, Wills, M, Lin, R-B, and Jones, M. Do u smoke after txt? Results of a randomised trial of smoking cessation using mobile phone text messaging. *Tob Control* 14(4), 255-261. 2005.
27. De Vries, H, Bakker, MJ, Mullen, PD, and Van Berukelen, G. The effects of smoking cessation by midwives on Dutch pregnant women and their partners.
28. Andrews J, Felton G, Ellen-Wewers M, Waller J, Tingen M. The effect of a multi-component smoking cessation intervention in African American women residing in public housing. *Research in Nursing and Health* 2007;30:45-60.

29. Copeland, L, Robertson, R, and Elton, R. What happens when GPs proactively prescribe NRT patches in a disadvantaged community. *50(2)*, 64-8. 2005.
30. Curry, SJ, Ludman, EJ, Graham, E, Stout, J, Grothaus, L, and Lozano, P. Pediatric-Based Smoking Cessation Intervention for Low-Income Women: A Randomized Trial. *Arch Pediatr Adolesc Med* 157(3), 295-302. 2003.
31. Nollen, NL, Mayo, MS, Sanderson-Cox, L, Okuyemi, KS, Choi, WS, Kaur, H, and Ahluwalia, JS. Predictors of quitting among African American light smokers enrolled in a randomized, placebo-controlled trial. *Journal of General Internal Medicine* 21(6), 590-5. 2006.
32. O'Loughlin, J, Paradis, G, Renaud, L, Meshefedjian, G, and Barnett, T. The Yes, I Quit Smoking Cessation Course: Does it Help Women in a Low Income Community Quit? *22(6)*, 451-468. 1997.
33. Borrelli, B, Novak, S, Hecht, J, Emmons, K, Papandonatos, G, and Abrams, D. Home health care nurses as a new channel for smoking cessation treatment: Outcomes from project CARES (Community-nurse Assisted Research and Education on Smoking). *Preventive Medicine* 41(5-6), 815-821. 2005.
34. Okuyemi, KS, James, AS, Mayo, MS, Nollen, N, Catley, D, Choi, WS, and Ahluwalia, JS. Pathways to Health: A Cluster Randomized Trial of Nicotine Gum and Motivational Interviewing for Smoking Cessation in Low-Income Housing. *Health Educ Behav* 34(1), 43-54. 2007.
35. Roddy, E, Romilly, N, Challenger, A, Lewis, S, and Britton, J. Use of nicotine replacement therapy in socioeconomically deprived young smokers: a community-based pilot randomised controlled trial. *Tob Control* 15(5), 373-376. 2006.
36. Sykes, CM and Marks, DF. Effectiveness of a cognitive behaviour therapy self-help programme for smokers in London, UK. *Health Promot. Int.* 16(3), 255-260. 2001.
37. Glasgow, RE, Whitlock, EP, Eakin, EG, and Lichtenstein, E. A brief smoking cessation intervention for women in low-income planned parenthood clinics. *Am J Public Health* 90(5), 786-789. 2000.
38. Lerman, C, Kaufmann, V, Rukstalis, M, Patterson, F, Perkins, K, Audrain-McGovern, J, and Benowitz, N. Individualizing Nicotine Replacement Therapy for the Treatment of Tobacco Dependence: A Randomized Trial. *Ann Intern Med* 140(6), 426-433. 2004.
39. McLeod, D, Pullon, S, Benn, C, Cookson, T, Dowell, A, Viccars, A, White, S, Green, R, and Crooke, M. Can support and education for smoking cessation and reduction be provided effectively by midwives within primary maternity care? *Midwifery* 20(1), 37-50. 2004.
40. Yilmaz, G, Karacan, C, Yoney, A, and Yilmaz, T. Brief intervention on maternal smoking: a randomized controlled trial. *Child: Care, Health and Development* 32(1), 73-79. 2006.
41. Grandes, G, Cortada, JM, and Arrazola, A. An evidence-based programme for smoking cessation: effectiveness in routine general practice. *British Journal of General Practice* 50(459), 803-7. 2000.
42. Monso, E, Campbell, J, Tonnesen, P, Gustavsson, G, and Morera, J. Sociodemographic predictors of success in smoking intervention. *Tob Control* 10(2), 165-169. 2001.

43. Halpin, HA, McMenamin, SB, Rideout, J, and Boyce-Smith, G. The costs and effectiveness of different benefit designs for treating tobacco dependence: results from a randomized trial. *Inquiry* 43(1), 54-65. 2006.
44. Polanska, K, Hanke, W, Sobala, W, and Lowe, JB. Efficacy and effectiveness of the smoking cessation program for pregnant women. *International Journal of Occupational Medicine and Environmental Health* 17(3), 369-77. 2004.
45. Hajek, P, West, R, Lee, A, Foulds, J, Owen, L, Eiser, JR, and Main, N. Randomized controlled trial of a midwife-delivered brief smoking cessation intervention in pregnancy. *Addiction* 96(3), 485-494. 2001.
46. Connet, JE and Stamler, J. Responses of black and white males to the special intervention program of the Multiple Risk Factor Intervention Trial. *Am Heart J* 108, 839-48. 1984.
47. Holme, I, Hjermand, I, Helgeland, A, and Leren, P. The Oslo study: Diet and antismoking advice. Additional results from a 5-year primary preventive trial in middle-aged men. *Preventive Medicine* 14(3), 279-292. 1985.
48. Jamrozik K, Vessey M, Fowler G, Wald N, Parker G, Van Vunakis H. Controlled trial of three different antismoking interventions in general practice. *Br Med J (Clin Res Ed)* 1984;288:1499-503.
49. Brown, J, Parr, W, and Bates, M. Evaluation of a smoking cessation programme that uses behaviour modification. *NZ Med J* 112, 399-402. 1999.
50. Pisinger, C, Vestbo, J, Borch-Johnsen, K, and Jorgensen, T . Smoking cessation intervention in a large randomised population-based study. The Inter99 study. *Preventive Medicine* 40(3), 285-292. 2005.
51. Wadland, WC, Soffelmayr, B, and Ives, K. Enhancing smoking cessation of low-income smokers in managed care. *Journal of Family Practice* 50(2), 138-44. 2001.
52. Solomon, LJ and Flynn, BS. Telephone Support for Pregnant Smokers Who Want to Stop Smoking. *Health Promot Pract* 6(1), 105-108. 2005.
53. Solomon, LJ, Scharoun, GM, Flynn, BS, Secker-Walker, RH, and Sepinwall, D. Free Nicotine Patches plus Proactive Telephone Peer Support to Help Low-Income Women Stop Smoking. *Preventive Medicine* 31(1), 68-74. 2000.
54. Solomon, LJ, Marcy, TW, Howe, KD, Skelly, JM, Reinier, K, and Flynn, BS. Does extended proactive telephone support increase smoking cessation among low-income women using nicotine patches? *Preventive Medicine* 40(3), 306-313. 2005.
55. Swartz, SH, Cowan, TM, Klayman, JE, Welton, MT, and Leonard, BA. Use and Effectiveness of Tobacco Telephone Counseling and Nicotine Therapy in Maine. *American Journal of Preventive Medicine* 29(4), 288-294. 2005.
56. Stevens, W, Thorogood, M, and Kayikki, S. Cost-effectiveness of a community anti-smoking campaign targeted at a high risk group in London. *Health Promot. Int.* 17(1), 43-50. 2002.

57. Fisher E, Auslander W, Munro J, Arfken C, Brownson R, Owens N . Neighbors for a smoke free north side: evaluation of a community organization approach to promoting smoking cessation among African Americans. *Am J Public Health* 1998;88:1658-63.
58. McAlister A, Ramirez A, Amezcua C, Pulley L, Stern M, Mercado S. Smoking cessation in Texas-Mexico border communities: a quasi-experimental panel study. *Am J Health Promot* 1992;6:274-9.
59. Darity, WA, Chen, TTL, Tuthill, RW, Buchanan, DR, Winder, AG, Stanek E, and et al. A multi-city community based smoking research intervention project in the African-American population. *Int Q Commun Health Educ* 17, 117-30. 1998.
60. Puska P, Nissinen A, Tuomilehto J. The community-based strategy to prevent coronary heart disease: conclusions from the ten years of the North Karelia Project. *Ann Rev Pub Health* 1995;6:117-93.
61. Voorhees, CC , Stillman, FA, Swank, RT, Heagerty, PJ, Levine, DM, and Becker, DM. Heart, Body, and Soul: Impact of Church-Based Smoking Cessation Interventions on Readiness to Quit. *Preventive Medicine* 25(3), 277-285. 1996.
62. O'Loughlin, JL, Paradis, G, Gray-Donald, K, and Renaud, L. The impact of a community-based heart disease prevention program in a low-income, inner-city neighborhood. *Am J Public Health* 6, 147-93. 1985.
63. Goodman R, Wheeler F, Lee P. Evaluation of the Heart To Heart Project: lessons from a community-based chronic disease prevention project. *Am J Health Promot* 1995;9:443-55.
64. Brownson R, Smith C, Pratt M, Mack N, Jackson-Thompson J, Dean C *et al.* Preventing cardiovascular disease through community-based risk reduction: the Bootheel Heart Health Project. *Am J Public Health* 1996;86:206-13.
65. O'Loughlin, JL, Paradis, G, Gray-Donald, K, and Renaud, L. The impact of a community-based heart disease prevention program in a low-income, inner-city neighborhood. *Am J Public Health* 89(12), 1819-1826. 1999.
66. Shelley, E, Daly, L, Collins, C, Christie, M, Conroy, R, Gibney, M, Hickey, N, Kelleher, C, Kilcoyne, D, Lee, P, Mulcahy, R, Murray, P, O'Dwyer, T, Radic, A, and Graham, I. Cardiovascular risk factor changes in the Kilkenny Health Project: A community health promotion programme. *Eur Heart J* 16(6), 752-760. 95.
67. Shelley E, Collins C, Daly L. Trends in smoking prevalence: the Kilkenny Health Project Population Surveys 1985 to 1991. *Ir Med J* 1996;89:182-5.
68. Carleton R, Lasater T, Assaf A, Feldman H, McKinlay S. The Pawtucket Heart Health Program: community changes in cardiovascular risk factors and projected disease risk. *Am J Public Health* 1995;85:777-85.
69. Reid C, McNeil J, Williams F, Powles J. Cardiovascular risk reduction: a randomized trial of two health promotion strategies for lowering risk in a community with low socioeconomic status. *J Cardiovasc Risk* 1995;2:155-63.
70. Secker-Walker, RH, Flynn, BS, Solomon, LJ, Skelly, JM, Dorwaldt, AL, and Ashikaga, T. Helping

- women quit smoking: results of a community intervention program. *Am J Public Health* 90(6), 940-946. 2000.
71. Helmert U. Social class and risk factor changes at the midpoint of the German Cardiovascular Prevention Study. Bonn/Berling: 1993.
  72. Weinehall, L, Westman, G, Hellsten, G, Boman, K, Hallmans, G, Pearson, TA, and Wall, S. Shifting the distribution of risk: results of a community intervention in a Swedish programme for the prevention of cardiovascular disease. *J Epidemiol Community Health* 53(4), 243-250. 1999.
  73. Brannstrom, I, Weinehall, L, Persson, LA, Wester, PO, and Wall, S. Changing Social Patterns of Risk Factors for Cardiovascular Disease in a Swedish Community Intervention Programme. *Int. J. Epidemiol.* 22(6), 1026-1037. 93.
  74. Sorensen, G, Stoddard, AM, La Montagne, A, Emmons, K, Hunt, MK, Youngstrom, R, McLellan, D, and Christiani, DC. A comprehensive worksite cancer prevention intervention: behavior change results from a randomized controlled trial (United States). *Am J Public Health* 92(6), 493-502. 2002.
  75. Hunt, MK, Lederman, R, Stoddard, AM, LaMontagne, AD, McLellan, D, Combe, C, Barbeau, E, and Sorensen, G. Process Evaluation of an Integrated Health Promotion/Occupational Health Model in WellWorks-2. *Health Educ Behav* 32(1), 10-26. 2005.
  76. Ringen, K, Anderson, N, McAfee, T, Zbikowski, SM, and Fales, D. Smoking cessation in a blue-collar population: results from an evidence-based pilot program. *American Journal of Industrial Medicine* 42(5), 367-77. 2002.
  77. Sorensen, G, Barbeau, E, Stoddard, A, Hunt, M, Goldman, R, Smith, A, Brennan, A, and Wallace, L. Tools for health: the efficacy of a tailored intervention targeted for construction laborers. *Cancer Causes and Control* 18(1), 51-59. 2007.
  78. Kadowaki, T, Watanabe, M, Okayama, A, Hishida, K, and Ueshime, H. Effectiveness of smoking-cessation intervention in all of the smokers at a worksite in Japan. *Industrial Health* 38(4), 396-403. 2000.
  79. Campbell, MK, Tessaro, I, DeVellis, B, Benedict, S, Kelsey, K, Belton, L, and Sanhueza, A. Effects of a Tailored Health Promotion Program for Female Blue-Collar Workers: Health Works for Women. *Preventive Medicine* 34(3), 313-323. 2002.
  80. Moskowitz, JM, Lin, Z, and Hudes, ES. The impact of workplace smoking ordinances in California on smoking cessation. *Am J Public Health* 90(5), 757-761. 2000.
  81. Heloma, A, Jaakkola, MS, Kahkonen, E, and Reijula, K. The Short-Term Impact of National Smoke-Free Workplace Legislation on Passive Smoking and Tobacco Use. *Am J Public Health* 91(9), 1416-1418. 2001.
  82. Freels, SA, Warnecke, RB, Johnson, TP, and Flay, BR. Evaluation of the Effects of a Smoking Cessation Intervention Using the Multilevel Thresholds of Change Model. *Eval Rev* 26 (1), 40-58. 2002.
  83. Community intervention trial for smoking cessation (COMMIT): II. Changes in adult cigarette

smoking prevalence. *Am J Public Health* 1995;85:193-200.

84. Community Intervention Trial for Smoking Cessation (COMMIT): I. cohort results from a four-year community intervention. *American Journal of Public Health* 1995;85:183-92.
85. Macaskill P, Pierce J, Simpson J, Lyle D. Mass media-led antismoking campaign can remove the education gap in quitting behavior. *Am J Public Health* 1992;82:96-8.
86. Gagne L. The 2005 British Columbia smoking cessation mass media campaign and short-term changes in smoking. *Journal of Public Health Management and Practice* 2007;13:296-306.
87. Fortmann, SP Taylor CB, Flora, JA, and Jatulis, DE. Changes in Adult Cigarette Smoking Prevalence after 5 Years of Community Health Education: The Stanford Five-City Project. *Am. J. Epidemiol.* 137(1), 82-96. 1993.
88. O'Loughlin J, Lampron G, Sacks-Silver G. Evaluation of a smoking cessation guide for low income, functionally illiterate women: a pilot study. *Can J Public Health* 1990;81:471-2.
89. Wiggins, M, Oakley, A, Roberts, I, Turner, H, Rajan, L, Austerberry, H, Mujica, R, Mugford, M, and Barker, M. Postnatal support for mothers living in disadvantaged inner city areas: a randomised controlled trial. *J Epidemiol Community Health* 59(4), 288-295. 2005.



## Appendix A Summary of results from individual studies

Table A1. Smoking cessation support using nicotine replacement therapy (NRT) and/or counseling. Evidence of effectiveness in low socio-economic groups

Target population	Type of intervention	Intervention	Effect of intervention	Study design	Reference
<i>Interventions aimed at low socio-economic groups, reported to be effective</i>					
African American women residing in public housing (USA)	Counseling, free?	Nurse led behavioural/empowerment counseling, NRT, community health workers to enhance smoking self-efficacy, social support and spiritual well-being Controls: self-help written smoking cessation materials and group education not related to smoking	6-month continuous smoking abstinence of 28 % in intervention and 6 % in control groups OR 6.3 (1.2-32.4). Education and income were not associated with cessation.	Quasi-experimental, repeated measures design	<sup>28</sup>
Smoking patients from a disadvantaged area visiting their GP (UK)	NRT, free?	Proactive prescription of NRT patches by GPs	Three months after NRT prescription 20% had stopped smoking.	Before-after study design/ no control group	<sup>29</sup>
Low-income women whose children received care at a paediatric clinic (USA)	Counseling, free?	Motivational message from the child's clinician, guide to quitting smoking, 10-minute motivational interview and telephone calls.	Abstinence rates after 12 months were twice as great in the intervention group as in the control group (14 % versus 7 %; OR 2.77 (1.24-6.60)	Randomized trial	<sup>30</sup>
African American light smokers (<10 cigarettes a day)	Counseling +NRT, free?	Health education with nicotine or placebo gum or motivational interviewing with nicotine or placebo gum.	Health education rather than motivational interviewing increased the likelihood of quitting OR 2.26 % (1.36-3.74), while low income reduced the odds of quitting OR 0.60 % 0.37-0.97) The trial did not find a treatment effect for nicotine gum.	Randomized trial	<sup>31</sup>
Low-income women	Counseling,	Smoking cessation course	Programme produced quit rates (22 % at	Before-after	<sup>32</sup>

(Canada)	free?		6 months) comparable to those reported for cessation programme directed at the general population	study design/ no control group	
<b><i>Interventions aimed at low socio-economic groups, reported to be non-effective</i></b>					
Medically ill patients who smoke (USA)	Counseling, free?	Home health care nurses delivered motivational interviewing and CO feedback Controls: standard care	No significant difference in 12-month abstinence rate between experimental and control group OR 2.1 (0.6-6.6).	Randomized trial	<sup>33</sup>
Smokers residing in low-income housing (USA)	NRT and counseling, free?	Educational materials, 8 weeks of nicotine gum and 5 motivational interviewing sessions. Controls: fruits and vegetables intervention	Smoking cessation rate did not differ between intervention and control group.	Cluster randomized trial	<sup>34</sup>
Young smokers (12-20 y) in a deprived area (UK)	NRT and counseling, free?	Nicotine patches in association with individual behavioural support	After 13 weeks none of the subjects was abstinent. Adherence to therapy was low.	Randomized controlled trial	<sup>35</sup>
Smokers from a deprived area (UK)	Counseling, free?	Cognitive behaviour therapy Controls: pocket-size leaflet commonly available	At 6-months follow-up 17 % in the intervention group was abstinent compared to 6 % in the control group, but this difference was not significant. Attendance rates were low, 1 out of 8 callers attended.	Randomized trial	<sup>36</sup>
Female smokers attending low-income planned parenthood clinics (15-35 years) (USA)	Counseling, free?	9-minute video, 12-15 min of behavioural counseling, 20 sec clinician advice to quit and follow-up telephone calls Controls: generic stop smoking brochure and standardized 20 sec message from their health care provider advising them to quit.	6 months post intervention no significant difference.	Randomized controlled trial	<sup>37</sup>
<b><i>Interventions aimed at general population, reported to be at least as effective in low as in high socio-economic groups</i></b>					
Treatment seeking smokers (USA)	NRT added to counseling,	Behavioural group counseling and 8 weeks of therapy with nicotine nasal spray or transdermal nicotine	Members of minority groups achieved higher 6-month abstinence rates with nasal spray than with transdermal nicotine OR 0.30 (0.09-0.94)	Randomized trial	<sup>38</sup>

	free?				
Women who smoked at the time they conceived (New Zealand)	Counseling, free?	Midwives in the intervention groups delivered either (1) a program of education and support for smoking cessation or reduction, (2) a program of education and support for breast feeding or (3) both programs. Controls: usual care.	Women in group 1 and 3 were significantly more likely to have reduced, stopped smoking or maintained smoking changes than women in the control group at 36 weeks gestation (2.71 (1.17-6.28) or 2.39 (1.08-5.31) respectively). There was no difference in rates of cessation or reduction between groups in the postnatal period. Ethnicity and deprivation were not independent predictors of success or failure with smoking cessation, although women with a low income were less likely to have stopped smoking.	Cluster randomized trial	<sup>39</sup>
Mothers who accompanied a child to the hospital for a healthcare visit (Turkey)	Counseling, free?	Group 1 received a smoking cessation intervention by a nurse aimed at their children's health, group 2's intervention concerned their own health Controls: no smoking cessation advice	Low income women in the child intervention and mother intervention group were more likely to stop smoking than controls (25 %, 8.1 % and 1.5 %, respectively p < 0.001). These results are comparable to those for high income women.	Randomized controlled trial	<sup>40</sup>
All smokers consulting their GP (Spain)	Counseling, free?	2 telephone calls and 2 consultations by GP after set stop date Controls: only stop smoking advice from GP was given when patients was consulting was related to tobacco addiction	The programme resulted in an increase of 5 % points (3.1 %-6.8 %) in the validated and sustained 1 year abstinence probability. This effect was not modified by SES.	Non-randomized controlled trial	<sup>41</sup>
Smokers (EU)	NRT, free?	NRT patches as an adjunct to smoking cessation advice Controls: no NRT	Intervention was effective for smoking cessation OR 1.50 (1.15-1.96). Education and employment did not have significant effect on smoking cessation.	Randomized controlled trial	<sup>42</sup>
Adult smokers (USA)	Counseling and NRT, free?	Drugs only, drugs and counseling or drugs if counseling	After 8 months there were no significant increases in quit rates between groups. No difference were observed in the groups who did and did not use	Randomized trial	<sup>43</sup>

			covered treatments by income and race.		
Pregnant women (Poland)	Counseling, free?	4 midwife visits during pregnancy and one after delivery Controls: standard written information about the health risk to the fetus from maternal smoking and the benefits of smoking abstinence.	The chance of quitting smoking by the women was significantly higher in the intervention group than in the control group OR 2.5 (1.8 – 3.7). No statistically significant differences could be found in the efficacy of the intervention with regard to the level of education or employment status.	Randomized trial	44
Pregnant women (UK)	Counseling, free?	Brief counseling (10-15 min) by midwife Controls: usual care	Reach: only a small proportion of women who would have been eligible were recruited. Effectiveness: Intervention and usual care group did not differ in continuous abstinence 6 months post-birth. Employment or education status were not associated with quit rates.	Randomized trial	45
Males with high risk for coronary heart disease (USA)	Counseling, free?	Smoking cessation counseling	The intervention found a similar effect on both black and white participants of varying educational and socio-economic backgrounds	Randomized controlled trial	46
Middle-aged men with high-risk for coronary heart disease (Norway)	Counseling, free?	Smoking cessation counseling	Antismoking advice was especially effective in lower class intervention group men.	Randomized controlled trial	47
Adult smoking patients of GP practices (UK)	Counseling, free?	Study groups: 1 Verbal and written advice from GP 2 Advice + demonstration of exhaled CO 3 Advice + further help from health visitor 4 Controls	Giving advice and demonstration of exhaled CO is the most effective intervention in the lower social classes (approximately 14.5 % quitters after 1 year)	Randomized controlled trial	48
<b><i>Interventions aimed at general population, reported to be less effective in low as in high socio-economic groups</i></b>					
General population (New Zealand)	Counseling, free?	Smoking cessation course	Unemployed, self-employed and students had low success rates compare to professional and technical workers	Cross-sectional survey	49
Daily smokers from adult population (30-60)	Counseling, free?	1. Personalized smoking consultation, complementary samples of nicotine	The validated abstinence rate at 1-year follow-up was 16% in the high intensity group (2) and 13%	Randomized population-	50

years) (Denmark)		products and self-help pamphlet 2. 1 and free participation in smoking cessation group Controls: Background population	in the low-intensity group (1) compared with a self-reported abstinence rate of 7.3% in the control group OR high intensity 1.5 (1.1 – 2.0). Higher SES was a predictor for success.	based intervention study	
------------------	--	---	---	--------------------------------	--

Table A2. Telephone support: evidence of effectiveness in low socio-economic groups

Target population	Type of intervention	Intervention	Effect of intervention	Study design	Reference
<i>Interventions aimed at low socio-economic groups, reported to be effective</i>					
Very low income smokers (USA)	Telephone support	Usual care by physician enhanced by 6 computer-assisted telephonic-counseling sessions. Controls: usual care	At 3 months 8 % of the usual-care group was smoke free compared with 21 % in the intervention group (p = 0.009).	Randomized trial	<sup>51</sup>
Low-income pregnant women (USA)	Telephone support	Proactive telephone support from a woman ex-smoker who called weekly, biweekly, and then monthly to provide counseling.	25 % reported abstinence at last telephone contact. Reach: 34 % accepted the telephone peer support, although approximately half of them actually received support	Before-after study design/ no control group	<sup>52</sup>
<i>Interventions aimed at low socio-economic groups, reported to be non-effective</i>					
Low-income women aged 18-50 y (USA)	Telephone support added to NRT	Proactive telephone support (7 calls over 3 months) in addition to free nicotine patches Controls: free nicotine patches	At 6 months there was no difference in abstinence between experimental (23 %) and patch only group (19 %). At 3 months more women in the experimental group were abstinent (42 %) compared to the patch only condition (28 %) (p=0.03).	Randomized controlled trial	<sup>53</sup>
Low-income women smokers (18-50 y) (USA)	Telephone support added to NRT	Proactive telephone support (12 calls over 4 months) in addition to free nicotine patches Controls: free nicotine patches	At 6 months there was no difference in abstinence between experimental (33 %) and patch only group (26 %). At 3 months more women in the experimental group were abstinent (43 %) compared to the patch only condition (26 %) (p=0.002).	Randomized trial	<sup>54</sup>
<i>Interventions aimed at general population, reported to be at least as effective in low as in high socio-economic groups</i>					
Adult smokers (USA)	Telephone counseling and free NRT	Tobacco Help Line services including telephone counseling and free NRT	Reach: 47 % of those reached had Medicaid or no health insurance compared to 34 % smokers state-wide (p < 0.001). Effectiveness only reported for total study sample	Before-after study design/ no control group	<sup>55</sup>

Table A3. Community based interventions designed to promote smoking cessation: evidence of effectiveness in low socio-economic groups

Target population	Intervention	Effect of intervention	Study design	Reference
<i>Interventions aimed at low socio-economic groups, reported to be effective</i>				
Turkish community (UK)	Community-based smoking cessation program (10 minute play, poster and media campaign and leaflets)	At 12 months follow up there was a net reduction in smokers of 2.9 % (CI 0-6.3 %) in all study subjects. More people in the lower SES groups were aware of program activities than people from higher SES groups (64 versus 48 %).	Before-after study design/ no control group	<sup>56</sup>
Residents (predominantly African-American) aged 18+ years of urban communities characterized by low income and high socio-economic deprivation (USA)	Community organization approach (smoking cessation classes, billboards, door-to-door campaigns, a gospel fest) and mass media	Prevalence of smoking declined significantly more in the intervention communities (from 34 % to 27 %) than in control communities (34 % to 33 %). A difference favouring the intervention was found for those with annual incomes over \$20,000, but not for those with incomes below this level.	Quasi-experimental design, incorporating repeat cross-sectional study	<sup>57</sup>
Adults (16-60 years) in disadvantaged low-income communities mostly of Hispanic origin (USA/Mexico)	Health education intervention which made extensive use of mass media. Activities also undertaken in schools. A more intensive contact programme, including individual counseling and telephone support, was received by some of the intervention group.	For moderate smokers (> 10 cigarettes a day) smoking cessation was significantly greater in the experimental group than in the control group.	Quasi-experimental design, incorporating cohort study	<sup>58</sup>
Adults (aged 18+ years) living in urban, predominantly African-American neighbourhoods, half	Passive intervention communities received mass media intervention to raise general awareness of smoking cessation. Active intervention communities received in addition a multi component intervention	Point prevalence of non-smoking was significantly improved in active communities compared to passive communities. Moderate-income areas tended to show a smaller change than lower-income areas.	Quasi-experimental design, incorporating cohort study	<sup>59</sup>

classed as low income half as moderate income (USA)	(including health advocacy, distribution of educational materials, telephone quit line)			
Whole adult population (especially middle aged-men) resident in mainly rural small towns with very high rates of cardiovascular disease, low socio-economic status, low educational levels and high unemployment (Finland)	Broad-based community intervention with extensive use of mass media. Anti-smoking programme focused on four main areas: general public information, organization for preventative services, training of personnel, and promotion of a smoke-free environment.	Reduction in smoking prevalence was significant only for men. Effects did not differ for males and females from different SES groups.	Quasi-experimental design, incorporating repeat cross-sectional study	<sup>60</sup>
African-American adults aged 18+ living in an economically deprived inner-city urban area with a high unemployment rate (USA)	Church parishes randomized to intensive intervention received pastoral sermons on smoking, testimonies from those trying to quit, training of lay cessation counsellors, individual and group support, and screening at church health fairs. Minimal self-help intervention churches received screening and distribution of a self-help booklet only.	Intervention groups differed significantly from the spontaneous quit rates reported in churchgoers in the community reference population ( $P < 0.0001$ ).	Randomized controlled trial, incorporating cohort study	<sup>61</sup>
<b><i>Interventions aimed at low socio-economic groups, reported to be non-effective</i></b>				
Adults in the municipality of Bergeyk (NL)	Intervention methods included mass media messages, self-help materials, small group activities, lectures, and structural activities. Community organization principles such as a social network approach, community participation, and intersectoral cooperation were applied in the project.	No significant difference in decline in the prevalence of smokers compared to control community. The people that were exposed to the intervention were more likely to have middle or higher education than the non-exposed.	Pre-test-post-test control group design	<sup>19</sup>
Adults in the Maastricht region (NL)	Regional mass media-led smoking cessation campaign and smaller local activities such as a non-smoking campaign for the parents of	No significant differences were found between the intervention region and the control region on smoking behaviour.	Pre-test-post-test control group design	<sup>19</sup>

	children in playgroups.			
Adults living in a low-income inner-city neighbourhood (Canada)	Community-based heart disease prevention programme (smoking cessation workshops, smoking cessation contest)	No substantial decline in the prevalence of smokers.	Quasi-experimental design, 3-year repeat independent sample survey and 5-year longitudinal cohort sample	<sup>62</sup>
Population aged 18+ years living in rural, low-income communities (USA)	Health education through mass media and, more directly, through presentations and community events. Other activities included screening at local fairs a quit and win contest, and distribution of self-help kits. Focus on cardiovascular disease reduction.	There was no significant overall effect of the intervention on smoking prevalence.	Quasi-experimental design, incorporating cohort study	<sup>63</sup>
Adults living in rural, predominantly African-American, communities, medically underserved, with high unemployment, low education levels and high poverty rates (USA)	Cardiovascular disease education programmes. Health messages disseminated through mass media and community events.	Although there were reductions in smoking prevalence in both experimental and control communities, there was no significant net effect. Further analysis of data from the intervention areas (not available for the control areas) shows that reduction in smoking prevalence was greater among those with post high-school education.	Quasi-experimental design, incorporating repeat cross-sectional study	<sup>64</sup>
Adult population (particularly women) living in low income, socio economically deprived communities with low education attainment (Canada)	Activities aimed at developing personal skills, creating supportive environments and building healthy public policy, in support of cardiovascular disease reduction. Also screening for cardiovascular disease risk factors, smoking cessation contests, workshops and support groups, community events, and distribution of educational materials	There was no significant net effect. Trends in smoking prevalence were equally favourable in both intervention and control communities	Quasi-experimental design, incorporating cohort and repeat cross-sectional studies	<sup>65</sup>

Whole adult population, but special efforts were made to reach unemployed and low-income groups (Ireland)	Training of health, education and catering personnel, health assessment programme, school-based health education, distribution of education material, special community events and media coverage. Policy-level intervention proved difficult.	There was no significant net effect. Trends in smoking prevalence were equally favourable in both intervention and control communities	Quasi-experimental design, incorporating repeat cross-sectional studies	66, 67
Adults living in low-income areas with low educational attainment and high unemployment (USA)	Small group risk factor screening, educational events, smoking cessation contests, a quit line, cessation groups and distribution of self-help quit kits. School programmes also undertaken. Focus on cardiovascular disease reduction.	Although trends in smoking moved in a favourable direction there was no significant difference between experimental and control communities. Less educated males showed smaller decreases in smoking in the experimental community compared to the control community.	Quasi-experimental design, incorporating repeat cross-sectional and cohort studies	68
Adults living in a community with low socio-economic status (Australia)	1 Single group counseling session 2 Specially prepared pamphlet	There were no major differences in quitters between the two groups.	Randomized parallel-group trial	69
<b><i>Interventions aimed at general population, reported to be at least as effective in low as in high socio-economic groups</i></b>				
Women aged 18-64 y (USA)	Community organization approaches to implement a multicomponent intervention (support, video, workplace, media)	Effectiveness: The odds of being a smoker after 4 y were 0.88 (0.78-1.00) compared to control counties. Quit rates were significantly higher in the intervention counties among women with low household incomes (23 % versus 15 %, $p < 0.01$ ).	Before-after study design	70
<b><i>Interventions aimed at general population, reported to be less effective in low as in high socio-economic groups</i></b>				
Adults (Germany)	Community-based primary prevention programmes for cardiovascular disease (interventions are aimed at smoking, nutrition, physical activity and hypertension)	Decrease in smoking among higher social classes and increase in smoking among lower classes.	3 independent cross-sectional surveys	71
Whole adult population in a small rural town with a high cardiovascular disease risk (Sweden)	General health education using mass media and direct education. Other activities included screening and counseling, political debate and community events	There was no significant net intervention effect. Trends were not in a favourable direction in the intervention community and remained unchanged in the control area. Subgroup analysis showed that the probability of being a smoker was reduced only among the highly educated groups.	Quasi-experimental design, incorporating repeat cross-sectional and cohort studies	72, 73

Table A4. Workplace interventions designed to promote smoking cessation: evidence of effectiveness in low socio-economic groups

Target population	Intervention	Effect of intervention	Study design	Reference
<b><i>Interventions aimed at low socio-economic groups, reported to be effective</i></b>				
Employees (USA)	Worksite health promotion only (HP) or worksite health promotion integrated within occupational health and safety intervention (HP/OHS)	6-month smoking quit rates among blue collar workers in the HP/OHS condition more than doubled relative to those in the HP condition (11.8 versus 5.9 %, p = 0.04; OR 2.13), and were comparable to quit rates of white-collar workers.	Randomized controlled trial	<sup>74, 75, 74</sup>
Smoking carpenters (USA)	Participants chose a 1-call or 5-call smoking cessation counseling plan, medications were limited to nicotine patch and gum and bupropion.	13 % of all smokers in the fund participated. The overall 1-year point prevalence quit rate was 22 % among participants.	After design/ no control group	<sup>76</sup>
Construction workers who were union members (USA + Canada)	Tailored telephone-delivered and mailed intervention to promote smoking cessation and increased fruit and vegetable consumption.	At 6 months 8 % of baseline smokers in the control group had quit, compared to 19 % in the intervention group (p = 0.03).	Randomized controlled trial	<sup>77</sup>
Male smokers in a radiator manufacturing factory (Japan)	Individual counseling by a doctor for 5 months	After the intervention the cessation rate was 12.9 % and 3.1% in the intervention and control groups, respectively (p = 0.003).	Randomized controlled intervention	<sup>78</sup>
<b><i>Interventions aimed at low socio-economic groups, reported to be non-effective</i></b>				
Rural female blue-collar employees (USA)	2 computer-tailored magazines and a natural helpers program	The rates of smoking cessation did not differ between groups.	Randomized trial	<sup>79</sup>
<b><i>Interventions aimed at general population, reported to be at least as effective in low as in high socio-economic groups</i></b>				
Adult indoor workers (USA)	Workplace smoking laws	Smokers who worked in localities with a strong workplace ordinance (compared with no workplace law) were more likely to quit smoking in the prior 6 months OR 1.5 (1.1-1.7). Smoking laws have similar effects on smoking cessation for different segments of	Cross-sectional	<sup>80</sup>

		the population.		
Employees (Finland)	Workplace legislation prohibiting smoking at workplaces.	Daily smoking prevalence among employees decreased significantly: from 30 % before the act to 25 % after the act had been in effect for 1 y. The largest decrease was observed among those without a college or university education.	Repeated cross-sectional design	<sup>81</sup>

Table A5. Mass media interventions: evidence of effectiveness in low socio-economic groups (MMC=Mass Media campaign, MMC+= MMC and additional policy)

Target population	Type of intervention	Intervention	Effect of intervention	Study design	Reference
<b><i>Interventions aimed at general population, reported to be at least as effective in low as in high socio-economic groups</i></b>					
Females with high school or less education (USA)	MMC+	Televised component and a written manual.	Women who participated were more likely to quit OR 1.53 (1.21-1.94).	Quasi-experimental trial	<sup>82</sup>
Whole adult population, although emphasis was given to heavy smokers (>25 per day) (USA/Canada)	MMC+	Multifaceted programme delivered through four main channels: public education (through mass media), healthcare providers, workplaces and cessation resources.	No significant net intervention effect for the total sample. However, a significant net intervention effect was found for the light-to-moderate smokers in the cohort study. This was largely attributable to behavioural change among the less educated (those with high-school education only)	Randomized controlled trial incorporating repeat cross-sectional and cohort studies	<sup>83, 84</sup>
Adult smokers (Australia)	MMC	Mass media-led smoking campaign	The relative decrease in smoking of the least educated is not significantly different from that of the most educated group	Quasi-experimental design	<sup>85</sup>
<b><i>Interventions aimed at general population, reported to be less effective in low as in high socio-economic groups</i></b>					
Smokers, especially 20- to 30 year old blue collar smokers (Canada)	Mass media campaign	Radio and television adds and posters	Poorer results in low SES group (measured by smoking prevalence).	Cross-sectional data with quasi-experimental	<sup>86</sup>

Population aged 12+ years (USA)	MMC+	Multifactorial health education campaign, emphasizing use of mass media, aimed at reducing cardiovascular disease	Significantly greater reduction in smoking prevalence in the experimental cities (compared to control cities). However, differences in smoking trends between experimental and control cities were not found for those with less than a high-school education.	approach Quasi-experimental design, incorporating repeat cross-sectional and cohort studies	<sup>87</sup>
---------------------------------	------	---	--	--	---------------

Table A6. Interventions targeting women: evidence of effectiveness in low socio-economic groups

Target population	Type of intervention	Intervention	Effect of intervention	Study design	Reference
<i>Interventions aimed at low socio-economic groups, reported to be effective</i>					
African American women residing in public housing (USA)	Counseling, free?	Nurse led behavioural/empowerment counseling, NRT, community health workers to enhance smoking self-efficacy, social support and spiritual well-being Controls: self-help written smoking cessation materials and group education not related to smoking	6-month continuous smoking abstinence of 28 % in intervention and 6 % in control groups OR 6.3 (1.2-32.4). Education and income were not associated with cessation.	Quasi-experimental, repeated measures design	<sup>28</sup>
Low-income women whose children received care at a paediatric clinic (USA)	Counseling, free?	Motivational message from the child's clinician, guide to quitting smoking, 10-minute motivational interview and telephone calls.	Abstinence rates after 12 months were twice as great in the intervention group as in the control group (14 % versus 7 %; OR 2.77 (1.24-6.60)	Randomized trial	<sup>30</sup>
Low-income women (Canada)	Counseling, free?	Smoking cessation course	Programme produced quit rates (22% at 6 months) comparable to those reported for cessation programme directed at the general population	Before-after study design/ no control	<sup>32</sup>

				group	
Low-income pregnant women (USA)	Telephone support	Proactive telephone support from a woman ex-smoker who called weekly, biweekly, and then monthly to provide counseling.	25 % reported abstinence at last telephone contact. Reach: 34 % accepted the telephone peer support, although approximately half of them actually received support	Before-after study design/ no control group	<sup>52</sup>
<b><i>Interventions aimed at low socio-economic groups, reported to be non-effective</i></b>					
Rural female blue-collar employees (USA)	Workplace	2 computer-tailored magazines and a natural helpers program	The rates of smoking cessation did not differ between groups.	Randomized trial	<sup>79</sup>
Adult population (particularly women) living in low income, socio economically deprived communities with low education attainment (Canada)	Community	Activities aimed at developing personal skills, creating supportive environments and building healthy public policy, in support of cardiovascular disease reduction. Also screening for cardiovascular disease risk factors, smoking cessation contests, workshops and support groups, community events, and distribution of educational materials	There was no significant net effect. Trends in smoking prevalence were equally favourable in both intervention and control communities	Quasi-experimental design, incorporating cohort and repeat cross-sectional studies	<sup>65</sup>
Low-income women aged 18-50 y (USA)	Telephone support added to NRT	Proactive telephone support (7 calls over 3 months) in addition to free nicotine patches Controls: free nicotine patches	At 6 months there was no difference in abstinence between experimental (23 %) and patch only group (19 %). At 3 months more women in the experimental group were abstinent (42 %) compared to the patch only condition (28 %) (p = 0.03).	Randomized controlled trial	<sup>53</sup>
Low-income women smokers (18-50 y) (USA)	Telephone support added to NRT	Proactive telephone support (12 calls over 4 months) in addition to free nicotine patches Controls: free nicotine patches	At 6 months there was no difference in abstinence between experimental (33 %) and patch only group (26 %). At 3 months more women in the experimental group were abstinent (43 %) compared to the patch only condition (26 %) (p = 0.002).	Randomized trial	<sup>54</sup>
Female smokers attending low-income	Counseling, free?	9-minute video, 12-15 min of behavioural counseling, 20 sec	6 months post intervention no significant difference.	Randomized controlled	<sup>37</sup>

planned parenthood clinics (15-35 years) (USA)		clinician advice to quit and follow-up telephone calls Controls: generic stop smoking brochure and standardized 20 sec message from their health care provider advising them to quit.		trial	
Low-income women (Canada)	Other	Smoking cessation guide	None of the subjects stopped smoking.	Before-after study design / no control group	<sup>88</sup>
Disadvantaged inner city mothers with infants (UK)	Other	One year of postnatal social support either by monthly supportive listening home visits by a support health visitor (SHV) or from community groups providing drop in sessions, home visiting and/or telephone support (CGS).	At 12 months there was little impact of either intervention on smoking status. (SHV: 0.86; 0.62-1.19, CGS: 0.97; 0.72-1.33). Uptake of the CGS intervention was low (19 %) compared with 94 % for the SHV intervention.	Randomized controlled trial	<sup>89</sup>
<b><i>Interventions aimed at general population, reported to be at least as effective in low as in high socio-economic groups</i></b>					
Women who smoked at the time they conceived (New Zealand)	Counseling, free?	Midwives in the intervention groups delivered either (1) a program of education and support for smoking cessation or reduction, (2) a program of education and support for breast feeding or (3) both programs. Controls: usual care.	Women in group 1 and 3 were significantly more likely to have reduced, stopped smoking or maintained smoking changes than women in the control group at 36 weeks gestation (2.71 (1.17-6.28) or 2.39 (1.08-5.31) respectively). There was no difference in rates of cessation or reduction between groups in the postnatal period. Ethnicity and deprivation were not independent predictors of success or failure with smoking cessation, although women with a low income were less likely to have stopped smoking.	Cluster randomized trial	<sup>39</sup>
Mothers who accompanied a child to	Counseling, free?	Group 1 received a smoking cessation intervention by a nurse aimed at their	Low income women in the child intervention and mother intervention group were more likely to	Randomized controlled	<sup>40</sup>

the hospital for a healthcare visit (Turkey)		children's health, group 2's intervention concerned their own health Controls: no smoking cessation advice	stop smoking than controls (25 %, 8.1 % and 1.5 %, respectively $p < 0.001$ ). These results are comparable to those for high income women.	trial	
Pregnant women (Poland)	Counseling, free?	4 midwife visits during pregnancy and one after delivery Controls: standard written information about the health risk to the fetus from maternal smoking and the benefits of smoking abstinence.	The chance of quitting smoking by the women was significantly higher in the intervention group than in the control group OR 2.5 (1.8 – 3.7). No statistically significant differences could be found in the efficacy of the intervention with regard to the level of education or employment status.	Randomized trial	<sup>44</sup>
Females with high school or less education (USA)	Other	Televised component and a written manual.	Women who participated were more likely to quit OR 1.53 (1.21-1.94).	Quasi-experimental trial	<sup>82</sup>
Pregnant women (UK)	Counseling, free?	Brief counseling (10-15 min) by midwife Controls: usual care	Reach: only a small proportion of women who would have been eligible were recruited. Effectiveness: Intervention and usual care group did not differ in continuous abstinence 6 months post-birth. Employment or education status were not associated with quit rates.	Randomized trial	<sup>45</sup>
Women aged 18-64 y (USA)	Community	Community organization approaches to implement a multicomponent intervention (support, video, workplace, media)	Effectiveness: The odds of being a smoker after 4 y were 0.88 (0.78-1.00) compared to control counties. Quit rates were significantly higher in the intervention counties among women with low household incomes (23 % versus 15 %, $p < 0.01$ ).	Before-after study design	<sup>70</sup>

## **Appendix B List of experts**

1. M. Ausems, Obstetrics Academy Maastricht
2. J. Bouwens, The Netherlands organization for health research and development (ZonMw)
3. M. Kleinjan, Addiction Research Institute Rotterdam
4. D. Kotz, University of Maastricht
5. A.D. Kunst, Department of Public Health, Erasmus University Rotterdam
6. M. Martens, Research and Consultancy (ResCon)
7. L. Peters, TNO Knowledge for business
8. K. Stronks, Department of Social Medicine, Academic Medical Centre, University of Amsterdam
9. S. Wigger, The Dutch Cancer society
10. M. Willemsen, STIVORO Nederland

# Appendix C Consultation round experts

## Introduction

Smoking bears considerable health risks and the social economic differences in smoking can be related to a large part of social economic differences in (healthy) life expectancy. The Dutch Ministry of Health, Welfare and Sport aims to reduce socioeconomic differences in (healthy) life expectancy. One possible way forward would be the reduction of smoking in lower socio-economic classes. For this reason, the Dutch Ministry of Health, Welfare and Sport has asked the RIVM to provide insights into the possible policies to reduce smoking in lower socio-economic classes.

The aim of our current research was to review the effectiveness of interventions to reduce smoking in persons with a lower socio-economic status (SES). We conducted a quick scan of the literature for two types of interventions: First interventions specifically developed for and tested in persons with a lower SES, second, more general interventions that have been evaluated for their effects in this specific group.

We scored the final results of the review for all interventions on evidence for effectiveness and relevance for Dutch policy. We felt reluctant however, to base these scores on a literature review only. Therefore, the current consultation round is included to allow you and other experts in the field to comment on our scores.

The remainder of this document is organized as follows: first, the different types of interventions are described. After that results of the literature review and our scores are shown. We end with some concluding remarks. Each section contains boxes with questions and we would like to receive your opinion about the conclusions we have drawn for every intervention. Obviously, any other comments are also most welcome. There is also an appendix attached to this document for your information. This appendix provides background information of the interventions discussed.

**Many thanks for your comments/contribution!**

## Background

In the review, ten different stop smoking interventions were identified in the Dutch and international literature that could be tailored to reach low SES groups or have been evaluated for their specific effect in low SES groups.

Two different types of interventions were distinguished that can reach groups with a lower SES. First, interventions directly targeting groups with a lower SES, such as community based interventions within a disadvantaged community. These interventions will mainly reach and possibly affect people with a low SES. Second, interventions aiming at a general public will also reach people with low SES. In the case that they attract relatively more low SES smokers or are more effective among this group than among high SES smokers they can also be categorized as interventions that will result in reducing socio-economic differences in smoking. Both types of interventions may reduce health disparities, because they have a bigger impact among low SES smokers.

## Methods

We started to search for review articles on smoking cessation and lower SES. Three relevant publications were found with an overview of the effectiveness of smoking cessation interventions among groups with a lower SES. The review by Kunst et al. identified five relevant tobacco control measures with a large potential to reduce inequalities in smoking between socio-economic groups. The review by Bouwens et al. described available policy and research done in the Netherlands, while the review by Platt and co-authors described international studies published until 2000.

In addition, the international literature was searched for the period 2000 to 2007, using a well-defined search strategy. After correcting for inclusion and exclusion criteria, this resulted in 42 relevant papers describing 39 studies. For details, please see Appendix A.

We made overview tables of individual effectiveness studies for each intervention and then scored the interventions for evidence on effectiveness in low SES groups as well as relevance for Dutch policy.

The scores considered evidence for effectiveness and were based on the following criteria. Furthermore relevance for Dutch policy was also discussed for each intervention.

---

<b>1) No evidence /insufficient literature</b>	No Dutch studies and < 3 International studies
<b>2) Evidence of no effect</b>	Several studies ( $\geq 1$ Dutch and/or $\geq 3$ International) with the majority of studies demonstrating no effects
<b>3) Little evidence</b>	Either $\geq 1$ Dutch studies with the majority of studies demonstrating effects, Or $\geq 3$ International studies with the majority of studies demonstrating effects
<b>4) Evidence</b>	$\geq 1$ Dutch studies with the majority of studies demonstrating effects
	+
	$\geq 3$ International studies with the majority of studies demonstrating effects

---

## Results

This section describes our conclusions about the effectiveness of ten interventions on smoking cessation.

### 1. Advertisement bans

- Contents: banning advertisement and promotion of tobacco.
- Evidence: the international literature review did not reveal any study of this policy.
- Conclusion: advertisement bans may specifically work for groups with a low SES, but there is almost no evidence.
- Current policy: this policy was left out of consideration, mainly because in the Netherlands banning of advertisement and promotion of tobacco is already implemented to a high degree.

Type of intervention	Evidence	Effective	Conclusion evidence of effect in low SES
Advertisement bans	Dutch studies: 0 International studies: 0	Dutch studies: 0 International studies: 0	No evidence/insufficient literature

**Do you support the conclusion we have drawn about this intervention? Yes/No**  
**If not, could you please explain why? Are your arguments based on literature that we missed or on any other reasons?**  
**And what would have been your conclusion?**

**Do you have any other tips, suggestions or comments about this intervention?**







## 5. Community based interventions

- Contents: complex interventions, usually aiming at many risk factors at once and carried out in disadvantaged communities.
- Evidence: in the Netherlands, two community studies were carried out. Both of them were not proven effective in producing higher quit rates in disadvantaged communities than in control communities. In the international literature, 16 studies were found on community based interventions. Of the 13 studies targeted at low socio-economic groups, six did demonstrate effectiveness and seven did not. There were also three studies which, although not targeted at low socio-economic groups, produced findings about differential impact according to socio-economic status. In one study, the intervention was at least as effective in low as in high socio-economic groups, whereas in two studies the intervention was shown to be less effective in low than in high socio-economic groups.
- Conclusion: evidence on these interventions is very mixed. The interventions are not proven to be specifically effective in reducing smoking prevalence in low SES groups.
- Current policy: in the Netherlands, community based interventions are carried out.

Type of intervention	Evidence	Effective	Conclusion evidence of effect in low SES
Community based interventions	Dutch studies: 2 International studies: 16	Dutch studies: 0 International studies: 7	Evidence of no effect

**Do you support the conclusion we have drawn about this intervention? Yes/No**  
**If not, could you please explain why? Are your arguments based on literature that we missed or on any other reasons?**  
**And what would have been your conclusion?**

**Do you have any other tips, suggestions or comments about this intervention?**



## 7. Workplace

### a) Reducing smoking in all workplaces

- Contents: reducing smoking in (all) workplaces through cessation support offered at the workplace.
- Evidence: no Dutch studies were found which evaluated the effectiveness of workplace interventions targeted at low SES groups on smoking cessation at workplaces. In the international literature, seven studies were found on workplace interventions to reduce smoking in (all) workplaces through cessation support offered at the workplace. Of the five studies targeted at low socio-economic groups, four did demonstrate effectiveness and one did not. The remaining two studies were not targeted at low socio-economic groups, but produced findings about differential impact according to socio-economic status. In both studies, the intervention was at least as effective in low as in high socio-economic groups.
- Conclusion: international evidence shows that workplace interventions are effective in reducing smoking at workplaces in groups with a low SES. Supporting Dutch evidence was not present.
- Current policy: in the Netherlands, smoking cessation courses are offered at workplaces, but no consistent policy exists to support this.

Type of intervention	Evidence	Effective	Conclusion of evidence of effect in low SES
Workplace: smoking cessation support in all workplaces.	Dutch studies: 0 International studies: 7	Dutch studies: 0 International studies: 6	Little evidence

**Do you support the conclusion we have drawn about this intervention? Yes/No**  
**If not, could you please explain why? Are your arguments based on literature that we missed or on any other reasons?**  
**And what would have been your conclusion?**

**Do you have any other tips, suggestions or comments about this intervention?**



## 8. Mass media campaigns

- Contents: broad campaigns aimed at a vast majority of a population through mass media which include newspapers and other printed material, radio, television and billboards.
- Evidence: in 1999/2000, parts of the Dutch mass media campaign ‘Dat kan ik ook!’ were presented in a television show called ‘Koffietijd’. Despite the fact that people from lower socio-economic groups watched on average more to the show and the smoking cessation course, the different cessation aids were at least as effective in low as in high socio-economic groups. Furthermore, the evaluation of the effectiveness of the overall campaign did not include information about socio-economic status. Five international studies were found on interventions including mass media campaigns. In three studies the interventions were at least as effective in low as in high socio-economic groups, whereas in two studies the intervention was shown to be less effective in low than in high socio-economic groups.
- Conclusion: evidence on the effectiveness of low SES groups in mass media campaigns is mixed and will of course highly depend on the type of campaign. The Dutch evidence seems to point to a relatively good reach for those elements specifically targeting low SES groups.
- Current policy: mass media campaigns are frequently used in the Netherlands for cessation support.

Type of intervention	Evidence	Effective	Conclusion of evidence of effect in low SES
Mass media campaigns	Dutch studies: 1 International studies: 5	Dutch studies: 1 International studies: 3	Evidence

**Do you support the conclusion we have drawn about this intervention? Yes/No**  
**If not, could you please explain why? Are your arguments based on literature that we missed or on any other evidence?**  
**And what would have been your conclusion?**

**Do you have any other tips, suggestions or comments about this intervention?**



## 10. Interventions for (pregnant) women

### a) Interventions targeted at pregnant women

- Contents: stop-smoking interventions targeted at pregnant women specifically.
- Evidence: one Dutch review was found which discussed several interventions for pregnant women; however, it did not report on their effects or reach for specific SES-groups. In the international literature we identified three studies targeting pregnant women. Of these three studies, all three were proven to be effective in low SES groups.
- Conclusion: interventions targeting all (pregnant) women seemed to have similar effects over all SES categories.
- Current policy: in the Netherlands, stop-smoking interventions targeted at pregnant women are offered, but no consistent policy exists to support this.

Type of intervention	Evidence	Effective	Conclusion of evidence of effect in low SES
For pregnant women	Dutch studies: 1 International studies: 3	Dutch studies: 0 International studies: 3	Little evidence

**Do you support the conclusion we have drawn about this intervention? Yes/No**  
**If not, could you please explain why? Are your arguments based on literature that we missed or on any other reasons?**  
**And what would have been your conclusion?**

**Do you have any other tips, suggestions or comments about this intervention?**



**Do you have any other tips, suggestions or comments about the whole review?**

We would like to thank you for your comments/contribution. We will take your comments into account while updating the scores given to the interventions in this review. Arguments provided based on new literature will be taken into account to review the scores of the intervention; expert opinions will be incorporated in this report separately.

**RIVM**

National Institute  
for Public Health  
and the Environment

P.O. Box 1  
3720 BA Bilthoven  
The Netherlands  
[www.rivm.com](http://www.rivm.com)