

Interventions for Tobacco Control in Low- and Middle-income countries: Evidence from Randomised and Quasi-Randomised Studies

Report from Kunnskapssenteret (Norwegian Knowledge Centre for the Health Services)

No 03-2012

Systematic Review



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Norwegian Knowledge Centre for the Health Services

Background: In several high-income countries, there has been an increase in public awareness of the harm caused by smoking tobacco, and a general decrease in smoking rates. Low and middle-income countries (LMIC) on the other hand, remain a large and vulnerable market for tobacco products. The growth in smoking rates is followed ten to twenty years later by an increase in the incidence of non communicable diseases. It is therefore important that efforts to control the consumption of tobacco in LMIC are strengthened. We systematically reviewed the literature to identify randomised and quasi-randomised studies of interventions for tobacco control implemented in LMIC. **Results:** We included 45 studies conducted in various low- and middle-income countries. The interventions were broadly on offering help to quit smoking and included pharmacotherapy, health education targeting smoking pregnant women or their husbands, or at the community or primary health care. Studies on school based interventions and one study on warnings on the dangers of smoking tobacco were also included. **Conclusions:** In low- and middle income countries: • Nicotine

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replacement therapy and bupropion may help smokers to stop smoking and probably reduces smoking rates. • Health education that targets smoking pregnant women probably helps them to stop smoking, and may result in one or more quit attempts or a reduction in the amount of smoking. • We are uncertain of the effect of health education at the primary care or community level on smoking cessation; however health education may decrease overall smoking rates. • School based interventions probably prevent progression to regular smoking among experimenters or non smokers. These interventions may reduce overall smoking rates and improve life skills. School based interventions probably improve knowledge, attitudes and beliefs about the effects of tobacco smoking. We are uncertain if school based interventions prevent experimentation with cigarettes.

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Norwegian Knowledge Centre for the Health Services assumes final responsibility for the content of this report.

Norwegian Knowledge Centre for the Health Services
Oslo, May 2012

Key messages

In several high-income countries, there has been an increase in public awareness of the harm caused by smoking tobacco, and a general decrease in smoking rates. Low and middle-income countries (LMIC) on the other hand, remain a large and vulnerable market for tobacco products. The growth in smoking rates is followed ten to twenty years later by an increase in the incidence of non communicable diseases. It is therefore important that efforts to control the consumption of tobacco in LMIC are strengthened. We systematically reviewed the literature to identify randomized and quasi-randomised studies of interventions for tobacco control implemented in LMIC.

We included 45 studies conducted in various low- and middle-income countries. The interventions were broadly on offering help to quit smoking and included pharmacotherapy, health education targeting smoking pregnant women or their husbands, or at the community or primary health care. Studies on school- based interventions and one study on warnings on the dangers of smoking tobacco were also included.

In low- and middle income countries:

- Nicotine replacement therapy and bupropion may help smokers to stop smoking and probably reduces smoking rates.
- Health education that targets smoking pregnant women probably helps them to stop smoking, and may result in one or more quit attempts or a reduction in the amount of smoking.
- We are uncertain of the effect of health education at the primary care or community level on smoking cessation; however health education may decrease overall smoking rates.
- School- based interventions probably prevent progression to regular smoking among experimenters or non smokers. These interventions may reduce overall smoking rates and improve life skills and probably improve knowledge, attitudes and beliefs about the effects of tobacco smoking. We are uncertain if school-based interventions prevent experimentation with cigarettes.

Title:

Interventions for tobacco control in Low- and Middle-Income Countries: Evidence from Randomised and Quasi-randomised Studies

Type of publication:

Systematic review

A review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyse and summarise the results of the included studies.

Doesn't answer everything:

- Excludes studies that fall outside of the inclusion criteria
- No health economic evaluation
- No recommendations

Publisher:

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Updated:

Last search for studies: March 2011.

Executive summary

Background

In many high-income countries, there has been an increase in public awareness of the harm caused by smoking tobacco, and a general decrease in smoking rates. Low and middle-income countries (LMIC) on the other hand, remain a large and vulnerable market for tobacco products. The growth in smoking rates is followed ten to twenty years later by an increase in the incidence of non communicable diseases. It is therefore important that efforts to control the consumption of tobacco in LMIC are strengthened.

The Norwegian Cancer Society commissioned the Norwegian Knowledge Centre for the Health Services to evaluate interventions to prevent and reduce the use of tobacco in low- and middle-income countries. Based on the literature emerging from randomised and non-randomised studies carried out in these countries, this review answered the questions: Which interventions are effective in preventing the use of tobacco? For those already using tobacco products, which interventions are effective in stopping the use of tobacco?

Method

We systematically searched the CENTRAL Cochrane database for references from the Cochrane Tobacco Addiction Group Specialised Register. The specialised register at the time of the search (June 2009, updated March 2011) was populated by studies identified from MEDLINE, EMBASE, PsycLIT/PsycINFO, Science Citations Index (SCI) and Social Science Citations Index (SSCI) via Web of Science, hand searching, and Conference abstracts. In addition, we searched MEDLINE Ovid, EMBASE and PsycLIT/PsycINFO. We also searched the reference lists of all eligible articles for any additional relevant articles. Two reviewers screened references according to the pre-specified inclusion criteria listed below:

- Study design:** Randomised controlled trials, Quasi-randomised controlled trials (e.g. controlled before-and after studies, interrupted time-series)
- Population** All people, including those that smoke or use tobacco products; or are exposed to tobacco smoke.
- Setting:** Low- and middle-income countries

Intervention:	We used the MPOWER framework (WHO 2003) to include interventions that: M onitor tobacco use and prevention policies, P rotect people from tobacco smoke, O ffer help to quit tobacco use, W arn about the dangers of tobacco, E nforce bans on tobacco advertising, promotion or sponsorship, R aise taxes on tobacco. We included other interventions to reduce the supply of tobacco and cigarettes and interventions to prevent tobacco uptake in schools.
Comparison:	No intervention, delayed intervention, general information on smoking prevention distributed to all participants, or one intervention compared to another intervention
Outcome:	Primary Outcome – smoking quit rates; rates of smoking initiation among non smokers. Secondary outcomes such as changes in smoking behavior, prevalence of quit attempts, change in knowledge about smoking, change in cigarette sales, self efficacy, and adverse effects
Language:	No restrictions

We extracted data from included studies and assessed the risk of bias. A meta-analysis was conducted where feasible and a narrative summary where the diversity of the included studies did not permit a meta-analysis. We used the GRADE instrument to assess our confidence in the effect estimates.

Results

Out of the 45 included studies, 26 were randomized controlled trials, 18 quasi randomized trials and 1 controlled before and after study. We found no studies that used an interrupted times series design. The studies were conducted in Asia (n=26), Europe (n=6), Latin America (n=5) and Africa (n=8). The interventions were broadly on offering help to quit smoking and included pharmacotherapy (n=7), interventions targeting smoking pregnant women or their husbands (n=3), and advise and support for smoking cessation delivered in the community or through primary care services (n=16). Other studies involved interventions among school children (n=18) and warnings on the dangers of smoking tobacco (n=1).

There was low quality evidence that nicotine replacement therapy (NRT) and bupropion are more effective than placebo to help smokers to stop smoking (3 RCTs, N=440, RR 2.03 95%CI 1.30–3.19) and probably reduces smoking rates. NRT may be more effective than naltrexone in helping smokers to quit (1 RCT, N=171, RR 7.21 95%CI 2.18–23.83). We are uncertain if NRT helps more smokers to stop smoking than clonidine (1 RCT, N=171, RR 1.85 95% 0.89–3.83). We are uncertain if NRT when combined with psychological techniques helps smokers stop smoking. We are uncertain if NRT combined with psychological techniques helps smokers to stop smoking more than psychological techniques alone (1 RCT, N=23, RR 1.83, 95%CI 0.60–5.61).

Health education that targets smoking pregnant women probably helps pregnant women to stop smoking in the short term (1 RCT, N=492, RR 1.80 95%CI 1.21–2.67)

and may result in one or more quit attempts or a reduction in the amount of smoking. We are uncertain if health education targeting smoking husbands of pregnant women helps the husbands to stop smoking (1 RCT, N=758, RR 1.43 95%CI 0.77–2.66). However, health education may result in one or more quit attempts or a reduction in the amount of smoking. We are uncertain of the effect of health education at the primary care or community level on smoking cessation (4 RCTs, N=836, RR 2.14 95%CI 0.77–5.95; 5 non RCTs, N=40854, RR 1.06 95%CI 0.86–1.31). However, health education may decrease overall smoking rates, and may help increase self efficacy, and improve knowledge and attitudes. We are uncertain if high intensity health education is more effective than low intensity education for smoking cessation. High intensity education may however lead to a larger decrease in smoking rates than low intensity education.

School- based interventions probably prevent progression to regular smoking among experimenters or non smokers. These interventions may reduce overall smoking rates and improve life skills. School based interventions probably improve knowledge, attitudes and beliefs about the effects of tobacco smoking. We are uncertain if school-based interventions prevent experimentation with cigarettes.

Discussion

Our findings indicate that NRT or bupropion as well as health education for pregnant women may help smokers in LMIC to quit. However these findings were from few, small studies and it is not clear how long these effects last. We are uncertain of the effect of health education delivered at the primary or community level for smoking cessation. This finding requires cautious interpretation as the studies were heterogeneous and overall reported few events. These findings may be seen to support the notion that health education needs to be carefully orchestrated and directed at different levels in a relevant conceptual model. The findings from the school based interventions could partly be explained by the fact that the included studies were mostly among high school students, a period when experimentation with tobacco is likely to occur. We did not assess if interventions that targeted younger students had a better outcome than those targeting older students who may have already experimented with cigarettes or become regular smokers.

Conclusion

In low- and middle income countries, nicotine replacement therapy and bupropion may help smokers to stop smoking and probably reduces smoking rates. Health education that targets smoking pregnant women probably helps them to stop smoking, and may result in one or more quit attempts or a reduction in the amount of smoking. We are uncertain of the effect of health education at the primary care or community level on smoking cessation, but this may decrease overall smoking rates. School- based interventions probably prevent progression to regular smoking among experimenters or non smokers. These interventions may reduce overall smoking rates and improve life skills. School based interventions probably improve know-

ledge, attitudes and beliefs about the effects of tobacco smoking. We are uncertain if school-based interventions prevent experimentation with cigarettes.

However the evidence base is not very strong as most of the included studies were small, implemented over short periods and at times addressed different questions. There is a need for more rigorous studies conducted in LMICs, perhaps with a particular focus on delivery strategies of therapies that have been successful in high income settings. Some interventions such as those targeting the supply of tobacco, enforcing bans on tobacco advertising or raising taxes require further evaluation, especially in LMIC where the legislation and enforcement of tobacco control varies widely.

Hovedfunn (norsk)

I mange høyinntektsland, har det vært en økning i offentlig oppmerksomhet om skader forårsaket av tobakksrøyking, og en generell nedgang i røyking. Lav- og middelsinntekt land (LMIC) derimot, forblir et stort og sårbart marked for tobakksvarer. Veksten i røyking er ti til tjue år senere fulgt av en økning i forekomsten av ikke-smittsomme sykdommer. Det er derfor viktig at arbeidet med å kontrollere forbruket av tobakk i LMIC blir styrket. Vi har systematisk gjennomgått litteratur for å identifisere randomiserte og ikke-randomiserte studier av tiltak for tobakkskontroll implementert i LMIC.

Vi inkluderte 45 studier utført i ulike lav- og middelinntektsland. Tiltakene i studiene var stort sett rettet mot hjelp til røykeslutt og inkluderte farmakoterapi, helseundervisning rettet mot røykende gravide eller deres ektemenn, eller tiltak iverksatt i lokalsamfunnet eller gjennom kommunehelsetjenesten. Andre studier involverte skolebarn og advarsler om farene ved tobakksrøyk.

Hovedfunn

I lav- og middelinntektsland:

- Nikotinerstatningsterapi (NRT) eller bupropion kan hjelpe røykere å slutte å røyke og kan muligens redusere antall røykere.
- Helseundervisning rettet mot gravide kvinner som røyker kan sannsynligvis hjelpe kvinnene til å slutte å røyke. Tiltaket kan gi flere røykeslutforsøk eller en reduksjon i røykingen for de som fortsetter å røyke.
- Vi er usikre på effekten av helseundervisning iverksatt i kommunehelsetjenesten eller i lokalsamfunnet på røykeslutt, men helseundervisning kan redusere røykemengden.
- Skolebaserte intervensjoner kan sannsynligvis forhindre progresjon til regelmessig røyking blant ikke-røykere og de som eksperimenterer. Disse intervensjonene kan redusere mengden røyking og kan forbedre sjansene til å si nei. Skolebaserte intervensjoner har sannsynligvis en positiv effekt på kunnskap, holdninger og oppfatninger om effektene av tobakksrøyking. Vi er usikre på om skolebaserte tiltak for røykeslutt forhindrer eksperimentering med sigaretter.

Tittel:

Tiltak for redusert tobakksbruk i lav- og mellominntektsland: Funn fra randomiserte og kvasi-randomiserte studier

Publikasjonstype:

Systematisk oversikt

En systematisk oversikt er resultatet av å

- innhente
- kritisk vurdere og
- sammenfatte relevante forskningsresultater ved hjelp av forhåndsdefinerte og eksplisitte metoder.

Svarer ikke på alt:

- Ingen studier utenfor de eksplisitte inklusjonskriteriene
- Ingen helseøkonomisk evaluering
- Ingen anbefalinger

Hvem står bak denne rapporten?

Kunnskapssenteret har skrevet rapporten på oppdrag fra Kreftforeningen.

Når ble litteratursøket utført?

Søk etter studier ble avsluttet Mars 2011

Sammendrag (norsk)

Bakgrunn

I mange høyinntektsland har det vært en økning i offentlig oppmerksomhet om skader forårsaket av røyking tobakk, og en generell nedgang i bruk av tobakksprodukter. Lav- og middelinntektsland (LMIC) derimot, forblir et stort og sårbart marked for tobakksvarer. Veksten i røyking blir, etter ti til tjue år, fulgt av en økning i forekomsten av ikke-smittsomme sykdommer. Det er derfor viktig at arbeidet med å kontrollere forbruket av tobakk i LMIC blir styrket. Vi har systematisk gjennomgått litteratur for å identifisere effektivitet-studier av tobakksforebyggende tiltak implementert i LMIC.

Kreftforeningen ga Nasjonalt kunnskapssenter for helsetjenesten i oppdrag å vurdere tiltak for å forebygge og kontrollere bruken av tobakk i lav- og middelinntektsland. Basert på litteraturen fra randomiserte og ikke-randomiserte studier gjort i disse landene, belyser denne oppsummeringen følgende problemstilling: Hvilke tiltak er effektive for å forebygge bruk av tobakk? Hvilke intervensjoner er effektive for å stoppe bruken av tobakk for de som allerede bruker tobakksprodukter?

Metode

Vi gjorde et systematisk søk etter litteratur i CENTRAL Cochrane-databasen for referanser fra Cochrane Tobacco Addiction Group Specialised Register. Det spesialiserte registeret på tidspunktet for søket (juni 2009, oppdatert mars 2011) inneholdt studier identifisert fra MEDLINE, EMBASE, PsycLIT/PsycINFO, Science Citations Index (SCI) og Social Science Citations Index (SSCI) via Web of Science, manuelt søk og Conference abstracts. Vi søkte også i referanselistene til alle kvalifiserte artikler for eventuelle ytterligere relevante artikler. To forskere vurderte hver potensielt relevant artikkel i henhold til de på forhånd spesifiserte inklusjonskriterier listet nedenfor:

- Studiedesign:** Randomiserte kontrollerte studier og kvasirandomiserte kontrollerte studier (f.eks kontrollerte før- og etterstudier, avbrutte tidsserieanalyser)
- Befolkning:** Alle, inkludert de som røyker eller bruker tobakksprodukter; eller som er utsatt for tobakksrøyk.
- Setting:** Lav- og middelinntektsland

Intervensjon:	Vi brukte MPOWER-rammen (WHO 2003) for å identifisere intervensjoner som: M onitor tobacco use and prevention policies, P rotect people from tobacco smoke, O ffer help to quit tobacco use, W arn about the dangers of tobacco, E nforce bans on tobacco advertising, promotion or sponsorship, R aise taxes on tobacco. Vi inkluderte andre intervensjoner for å redusere tilførselen av tobakk og sigaretter, og tiltak for å forebygge tobakksbruk i skolen.
Sammenligning:	Ingen intervensjon, forsinket intervensjon, generell informasjon om røykeforebygging distribuert til alle deltakere, eller en intervensjon sammenlignet med en annen intervensjon
Resultat:	Primærutfall – Hyppighet av røykeslutt; hyppighet av oppstart av røyking blant ikke-røykere. Sekundære utfall som for eksempel endringer i røykevaner, utbredelsen av forsøk på å slutte, endring i kunnskap om røyking, endring i sigarettsalg, tro på egen mestring, bivirkninger
Språk:	Ingen restriksjoner

Vi hentet data fra inkluderte studier og vurderte "risk of bias". En meta-analyse ble gjennomført der det var mulig og en narrativ oppsummering der mangfoldet av det inkluderte studiene ikke tillater en meta-analyse. Vi benyttet GRADE-verktøyet for å vurdere i hvilken grad vi kunne ha tillit til effektestimaterne.

Resultat

Av de 45 inkluderte studiene, var 26 randomiserte kontrollerte studier, 18 var kvasi-randomiserte studier og 1 kontrollert før- og etterstudie. Vi fant ingen avbrutt tidsserie-studier. Studiene var utført i Asia (n = 26), Afrika (n = 8), Europa (n = 6) og Latin-Amerika (n = 5). Disse tiltakene gikk stort sett ut på å tilby hjelp til å slutte å røyke og inkluderte farmakoterapi (n = 7), intervensjoner rettet mot røykende gravide kvinner eller deres ektemenn (n = 3), og rådgivning og støtte for røykeavvenning levert i lokalsamfunnet eller gjennom kommunehelsetjenesten (n = 16). Andre studier involverte tiltak blant skolebarn (n = 18) og advarsler om farene ved tobakksrøyk (n = 1).

Det var dokumentasjon av lav kvalitet for at nikotinerstatning terapi (NET) og bupropion er mer effektivt enn placebo for å hjelpe røykere å slutte å røyke (3RCT, N=440, RR 2.03 95 % CI 1.30–3.19) og antakeligvis redusere røykemengden blant røykere. NET er muligens mer effektiv enn naltrexone for å hjelpe røykere å slutte (1 RCT, N=171, RR 7.21 95 % CI 2.18–23.83). Vi er usikre på om NET hjelper flere røykere å slutte enn clonidine (1 RCT, N=171, RR 1.85 95 % CI 0.89–3.83). Vi er usikre på om NET kombinert med psykologiske teknikker hjelper røykere å slutte. Vi er usikre på om NET kombinert med psykologiske teknikker hjelper røykere å slutte mer enn bare psykologiske teknikker (1 RCT, N=23, RR 1.83, 95 % CI 0.60–5.61).

Helseundervisning som er rettet mot røykende gravide kvinner hjelper antakeligvis gravide kvinner å slutte å røyke på kort sikt (1 RCT, N=492, RR 1.80 95 % CI 1.21–2.67) og kan resultere i ett eller flere røykeslutforsøk eller i reduksjon i røykemengde. Vi er usikre på om helseundervisning rettet mot ektemenn av gravide kvinner hjelper ektemannen å slutte å røyke (1 RCT, N=758, RR 1.43 95 % CI 0.77–2.66). Helseundervisning kan derimot resultere i ett eller flere røykeslutforsøk eller i reduksjon i røykemengde. Vi er usikre på effekten av helseundervisning i lokalsamfunnet eller via kommunehelsetjenesten på røykeslutt (4 RCTs, N=836, RR 2.14 95 % CI 0.77–5.95; 5 non RCTs, N=40854, RR 1.06 95 % CI 0.86–1.31). Helseundervisning kan derimot redusere mengden røyk blant røykere, kan hjelpe tro på egen mestring, og kan forbedre kunnskap og holdninger. Vi er usikre på om høyintensiv helseundervisning er mer effektiv enn lavintensiv informasjon for røykeslutt. Høyintensiv undervisning kan derimot lede til en større reduksjon i røykemengden blant røykere enn lavintensiv informasjon.

Skolebaserte intervensjoner kan muligens forhindre progresjon til regelmessig røyking blant ikke-røykere og de som eksperimenterer. Disse intervensjonene kan redusere røykemengde blant røykere og øke generelle ferdigheter i forhold til å ta valg om egen adferd. Skolebaserte intervensjoner forbedrer sannsynligvis kunnskap, holdninger og oppfatninger om effekten av tobakksrøyking. Vi er usikre på om skolebaserte intervensjoner forhindrer eksperimentering med sigaretter.

Diskusjon

Våre funn indikerer at NRT eller bupropion samt helseundervisning for gravide kvinner kan hjelpe røykere i LMIC til å slutte. Disse funnene var fra få og små studier, og det er ikke klart hvor lenge disse effektene varer. Vi er usikre på effekten av helseundervisning gitt i lokalsamfunnet eller gjennom kommunehelsetjenesten på røykeslutt. Disse funnene krever forsiktig tolkning siden studiene var heterogene og rapporterte få hendelser til sammen. Funnene kan støtte tanken om at helseundervisning må nøye orkestreres og rettes mot forskjellige nivåer i en relevant konseptuell modell. Funnene fra de skolebaserte intervensjonene kan delvis forklares med at de inkluderte studiene for det meste var blant elever på videregående skole, en periode i livet hvor det er sannsynlig at eksperimentering med tobakk vil forekomme. Vi vurderte ikke om intervensjoner rettet mot yngre elever hadde et bedre resultat enn de som rettet seg mot eldre elever som kanskje allerede har eksperimentert med sigaretter eller har blitt faste røykere.

Konklusjon

I lav- og middelinntektsland, kan nikotinerstatningsterapi eller bupropion hjelpe røykere til å slutte å røyke og antakeligvis redusere mengden røyking blant røykere. Helseundervisning som er rettet mot røykende gravide kvinner kan sannsynligvis føre til at de slutter å røyke, og kan resultere i ett eller flere røykeslutforsøk eller en reduksjon i mengden røyk. Vi er usikre på effekten av helseundervisning gitt i lokal-

samfunnet eller i kommunehelsetjenesten på røykeslutt, men helseundervisning kan redusere røykemengden hos røykere.

Skolebaserte intervensjoner kan kanskje forhindre progresjon til regelmessig røyking blant ikke-røykere og de som eksperimenterer. Disse intervensjonene kan redusere mengden røyking blant de som røyker og forbedre sjansene til å avstå fra røyking. Skolebaserte intervensjoner kan sannsynligvis forbedre kunnskap, holdinger og oppfatninger om effekten av tobakksrøyking. Vi er usikre på om skolebaserte intervensjoner forhindrer eksperimentering med sigaretter. Evidensgrunnlaget er ikke veldig sterkt fordi de fleste inkluderte studiene var små, implementert over kort tid, og tidvis tok for seg forskjellige spørsmål. Det er behov for flere velutførte studier gjort i lav- og middelinntektsland, muligens med et spesielt fokus på leveringsstrategi av terapi som har vært vellykket i en høyinntektssetting. Noen intervensjoner, slik som de som retter seg mot tobakksforsyning, forbud mot tobakksreklame eller økte avgifter, trenger videre evaluering, spesielt i lav- og middelinntektsland hvor lovgivning og håndhevelse av tobakkskontroll varierer i stor grad.

Nasjonalt kunnskapssenter for helsetjenesten fremskaffer og formidler kunnskap om effekt av metoder, virkemidler og tiltak og om kvalitet innen alle deler av helsetjenesten. Målet er å bidra til gode beslutninger slik at brukerne får best mulig helsetjenester. Kunnskapssenteret er formelt et forvaltningsorgan under Helse- og omsorgsdepartementet, men har ikke myndighetsfunksjoner og kan ikke instrueres i faglige spørsmål.

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Preface

The Norwegian Cancer Society commissioned the Norwegian Knowledge Centre for the Health Services to summarize the evidence on interventions to control and prevent the use of tobacco and its products in Low- and middle-income countries. The evidence in this review is intended to inform priority setting for Norwegian support that is provided through several agencies and international collaborations for tobacco control in these countries.

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This report is to help decision makers in public health to arrive at well-informed decisions regarding the choice of interventions to prevent and control the use of tobacco in low- and middle- income countries. When considering how the interventions work, the evidence must be considered in the context of other policies in general and specifically those regarding tobacco control and their regulation.

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Objective

To review the findings from studies of interventions to prevent and control tobacco use that are implemented in low- and middle-income countries (LMIC), in order to address the following questions:

- Which interventions have been shown to be effective in preventing the use of tobacco?
- For those already using tobacco products, which interventions have been shown to be effective in stopping the use of tobacco?

In this report we focus on the impact of interventions on tobacco knowledge, attitudes, beliefs and use. The review is limited to randomised and non-randomised (controlled) studies.

Background

In many high-income countries, there has been an increase in public awareness of the harm caused by smoking tobacco, and a general decrease in the use of tobacco products. Low and middle-income countries (LMIC) on the other hand, remain a large and vulnerable market for tobacco products. Tobacco consumption decreased by 0.2% per year in high income countries between 1970 and 2000, while consumption in LMIC increased by 5% per year in the same period (FAO 2003). In these areas, the large population growth means there is a growing potential for new users of tobacco as well as a general increase in consumption of tobacco. Large trans-national companies have realized this potential market and have therefore shifted their focus to these countries.

The growth in smoking rates is followed ten to twenty years later by an increase in the incidence of diseases such as ischemic heart disease, lung, oral cavity and larynx cancers; and twenty to forty years later, chronic obstructive airway disease (Lopez 1994, Slama 2008). Already at the current smoking rates, health services in LMIC are constrained by lack of resources and high burden of infectious diseases. As the prevalence of smoking related non communicable diseases increases, the total burden on the health care systems in these countries will continue to grow. It is therefore important that efforts to control the growing consumption of tobacco in LMIC are strengthened.

In response to the tobacco epidemic, the WHO Framework Convention on Tobacco Control (FCTC) was formulated (WHO, 2003). This treaty was adopted at the World Health Assembly of 2003 and entered into force in 2005. Countries that are signatory to this treaty are obliged to strive for the right of all people to the highest standard of health including protection from exposure to tobacco smoke. This framework details core demand reduction provisions such as price and tax measures, non price measures like protection from exposure to tobacco smoke, regulation of contents of tobacco products, product disclosure, tobacco advertising among others; as well as supply reduction measures like provision of support for economically viable alternative activities, control of illicit trade in tobacco products and sales to minors. Such control measures are intended to both prevent uptake of tobacco use and reduce use among those already using tobacco.

The effectiveness of interventions for the prevention and control of tobacco use have been assessed in several systematic reviews of research findings, mainly including studies conducted in high-income settings:

Mass media campaigns have been shown to result in reduced smoking rates when included as part of a complex set of interventions (Bala M, 2008). Five out of nine large studies included in the systematic review reported decreasing smoking prevalence rates, three out of seven studies showed decreased consumption of cigarettes. Over half of the studies in the review that reported on quit rates showed increased rates of abstinence.

A systematic review of the impact of legislative smoking bans found that there is “limited evidence on the impact of active smoking, but the trend is downwards”. Also, the reviewers found “some evidence” that bans can lead to improvements in health outcomes (Callinan 2010).

Tax increases are widely seen as an effective measure to reduce tobacco-consumption. These are largely based on studies conducted in several countries including South Africa, on the correlation between price and consumption of tobacco, not on findings from experimental or quasi-experimental research (Chaloupka 2000).

Interventions such as warnings and fines for retailers selling cigarettes to minors have not shown a clear effect on the perception of young smokers in acquiring cigarettes or their smoking behavior (Stead LF, 2008).

Proactive telephone counseling among smokers that contact help lines has been shown to result in an almost 40% decrease in smoking rates among those receiving multiple calls (9 studies, RR 1.39, 95% CI 1.26–1.50). When not initiated by calls, telephone counseling increased quitting rates by about 30% (44 studies, RR 1.29, 95% CI 1.20–1.38) (Stead LF 2009). Nicotine replacement therapy increases the chance of stopping to smoke by 50-70% (Stead LF, 2007).

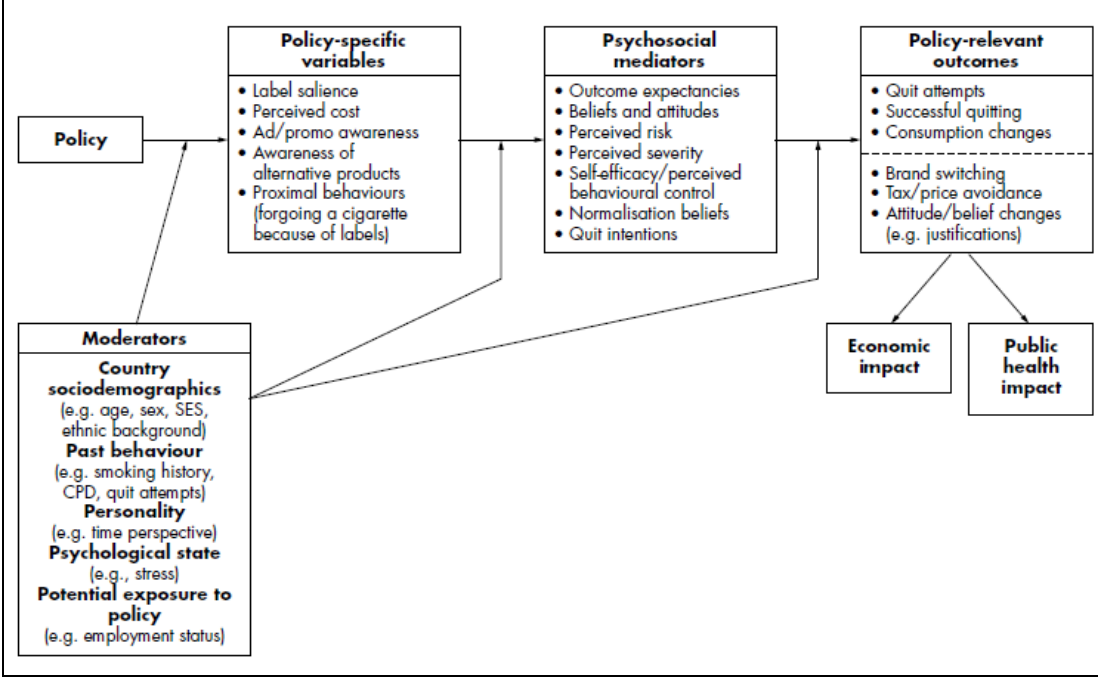
The effectiveness of interventions to control the use of tobacco may be context specific and the implementation of such measures may require adaptation to local circumstances, e.g. prevailing national policies and the level of enforcement of these policies, and the local culture. For policymakers in LMIC that develop tobacco-control strategies, the findings from research conducted in LMIC-settings may be useful as an adjunct to systematic reviews of the global evidence on the effectiveness of tobacco control measures, most of which stems from high-income countries. We therefore systematically reviewed the literature to identify effectiveness-studies of interventions for tobacco control implemented in LMIC.

Our review was limited to research findings from randomised and non-randomised studies, for two reasons: 1) Controlled comparisons are most often required to reliably assess the effectiveness of interventions that are contested, and 2) A review of all descriptive evaluations in the field of tobacco control in LMIC would likely be an insurmountable task. However, this choice also means that the evidence-base for some of the highly promoted tobacco control strategies will not be covered in our review as they have not been evaluated in experimentally or quasi-experimentally designed studies.

Theoretical Framework

The International Tobacco Control Policy Evaluation Project (Fong GT 2006) is an international collaborative project launched to evaluate the impact of the WHO Framework Convention on Tobacco Control and guide evaluations of tobacco policies. The project is firmly based on a theoretical framework with psychosocial research and health communication theories as key elements, and suggests causal pathways through which policy achieves behavior change. It suggests various psychosocial outcomes through which policy can achieve the ultimate goal of smoking cessation and identifies more upstream or policy specific variables such as perceived costs of cigarettes after tax increase from downstream effects such as self-efficacy, intentions and smoking cessation. We have included the model to illustrate the complex relationships between policy, psychosocial mediators and outcomes, and we discuss how interventions may be relevant despite weak direct effects on smoking behaviour.

Fig. 1: Conceptual model that reflects the process through which policy influences smoking behavior.



Source: Fong 2006, pg iii5. Produced with permission from the BMJ Group.

Method

Literature search

A search strategy including terms that specify low- and middle-income countries, study design such as randomised or non-randomised controlled trials, as well as smoking cessation, prevention, tobacco among others was developed to identify potentially relevant references. We included terms for 'smokeless' tobacco as well. Research librarian Marit Johansen planned and executed all the searches. For the complete search strategies see appendix 2.

We systematically searched for literature in the CENTRAL Cochrane database for references from the Cochrane Tobacco Addiction Group Specialised Register. The specialized register is maintained by the Cochrane Tobacco Addiction Group and at the time of the searches (June 2009 and March 2011) had been populated by studies identified from the following databases:

- MEDLINE
- EMBASE
- PsycLIT/PsycINFO
- Science Citations Index (SCI) and Social Science Citations Index (SSCI) via Web of Science,
- Hand searching,
- Conference abstracts

At the time of our first search most of the key databases had been searched up to August 2008 and Medline up to February 2009. In addition, we searched Medline Ovid, EMBASE and PsycINFO up to June 2009 to identify any later publications that may not have been included in the register. We carried out our last search of CENTRAL, MEDLINE, EMBASE and PsycLIT/PsycINFO in March 2011. The reference lists of all included studies were searched for any additional relevant articles. In addition, we identified key websites of organisations dedicated to the control of tobacco use e.g. Research for International Tobacco Control (RITC) a program of the International Development Research Center (IDRC) and searched them for relevant publications.

Abstracts and subsequently full text articles of references that were deemed relevant were screened in duplicate by the project working group according to the following criteria:

Inclusion criteria

Study design

1. Randomised controlled trials (including cluster randomised trials)
2. Non randomised controlled trials (e.g. controlled before-and after studies, interrupted time-series)

For population level interventions e.g. use of mass media, we included controlled before and after studies and interrupted time series. We used the criteria suggested by the Cochrane Effective Practice and Organisation of Care (EPOC) for inclusion of interrupted time series and controlled before and after studies, as a guide (Norwegian satellite of EPOC, 2012). However, we included controlled before- and after studies with only one control comparison (EPOC-criteria demand at least two intervention- and two control groups). The quality of included studies was considered at the time of analysis.

Population: All people in low and middle income countries that smoke, or use other forms of tobacco or are non-users of tobacco but are exposed to tobacco through their interaction with tobacco users. This includes children, young people/adolescents and pregnant women. (LMIC defined by the World bank, World Bank 2009.)

Intervention: We used WHO's "MPOWER"-categorisation for measures on tobacco control (WHO, 2003) as a guide to include interventions that were intended to:

- **Monitor** tobacco use and prevention policies such as establishment of monitoring systems for prevalence of tobacco use, industry marketing
- **Protect** people from tobacco smoke e.g. Bans on smoking in public places, workplaces
- **Offer** help to quit tobacco use including pharmacotherapy, telephone help lines, cessation incorporated into primary care
- **Warn** about the dangers of tobacco such as changes in labelling and packaging of cigarettes, anti-tobacco counter advertising e.g. using the mass media
- **Enforce** bans on tobacco advertising, promotion or sponsorship such as including legislation, where possible attempts at its enforcement shall be documented

- **R**aise taxes on tobacco

We also intended to include other interventions such as: Interventions to reduce the supply of tobacco and cigarettes e.g. support for economically viable alternative activities such as crop diversification and buy outs, surveillance for illicit trade in tobacco products. We included interventions aimed at the individual as well as the population level.

Comparison:

- No intervention
- Delayed Intervention
- General information on smoking prevention distributed to all participants
- One intervention compared to another intervention

Outcome:

Primary Outcome – Smoking quit rates; rates of smoking initiation among new smokers. Where available, we noted studies where smoking status was verified using biochemical analysis. A priori, abstinence was defined according to the Russell standard (West 2005) as a self-report of smoking not more than 5 cigarettes from the start of the abstinence period followed by a negative biochemical test, whenever possible. We documented abstinence at 6 and 12 month time points and any additional time points reported by the author. Where a sample of those that quit smoking had been taken for biochemical verification, the sample should be randomly selected. For those using cotinine-measurements for verification of smoking status, an attempt to rule out use of nicotine replacement therapy should have been made.

Secondary outcomes included the following:

- Changes in smoking behaviour such as the number of cigarettes smoked, smoking rates
- Prevalence of quit attempts
- Change in knowledge and attitudes about smoking
- Change in cigarette sales
- Self efficacy
- Adverse effects

Language:

No restrictions on language

Exclusion criteria

- Study design:** Simulation studies
- Population:** High Income settings, Animal studies
- Intervention:** We did not exclude any intervention targeting smoking prevention or cessation among human populations
- Outcome:** Health related outcomes were not considered as this was not the purpose of this study
-

Article selection

Abstracts were screened in duplicate for potentially eligible references. Full text articles were retrieved for any that were thought to be relevant. Two reviewers screened each potentially relevant article according to the pre-specified inclusion criteria. Where the two reviewers disagreed, a third reviewer screened the article to make a decision. Whenever this decision was not clear, the article was discussed and a decision made by the group.

Data extraction and analysis

Articles that met the above criteria were eligible for inclusion in this review. Data from eligible studies were extracted by one reviewer and another reviewer cross checked all entries for any errors. We used the MPOWER framework to guide the analysis (WHO 2003). However, within these broad categories, we further categorized the relevant studies according to the intervention and population targeted. For categories where the purpose of the intervention was thought to be sufficiently similar, we combined the data quantitatively including a meta-analysis where possible.

We extracted and grouped dichotomous and continuous data for relevant outcomes. Considering the diversity of the populations and interventions among the studies, we used a random effects model for any meta-analysis. Our calculations were based on an intention to treat analysis, and drop outs were considered as smokers. We estimated the effect of the intervention on dichotomous variables by the risk ratio (RR) and 95% confidence interval (95% CI) and effect on continuous variables (measured in the same way) by mean difference (mean diff) and 95% CI. We reported the findings as risk ratios, not odds ratios, to ease interpretation of findings. To the extent that data were available, we reanalyzed the studies that had reported results as odds ratios.

Methodological quality of included studies was assessed by one of the authors (SMB) and checked by another author (SØ or AF) using the Cochrane Risk of Bias tool

(Higgins 2011). We also considered other sources of bias such as no biochemical validation and conflict of interest from funding sources. Studies were categorised into unclear risk of bias if there was one or more unclear domains. Studies were classified as low risk of bias when key domains were done and there was no conflict of interest. Studies were considered high risk if one or more key domains scored as “not done” and there was conflict of interest. Sequence generation, allocation concealment and incomplete reporting (in particular drop-out rates) were considered key domains. Risk of bias assessments are summarized in appendix 13. We planned a subgroup analysis in case a sufficient number of studies reported smoking status after biochemical analysis.

For cluster randomized trials with unit of analysis errors, we planned to re-analyse the data using an estimate of the intra-cluster correlation (ICC) provided in any of the included studies.

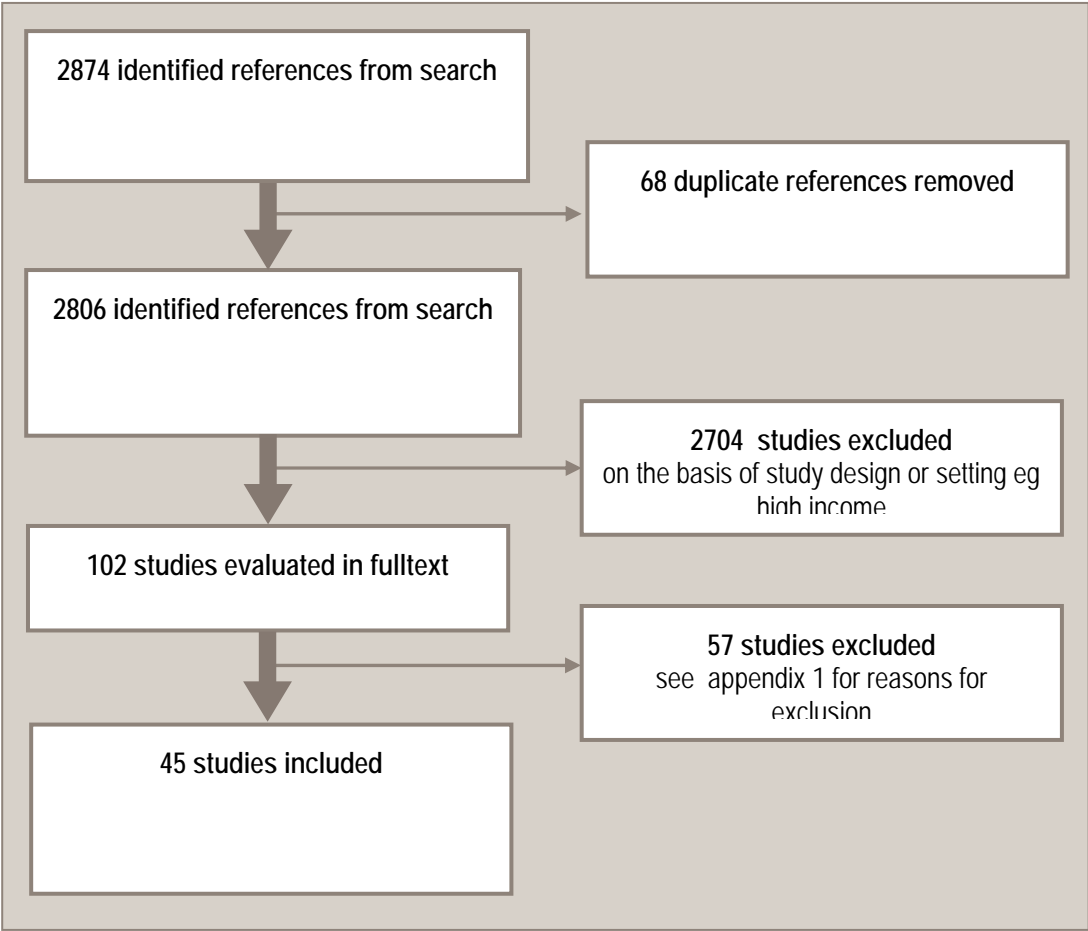
For studies with data from three arms, two authors identified and agreed on the two main comparisons. The number of events and participants in each of the two groups was halved to prevent unit of analysis error from double counting. We disregarded the third and less important comparison. This was done posthoc for two studies in the pharmacotherapy category (Ahmadi 2003 and Ward 2001).

We applied the instrument Grading of Recommendations Assessment, Development and Evaluation (GRADE) with GRADE-Profilers version 3.2.2 to assess the extent to which we could be confident that estimates of effect were correct. We applied eight criteria: methodological quality of study, consistency (were results consistent across studies?), directness (were the intervention, population and outcome measures similar?), precision (were the results precise enough?) and publication bias. In addition we considered the magnitude of effect, dose response gradient, plausible confounding and other biases to upgrade any studies. For more details about the GRADE-system we refer to publications by the GRADE Working Group (Guyatt 2011). We used the standard definitions in grading the quality of the evidence: High = We are very confident that the true effect lies close to that of the estimate of the effect; Moderate = We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different; Low = Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect; Very low = We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.

Results

From the electronic search, 2874 references were retrieved of which 68 were duplicate publications. Each of the 2806 titles and abstracts were screened by two of the reviewers. 2704 abstracts and references were found irrelevant and excluded. Two reviewers then screened each of the 102 full text articles. Out of these, 45 were eligible for inclusion in this review. We present a list of excluded studies and the reasons for exclusion in appendix 3.

Figure 2: Flow chart of the review process



Fifteen of the 45 included studies were obtained when the search was updated in March 2011. Twenty six were randomized controlled trials, 18 were quasi rando-

mized trials and 1 controlled before and after study. Our search found no studies using an interrupted times series design. Most of the studies were conducted in Asia (n=26), Africa (n=8), and a few in Europe (n=6), and Latin America (n=5). The studies conducted in Europe were from Russia (3), Turkey (2), and Romania (1).

Most of the interventions in the included studies (n=26) were categorised under “Offer help to quit tobacco use” in the WHO Tobacco framework (i.e. the “O” in “MPOWER”). However, the included studies in this category varied greatly and we further classified them into the following groups:

1. Pharmacotherapy for smoking cessation (n=7). Two of these included a psychosocial intervention in combination with nicotine replacement therapy (NRT)
2. Interventions targeting pregnant women (n=2) or their husbands (n=1)
3. Advice and support for smoking-cessation delivered in the community or through primary care services (n=16). One of these studies used a mass media campaign as part of the intervention. This could partly have been categorised under the “Warnings” group, but we thought it was better suited in this category. One intervention was specifically targeted at factory workers and one at security guards.

The remaining studies were of school-based interventions (n=18) and in the “Warnings” category (n=1). Thus, the fourth and fifth categories of anti-smoking measures used in our report are:

4. School-based intervention (n=18). Three of these could also have been categorised as measures to “Protect people from smoke” (the “P” in “MPOWER”): Two studies that included a ban on smoking at school as one component of the intervention, and another that evaluated environmental exposure of children whose parents or caregivers smoked.
5. Warnings (n=1).

Pharmacotherapy for smoking cessation

Population

Six randomised trials (Singh P 2010, Baltieri DA 2009, Sun HQ 2009, Ahmadi 2003, Ward 2001, Areechon 1988) and one non-randomised trial (Baddeley 1988) were included. These were conducted in India (Singh P 2010), China (Sun HQ 2009), Brazil (Baltieri 2009), Iran (Ahmadi 2003), Jamaica (Ward T 2001), Thailand (Areechon 1988), and South Africa (Baddeley 1988). All seven studies included adult populations that were heavy smokers, smoking approximately 20 or more cigarettes per day.

In Singh P 2010, the study was conducted among 30 participants who were mostly male subjects (93%) and registered with an anti-smoking clinic. The mean age was about 47 years (SD14.12) in the treatment group, and 39 years (SD12.18) in the placebo group. The mean number of years of smoking in both groups was about 21 years, mean number of cigarettes smoked per day were about 18. The mean Fagerstrom score (measured using the Fagerstrom Nicotine Tolerance Questionnaire, range 0 – 10, 10 is highest level of dependence) was approximately 5 (SD2) in each of the two groups.

In Baltieri DA 2009, all 155 participants were alcohol-dependant and enrolled in a clinic for drug dependence. 66% were smokers whose mean age was about 45 years (SD8). The mean no. of cigarettes smoked per day was 24 (sd7). The level of nicotine dependence was not indicated.

The Sun HQ 2009 study included 211 participants recruited via newspaper advertisements and had a mean age of about 40 years (SD11.30) in the placebo group, and 43 years (SD11) in the treatment group. Most were male, had smoked cigarettes for about 21 years (SD11) in control group and 23 years (SD10.5) in treatment group. The mean number of cigarettes smoked per day was 23 (SD10).

In Ahmadi 2003, the study was conducted among 171 men seeking treatment, with a mean age of 38 years (SD10) smoking on average 20 cigarettes per day and had been smoking 10 or more cigarettes for at least 1 year.

Ward 2001 included 110 volunteers recruited via television and print media. The mean age was 42 years (SD7.2) in the group receiving nicotine replacement therapy (NRT) plus Self Efficacy (SE) plus stages of change (SoC) intervention, 38 years (SD5.9) in the group receiving NRT plus SE plus SoC plus Cognitive Counter conditioning (CCC) and 37 years (SD8.3) in the waiting (control) group. The baseline smoking rates or levels of nicotine dependence were not clear.

In Areechon 1988, two hundred participants were recruited through newspaper advertisements and were mostly men with a mean age of 38 years (active gum group) and 40 years (placebo group). The mean number of years of smoking was approximately 20 years and mean daily cigarette consumption of 24 cigarettes.

Baddeley 1988 included 23 participants (50% in each group were men) with an average age of 46 years, smoking 39 cigarettes per day in intervention group and 33 in the control group, and had about 26 years of smoking in each group. Nicotine dependence score was 8 in the intervention group and 6.7 in the control group (measured using the Fagerstrom Nicotine Tolerance Questionnaire).

Intervention

The interventions delivered varied greatly in their purpose and the way they were delivered (see appendix 4). Three studies (Singh 2009, Sun HQ 2009, Areechon 1988) compared pharmacotherapy (NRT or bupropion) to placebo. Baltieri 2009 compared two different types of pharmacotherapy (naltrexone and topiramate) with placebo. Ahmadi 2003 compared three different types of pharmacotherapy (NRT, Clonidine and Naltrexone). Ward 2001 evaluated the use of NRT with the addition of 3 key psychological techniques - Stages of change, Self-efficacy, and Cognitive counter conditioning technique. The stages of change intervention included an outline to smokers of the notion of stages of change so they could evaluate their own progress and gain perspective on what they needed to work towards. Self-efficacy involved helping the smokers gain insight into their readiness to attempt to stop smoking. Cognitive counter conditioning was intended to reduce the pleasure in smoking as the participants focused on the negative aspects of smoking. Baddeley 1988 compared nicotine gum in addition to psychological treatment, with psychological treatment only, in matched groups of heavy smokers motivated to stop smoking.

Outcomes

Four studies documented abstinence rates at 6 months, Baddeley 1988 registered 2 additional time points (at 2 weeks and 6 weeks) while Ward 2001 included 1 additional time point at 12 months. In one study, abstinence was reported at 4 months (Singh P 2010) and two others reported abstinence at 3 months (Sun HQ 2009, Baltieri 2009). Abstinence was measured by self-report and verified in 5 studies (saliva cotinine test in Ward 2001, breath carbon monoxide levels in Areechon 1988, Singh P 2010 and Sun HQ 2009). In addition, Sun HQ 2009 also measured urine cotinine levels. Baddeley 1988 measured carboxy haemoglobin concentration levels. In Ahmadi 2003, test verification was done but the details of the test used were not reported. There was no verification done in the Baltieri 2009 study.

Results

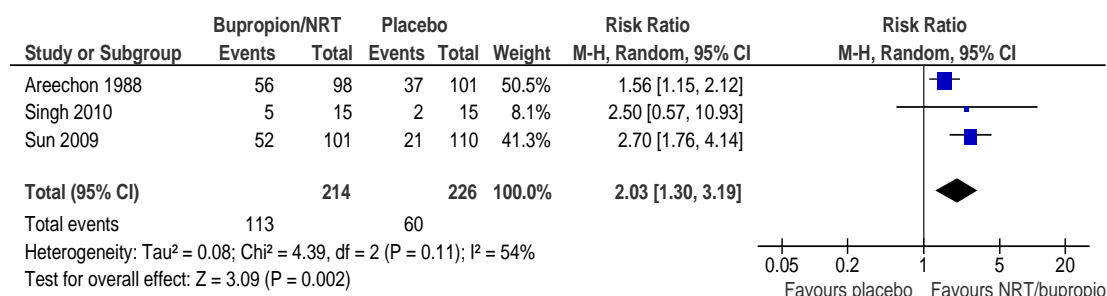
i) Pharmacotherapy versus placebo

Abstinence rates

4 studies (N=595) compared pharmacotherapy to placebo and reported abstinence rates. One of these (Baltieri 2009, N=155) compared topiramate, naltrexone and placebo among alcoholics and has not been included in the meta-analysis as the number of participants who report abstinence were insufficient for this analysis. In this study, there was low quality evidence of a non-significant difference in abstinence rates among alcoholic smokers who received topiramate or naltrexone when compared to placebo (5.83 versus 1.94% versus 0.97% respectively, $p=0.12$).

The three studies reported in the meta-analysis below, reported abstinence rates in the short term (3 months Sun 2009, 4 months Singh 2010, 6 months Areechon

1988). There was low quality evidence that NRT or bupropion is more effective than placebo in helping heavy smokers to stop smoking.



Smoking rates

One study (Sun 2009, N=211) reported the proportion of participants who reduced their smoking rates by 50% from baseline. There was a higher proportion that reduced their smoking rates in the active drug group (43%) compared to 15% that got placebo, out of the 95% who had either stopped smoking or reduced their smoking to 50% after the intervention (RR 2.45 95%CI 1.68 – 4.51).

Adverse effects

Adverse effects were reported in four studies. Singh P 2010 reported statistically significant differences in insomnia between the drug group (40%) and the control group (7%), as well as altered sensation or dry mouth. Other non statistically significant adverse events reported were loss of appetite and dyspepsia. One participant in the drug group had left sided chest pain with no abnormality detected on cardiovascular evaluation.

Sun HQ 2009 reported minor adverse events in both the nicotine and placebo groups. The most common were dry mouth, nausea, vomiting, dizziness, insomnia and loss of feelings at the apex of the tongue. There were no serious adverse events reported.

In Areechon 1988, 10 subjects, 5% of all participants reported at least one side effect such as dizziness, sore throat, nausea, headache, and mouth ulcers. Differences in adverse events between the two groups were not significant. One subject discontinued treatment because of side effects. It was not clear which group he/she belonged to.

Baltieri 2009 reported non significant differences in adverse events in the 3 groups (topiramate, naltrexone and placebo). The most common adverse events reported were somnolence, insomnia, paraesthesia, nausea, loss of appetite and fatigue. No serious adverse events were reported.

ii) Pharmacotherapy plus psychological support versus psychological therapy/waiting control

Abstinence rates

Two studies compared pharmacotherapy plus psychological support (or psychotherapy) with psychological support (Baddeley 1988) or a waiting control (Ward 2001). These studies were not combined as Baddeley 1988 was a non-randomized controlled study. In Baddeley 1988 (N=23), we are uncertain of the effect of the intervention on abstinence rates after 6 months (RR 1.83, 95% CI 0.60– 5.61). Similarly in Ward 2001 (N=110), we are uncertain that NRT when combined with psychological techniques after 6 months increases the number of abstainers above the spontaneous rate observed in the waiting list control for both groups. (Group A-NRT plus self efficacy (SE) plus stages of change (SoC) versus control: RR 4.14 95% CI 0.57-30.09; Group B-NRT plus SE plus SoC plus Cognitive Counter conditioning versus control: RR 5.21 95% CI 0.73- 37.32). We are also uncertain of the difference between Group B and A at 12 months (RR 0.84, 95% CI 0.39 – 1.79). The quality of evidence was graded low for this outcome in both studies.

Self Efficacy

Ward 2001 found no difference in self efficacy across treatment groups at 6 months but there was a significant difference between the treatment groups at 12 months with Group B showing even more enhanced efficacy than group A. No data comparing each group to the control group was available. There were no significant differences between groups for the pros and cons scores at both 6 and 12 months.

Adverse events

In Baddeley 1988, minor side effects of the gum such as burning in the mouth and stomach, unpleasant taste or hiccup were experienced by most users but these did not stop anyone from using the gum. No adverse effects in the control group were reported. Ward 2001 did not report any side effects.

iii) Pharmacotherapy versus pharmacotherapy

One study (N=171) compared nicotine to clonidine and naltrexone. In Ahmadi 2003, we are uncertain if there is a difference between NRT and clonidine for smoking cessation (RR 1.85 95% CI 0.89 – 3.83). There was a significant difference in abstinence rates between NRT and naltrexone in helping smokers to quit (RR 7.21 95% CI 2.18 – 23.83). The quality of the evidence was graded low.

Adverse events

In Ahmadi 2002, minor adverse events were reported in each group. 42% in the nicotine group (n=24) reported at least one event such as headache, nausea, mouth/throat irritation, bad taste, and anxiety. 31.6% (n=18) reported at least one event of drowsiness, hypotension, or lethargy from using Clonidine. 84.2% (n=48) reported at least one episode of headache, gastrointestinal upset or sleep distur-

bance after using Naltrexone. It was not clear if differences in adverse events between groups were statistically significant.

Summary of Findings (See appendix 5 for summary tables):

- NRT and bupropion may help smokers to stop smoking (low quality evidence) and probably reduces smoking rates (moderate quality evidence) compared to placebo.
- NRT may help more smokers to stop smoking than naltrexone (low quality evidence). We are uncertain if NRT helps more smokers to stop smoking than clonidine (low quality evidence).
- We are uncertain that NRT when combined with psychological techniques compared to waiting control helps smokers stop smoking (low quality evidence).
- We are uncertain if NRT combined with psychological techniques helps more smokers to stop smoking than psychological techniques alone (low quality evidence).

Interventions targeting pregnant women

Population

Two randomized controlled trials and one controlled before and after trial was included in this category. The RCTs were conducted in China (Loke 2005), and one study in four Latin American countries: Brazil, Cuba, Argentina, Mexico (Belizan 1995). The controlled before and after study was conducted in South Africa (Everett-Murphy K 2010).

The Latin American study (Belizan 1995) included 492 women at 15-20 weeks gestation, with a singleton pregnancy that had at least one of the following risk factors: a previous low birth weight baby or fetal, neonatal or infant death, was ≤ 17 years, ≤ 50 kg and height ≤ 1.50 m, a low family income, heavy smoking or alcohol consumption. Other risk factors were less than 3 years of schooling and single, separated, divorced or widowed mothers. The mean age was about 24 years, and mean gestational age about 18 weeks. 23% in the intervention group and 21% in the control group were smokers. Among the current smokers, the mean number of cigarettes smoked per day was about 8 (SD8), and approximately 30% of the women smoked more than 10 cigarettes per day.

In Loke 2005, the participants were 758 non-smoking women attending prenatal care at a women and child health care centre and had husbands that smoked. Around half of them had husbands smoking 6-15 cigarettes per day (47.5% in intervention, 44% in control), and about 20% in each group had husbands that smoked 16 - 25 cigarettes. Most husbands smoked at home (about 80%).

The non-randomised controlled trial by Everett-Murphy K 2010 included 759 pregnant women of low socio-economic status, with a mean age of approximately 24 years (SD6). The mean gestation of pregnancy was 16 weeks (SD5). The reported mean no. of cigarettes smoked per day was 6 (SD5), and most (about 60%) had high urine cotinine levels (≥ 1000 ng/ml) at the start of the study. About 68% reported environmental tobacco exposure.

Interventions

The interventions delivered varied greatly in their purpose, and the way they were delivered (See appendix 6). The Everett-Murphy 2010 study was intended to evaluate the effect of smoking cessation intervention based on best practice guidelines, on quit rates of disadvantaged pregnant women. The intervention was based on the 5As approach (see Glossary, p. 67) delivered by midwives and counselors and included motivational interviewing. In Loke 2005, obstetricians gave simple advice to non-smoking pregnant women with the aim of helping their husbands to give up smoking. The Belizan 1995 study was intended to reduce stress, anxiety, inadequate health-related behaviour including smoking, untimely recognition of pregnancy and labor-related morbidity and at increasing health service utilization. The intervention was targeted at the mother and her support person.

Comparisons

The Everett-Murphy 2010 study used a natural history cohort that received usual care involving midwives asking about smoking status, advising quitting or reducing smoking, and mentioning only growth retardation and respiratory problems as complications. Participants in the control groups of the other two studies received routine prenatal care.

Outcomes

One randomized trial reported on the proportion of women that stopped smoking after delivery (Belizan 1995). One controlled trial reported the number of women quitting smoking by late pregnancy (Everett-Murphy 2010). Other outcomes reported were quitting by self report and reduction of smoking and quit attempts. Loke 2005 reported on the proportion of husbands that were reported by their wives to have quit smoking after 3-5 months follow up. In this study, other outcomes reported were the number of attempts at giving up smoking and changes in number of cigarettes smoked. Belizan 1995 reported on other health related behaviours but these are not related to our research question and will therefore not be reported here.

Everett-Murphy 2010 verified smoking status by measuring urine cotinine levels. None of the other trials verified the smoking status of the participants or the husbands smoking status (Loke 2005).

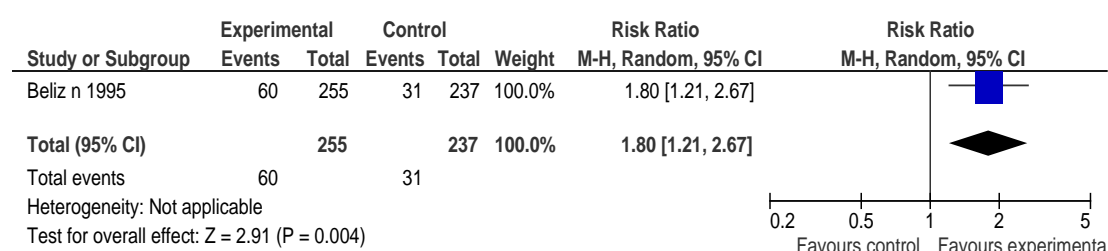
Results

i) Pregnant smoking women

Abstinence

Two studies reported this outcome (Everett Murphy 2010, Belizan 1995). However, Everett Murphy 2010 used a non-randomised controlled design and has therefore not been included in the meta-analysis. This study indicated a 5.3% difference in quit rates between the intervention and control groups (RR 12.24, 95%CI 2.95 – 50.84).

Findings from the Belizan 1995 study indicate moderate quality evidence of a beneficial effect of health education for helping pregnant women to stop smoking. (RR 1.80 95%CI 1.21 – 2.67).



Quit Attempts

There was low quality evidence from the Everett Murphy 2010 study (N=759), of a significant difference in the mean number of quit attempts in the intervention group compared to the control group (Mean Difference 1.28, 95%CI 1.07 – 1.49).

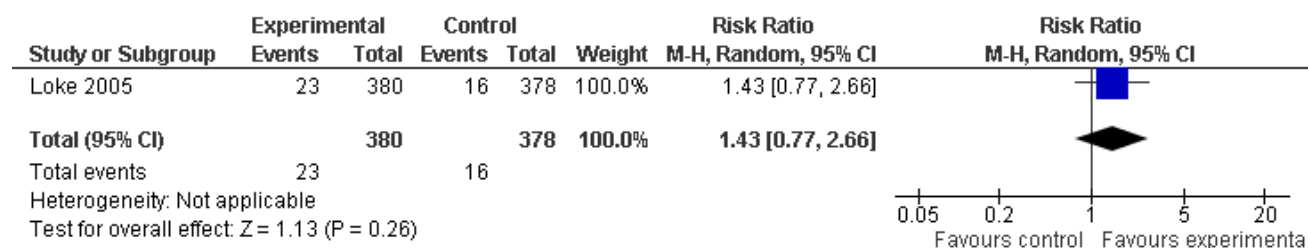
Smoking rates

Everett Murphy 2010 reported that by the end of the pregnancy, more women in the intervention group compared to the control group had reduced their cotinine levels by half (RR 1.87 95% CI 1.35 – 2.59). This was low quality evidence.

ii) Pregnant non-smoking women with husbands that smoke

Abstinence

One study (Loke 2005) reported abstinence in this population. There was uncertainty round the estimate of effect of husband's abstinence from smoking (RR 1.43, 95%CI 0.77 – 2.66). This evidence was graded low quality.



Quit attempts

Loke 2005 reported an increase in number of husbands with one or more attempts to stop smoking in the intervention compared to the control group (RR 1.35 95%CI 1.06–1.72). This evidence was graded low quality.

Smoking rates

Loke 2005, reported a reduction in the number of cigarettes smoked when the intervention was compared to the control group (RR 2.24 95%CI 1.75–2.88). This was low quality evidence.

Summary of Findings (See appendix 7 for summary tables):

Health education that targets smoking pregnant women probably helps pregnant women to stop smoking in the short term (moderate quality evidence). Health education may also result in one or more quit attempts or a reduction in the amount of smoking (low quality evidence).

We are uncertain if health education that targets smoking husbands of pregnant women helps the husbands to stop smoking in the short term (low quality evidence). However, health education may result in one or more quit attempts or a reduction in the amount of smoking (low quality evidence).

Advice and support for smoking-cessation delivered in the community or through primary care services

Population

We included 16 studies of which 6 were RCTs and 10 were non-randomised controlled trials. Two of the RCTs were conducted in China (Zheng 2007, Jiang 2007), one each in Indonesia (Ng 2010), Syria (Asfar 2008), Malaysia (Jackson 2004) and Seychelles (Bovet 2002). The non-randomised controlled trials were conducted in Brazil (de Azevedo 2010), Chile (Puschel 2008), India (Kar 2008), Turkey (Gunes 2007), Malaysia (Moy F 2006), China (Xie 2005, Liu 2003, Fang XH 1999), Russia (McAlister 2000) and South Africa (Steenkamp 1991).

Nine studies were implemented and targeted the general population (Asfar 2008, Liu 2003, Zheng 2007, Xie 2005, Kar 2008, Bovet 2002, McAlister AL 2000, Fang XH 1999, Steenkamp 1991). Five studies were among populations attending clinics or hospitals. In de Azevedo 2010, the participants were hospitalized patients from all wards apart from the intensive care unit and psychiatric units. In Ng 2010, these were patients attending the diabetes clinic. In Jiang 2007, these were patients recovering from coronary heart disease. In Puschel 2008, these were women of child-bearing age attending a primary health care clinic for a consultation with the physician, nurse or midwife. In Jackson 2004, the participants were patients awaiting a

consultation with a physician at the university hospital. In Gunes 2007, participants were males working at a textile factory, while in Moy F 2006; they were security workers at a public university.

Intervention

These studies largely focused on preventing chronic diseases that are associated with smoking such as cerebral vascular disease, and chronic airways disease. However, they varied greatly in the way they were delivered (see appendix 8). Some were clinic based and involved health education about tobacco and the dangers of smoking (Ng 2010, de Azevedo 2010, Asfar 2008, Puschel 2008, Jackson 2004, Bovet 2002). In Bovet 2002 the intervention was to perform an ultrasonographic scan of the carotid and femoral arteries, and if signs of atherosclerotic plaques were found, the photographs of a plaque were presented with a relevant explanation. Some interventions were delivered in the community at household level (Kar 2008, Xie 2005, Fang 1999) or during group discussions (Zheng 2007, Liu 2003). Steenkamp 1991 involved a mass media campaign and home visits in the group assigned to the intensive intervention. This study, (as well as Liu 2003, Kar 2008, Moy 2006 and Fang 1999) targeted smoking as one of several other coronary risk factors. Xie 2005 included smoking as one of other risk factors for chronic airways disease and also used radios, leaflets and home visits to deliver the intervention. The McAlister 2000 study provided smoking cessation competitions via a communication campaign using leaflets and local newspapers. These included stories of local role models that had quit smoking and winners of the competition. Jiang 2007 was a home-based, enhanced self management and secondary prevention program for patients who had recovered from coronary heart disease. Gunes 2007 was delivered in a factory setting and Moy F 2006 at a public university.

A few studies mentioned the theoretical base or a specific package of care on which they were based. Asfar 2008 used mainly stimulus control strategies and relapse prevention skills using cognitive behavioural strategies, Zheng 2007 was also based on social cognitive theory and included components of coping strategies. Jiang 2007 used goal setting strategies as part of the self management program. Ng 2010 and Puschel 2008 were based on the 5A model (see Glossary p. 68) while Kar 2008 was based on the WHO CVD risk management package of care. Gunes 2007 was based on the stages of change model. McAlister 2000 was based on stages of behaviour change (Prochaska and DiClemente) and important change processes.

Comparisons

There was no intervention given in the communities assigned to the control groups in de Azevedo 2010, Xie 2005, Liu 2003, McAlister 2000, Fang XH 1999 and Steenkamp 1991, while this was not clear in Jiang 2007. In all other studies, the control groups received minimal intervention. The Ng 2010 study provided one group with

doctor advice and information about a cessation clinic (control group), while the other group got both the doctors counseling and a written referral to the cessation clinic. In Kar 2008, the control group had a risk assessment carried out by the investigator at the beginning and end of the study using the WHO steps instrument. In Bovet 2002, the control group had no ultrasonography done and therefore no plaques were shown to them, but they were counseled on quitting smoking.

Of the two standard clinics in the control group of the Puschel 2008 study, one clinic had no specific smoking cessation program at the time of the study, but the other clinic had a cardiovascular program that was implemented at the time of the study. The program asked providers to advise patients to quit smoking as part of their activities. In Zheng 2007, the participants in the control group were given brief advice to quit smoking after the baseline survey, and got same training 6 months later. Both the intervention and control groups were followed up for 1 year after the intervention. In Asfar 2008, they received the brief intervention which consisted of a single 45 minute educational/counseling session with a trained physician who emphasized health effects and consequences of tobacco use, encouraged setting of quit date, gave basic stimulus control and contingency management strategies to quit and prevent relapse. Participants received self help materials. In Jackson 2004, the control group was asked the brief questions on 'safe' number of cigarettes one can smoke, 'safe' ways to smoke, diseases caused by smoking and death due to smoking. In Gunes 2007, the control group did not receive any education but completed a baseline questionnaire and had another survey 6 months after the intervention. At the end of the study, all received information on the hazardous effects of smoking and ways of quitting. Moy 2006 provided minimal health education, through feedback of results by mail, standard brochures and group sessions once every year.

Results

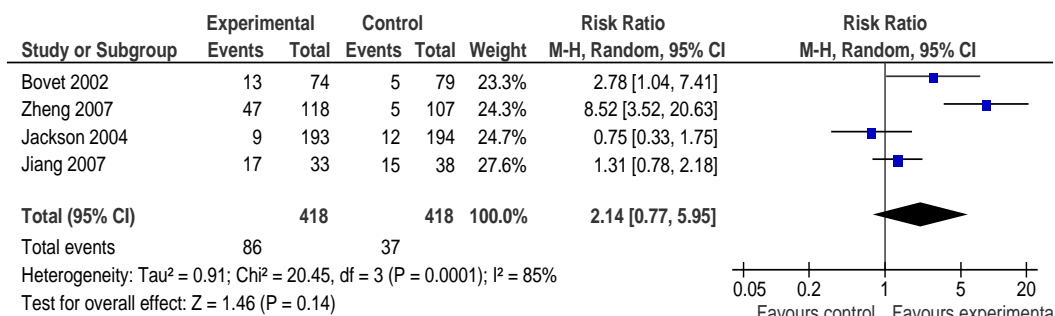
i) Intervention compared to control

Abstinence Rates

RCTS

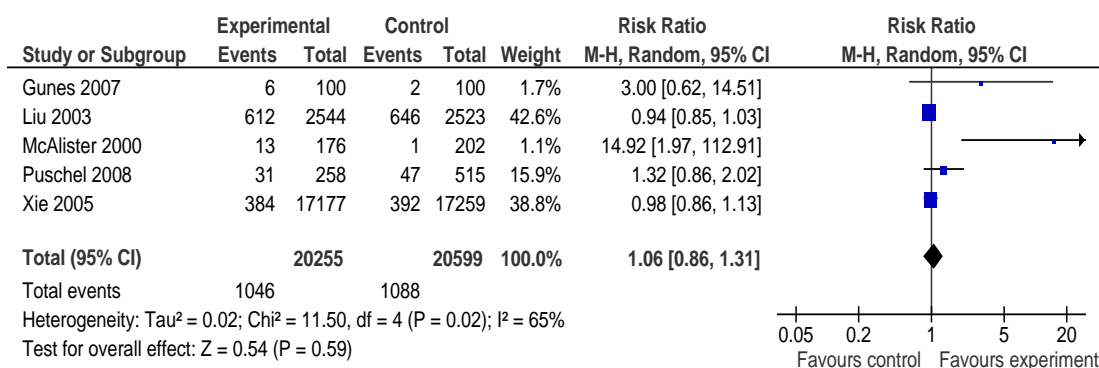
Four studies (N=836) reported this outcome after 3-6 months follow up.

Overall we are uncertain of the effect of health education and support for smoking cessation. However these studies were heterogeneous and the quality of evidence was low because of high drop- out rate (Jackson 2004), non verification of smoking status (Bovet 2002, Jiang 2007), overall few events resulting in wide confidence interval and large unexplained heterogeneity.



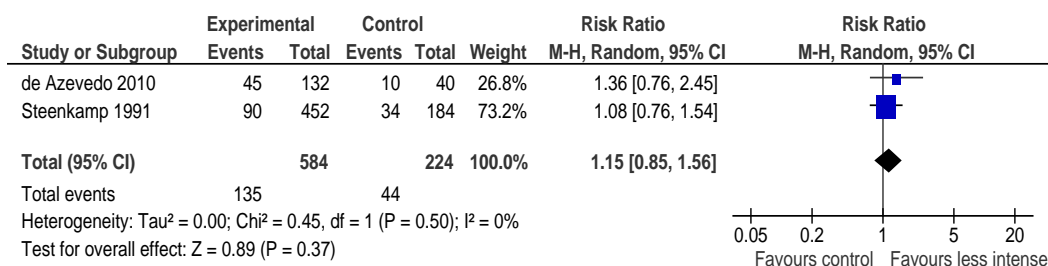
Non RCTS

Five studies reported this outcome (N=40854). These had varying lengths of follow up from months (3 months in Puschel 2008, 6 months Gunes 2007), to years (1 year McAlister 2000, 3 years Lui 2003, 8 years Xie 2005). Overall, we are uncertain of the effect of health education on smoking cessation. However the evidence was of low quality (non random allocation, no verification of smoking status, high drop-out rate in McAlister 2000), and there was residual heterogeneity.

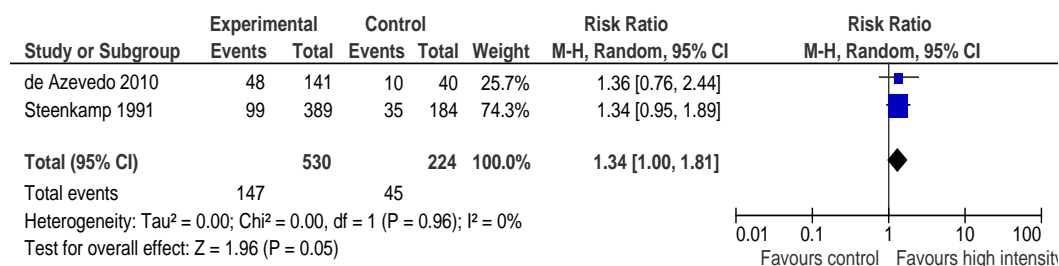


In addition, two non RCTs (N=808) compared a low intensity to a high intensity intervention and control group and reported abstinence rates. In de Azevedo 2010, less intense intervention was 15 min individual counseling compared to 30 min individual counseling using motivational interviews. In Steenkamp 1991, the less intense intervention was small media only while the high intensity intervention was small media plus interpersonal intervention to smokers. We were likewise uncertain of the effect of the less intense and high intensity intervention on smoking cessation. This evidence was graded low quality.

Less intense intervention compared to control:



High intensity intervention compared to control:



Smoking rates

RCT

One study (N=225) reported smoking rates. Zheng 2007 showed a reduction in smoking rates in both intervention and control groups and this was statistically significant (MD 9.80 SD 7.45 – 12.15). The quality of evidence was moderate.

Non RCT-

Five studies reported smoking rates (Moy 2006, Fang 1999, Liu 2003, Xie 2005, Puschel 2008; N=80227). The reporting of this outcome varied and in some studies focused on differences between smoking rates among women and men. We re-analysed Liu 2003 and Xie 2005 studies to obtain changes in smoking rates in the overall study population and not gender differences in smoking rates. We found a 4.3% relative decrease in smoking rates in the intervention group compared to 2.8% in the control group for the Xie 2005 study. In Lui 2003, we found a 10.76% relative decrease in smoking rates compared to 2.4% relative increase in smoking rates in the control group. For both these studies, we were not able to calculate the degree of uncertainty from the data available. Moy 2006 indicated reduction in the mean number of cigarettes smoked between baseline and final follow up of the intervention but not the control group and it is not clear if this was significant. Fang 1999 reported a constant prevalence in smoking rates in both groups. Puschel 2008 indicated a decrease in smoking rates in the intervention arm of the trial (Mean difference -0.5 cigarettes per day). In one of the control groups, there was an increase in smoking rates (Mean difference 0.7) and a decrease in another (Mean difference -0.4). The differences between baseline and final assessment for number of cigarettes smoked per day across all clinics were non significant but it was not clear if the difference between the intervention and control clinics was significant.

Two non RCTs that compared high and low intensity interventions with control also reported smoking rates (N=754). Steenkamp 1991 reported net decreases in overall smoking rates in the high and low intensity groups but these were largely not significant (no numeric data for the total population in each group). De Azevedo 2010 indicated a statistically significant lower median number of cigarettes smoked when the high (median =2) and the low intensity groups (median=5) were each compared to the control group (median=10, p=0.001).

Self efficacy

One RCT (Zheng 2007; N=225) reported changes in self efficacy between the intervention and control group. Self efficacy was measured on a 7 point scale and scored from 'not at all sure I am able to' (-3) to 'very sure I am able to' (+3). There were statistically significant differences in emotional (+5.75 sd 11.40 versus -0.27 sd 10.04), social (+5.69 sd 10.25 vs. 1.92 sd 9.03) and skill scores (+6.29 sd 15.48 vs. 1.53 sd 16.17) when intervention was compared to control group. There were small non significant differences in relapse (+3.52 sd 11.46 vs. 3.20 sd 11.30) and attempt scores (+2.19 sd 6.74 vs. 1.43 sd 8.19) between the two groups.

Stage of Change

RCT

One RCT (Zheng 2007; N=225) reported more participants in the intervention group moving to the action and maintenance stage than in the control group, but it was not clear if this difference was significant or not.

Non RCTs

Two studies reported this outcome (Puschel 2008 and Gunes 2007; N=973). In Puschel 2008 there were non significant differences in the proportion of individuals in the pre contemplative, contemplative and preparation stages of change between baseline and the final survey across the clinics.

Gunes 2007 reported a 12% increase in the proportion of workers who were preparing to quit smoking in the intervention group but a 3% decrease in those preparing to quit smoking in the control group. This difference was statistically significant.

Intention to quit

One study with a high risk of bias (Kar 2008) reported this outcome and indicated that after 5 months of follow up, a higher proportion in the intervention area compared to the control area expressed their intention to quit using tobacco. This was the only outcome related to smoking that was reported, no numeric data were presented.

Knowledge and attitudes

One study (Puschel 2008) reported outcomes on knowledge and attitudes. There were significant differences in 2 of the 4 knowledge variables about smoking between the intervention and control groups. There was a significant difference in attitudes between the intervention and control sites for one variable (warnings should be clearer). There was a positive change in attitude about restricting access to cigarettes between baseline and final assessment across all clinics.

ii) One intervention compared to another

Abstinence rates

RCTS:

Two studies compared one intervention to another (Ng 2010, Asfar 2008). In Ng 2010 one group received doctors advice including visual representation of how tobacco affects diabetes as well as passive information about the cessation clinic, and the other group received doctors advice plus active referral to a cessation clinic. In Asfar 2008 brief and intensive cessation interventions were compared. We did not combine these studies in a meta-analysis as the interventions were very different and in Ng 2010 included establishing a special clinic for smoking cessation.

We were uncertain of the effect of the brief intervention compared to the intensive intervention in Asfar 2008 for helping smokers to stop smoking (RR 0.25 95% CI 0.03- 2.28). Likewise there was uncertainty round the estimate of effect of the doctor's advice and active referral to the cessation clinic compared to doctors advice and passive referral to the clinic in Ng 2010 study (RR 1.22 95% CI 0.63 – 2.36). The evidence from both studies was graded low quality.

Non RCTs

Steenkamp 1991 and de Azevedo 2010 compared high intensity and low intensity interventions. Smoking cessation rates in the high and low intensity groups were broadly similar in the de Azevedo 2010 study. Steenkamp 1991 indicated the high intensity had higher rates of smoking cessation than the low intensity intervention, but it was not clear if this difference was statistically significant.

Smoking rates**RCT**

Ng 2010 showed a small non significant difference in quit attempts or reduction in smoking rates when the doctor advice with passive referral to cessation clinic was compared to the doctor advice and active referral to the clinic. The quality of evidence was low.

Non RCTs

The number of cigarettes smoked was significantly reduced in the high compared to the low intensity groups in the de Azevedo 2010 study. Steenkamp 1991 indicated the net decrease in smoking rates in the high intensity more favourable in the higher than the low intensity intervention, but it was not clear if this difference was statistically significant.

Summary of Findings (See appendix 9 for summary tables):

We are uncertain of the effect of health education at the primary care or community level on smoking cessation (low quality evidence). Health education probably decreases overall smoking rates (moderate quality evidence), helps increase self efficacy, and may improve knowledge and attitudes (low quality evidence).

We are uncertain if high intensity health education is more effective than low intensity education for smoking cessation and if it leads to a larger decrease in smoking rates than low intensity education (low quality evidence).

We are not certain of the effect of doctor's advice and active referral to a cessation clinic compared to doctor's advice and passive referral on smoking cessation (low quality evidence).

No adverse effects were reported in any of the included studies in this category.

Interventions targeting schools

Population

Eleven randomized controlled trials and seven quasi randomized trials were included. Of the eleven RCTs, ten were cluster randomized trials (Lotrean 2010, Wen 2010, Renisow 2008, Chou 2006, Stigler 2007, Arora 2008, Seal 2006, Reddy 2002, Chen 2001, Prokhorov 1994) and one was an individual randomized trial (Ekerbicer 2007). Chou 2006 and Chen 2001 are publications from one study done in the same population, and Stigler 2007, Reddy 2002 and Arora 2008 are also from the same population. We therefore will only refer to the publications (Chou 2006 and Stigler 2007) that reported the outcomes relevant to this review.

The RCTs were conducted in China (Chou 2006, Wen 2010), India (Stigler 2007), Thailand (Seal 2006), Russia (Prokhorov 1994), Romania (Lotrean 2010), Turkey (Ekerbicer 2007), and S Africa (Renisow 2008). The seven quasi randomized trials were conducted in China (Zhang 1993), Iran (Allahverdipour H 2009), Russia (Alexandrov 1992), Taiwan (Lee 2007), Tunisia (Harrabi 2010, Emam Hadi 2008) and Zimbabwe (Munodawafa 1995).

The studies were generally conducted among children of school age, between 9 and 18 years (see appendix 11). Four studies included components that targeted parents that smoked (Ekerbicer 2007, Zhang 1993, Prokhorov 1994) and Alexandrov 1992 included parents in counseling sessions in preventing and managing precursors of atherosclerosis and coronary heart disease. Wen 2010 included community activities as part of the school interventions.

Intervention

In general, the objective of the included studies was to prevent the use of tobacco (and substance abuse) by school going children. However, the included studies were diverse in the content and delivery of the interventions (see appendix 11). Some studies e.g. Harrabi 2010 and Alexandrov 1992 were intended to prevent risk factors for chronic diseases such as coronary heart disease and targeted smoking as one such risk factor. Wen 2010 included a no school smoking policy and worked with groceries in the neighbourhood not to sell cigarettes among other activities in school. Apart from a life skills training program, Resnicow 2008 included a harm minimiza-

tion intervention where youth were encouraged to minimize their levels of use of tobacco and other drugs. Emam Hadi 2008 provided social skills training to one group, increased knowledge using a 6 session curriculum in another group and one group had posters related to the same subject in their school. Ekerbicer 2007 targeted a slightly younger age group (9-11 years) and assessed environmental tobacco exposure from smoking parents. The Lee 2007 study included a smoking ban as one component of the intervention that also involved a smoking prevention curriculum. Zhang 1993 provided information about tobacco and the harmful effects of smoking but also restricted smoking in school and asked students to monitor and report on their fathers' smoking behaviour. Apart from a school based program, Prokhorov 1994 included discussions during parents' days, films and professional counseling for parents. Most interventions were delivered by teachers, while others included components of peer led activism (Lotrean 2010, Stigler 2007), education by health care providers (Prokhorov 1994) and Munodawafa 1995 used student nurses. Interventions were delivered in various ways, including lectures, discussions, role-play, drama, competitions, posters, and video shows.

Eight studies did not mention the theoretical base of the intervention but included components of information sharing (Prokhorov 1994), refusal skills (Seal 2006, Lee 2007), and cognitive behavior skills (Allahverdipour 2009) and social influence (Munodawafa 1995). Harrabi 2010, Ekerbicer 2007 and Alexandrov 1992 did not mention any theoretical base in their studies. The other studies were based on various theories, some including more than one theoretical base. Chou 2006 was based on the social normative approach, Stigler 2007 on social cognitive theory and Zhang 1993 on stages of change theory. Wen 2010 used the social-ecological framework and PRECEDE-PROCEED model that included the target audience (school children) and other environmental factors. Emam Hadi 2008 was based on social skills training, social cognitive theory and social influence competence. Reniscow 2008 was based on life skills training and harm minimization model. Lotrean 2010 was based on the social cognitive theory, integrated model of change, and principles of social influence.

Comparison

Most studies included schools as control groups that received only the routine curriculum or health education that may include information on tobacco control (Lotrean 2010, Reniscow 2008, Chou 2006, Seal 2006, Prokhov 1994) or no intervention at all (Alexandrov 1992, Zhang 1993, Lee 2007, Emam Hadi 2008, Harrabi 2010). The control group in Wen 2010 had the regular health education curriculum but also participated in the international no tobacco day activities. In Stigler 2007, the control group received the intervention after the end of the study. In the Ekerbicer 2007 study, control students also had a urine test done and information passed on to the parents in a brief note with a sentence: "Your child's exposure to tobacco smoke was

detected by a urine test". In one study (Allahverdipour H 2009), it was not clear what the control group received, if anything.

Results

No meta-analysis was done as the studies varied greatly in the reporting of outcomes. For example on smoking behavior, some studies reported change in smoking rates in general, while a few reported change to smoking among never smokers, while others reported rates of regular smoking.

i) Intervention compared to control

Primary prevention of smoking

Three RCTs (N=7888) reported on primary prevention of smoking among baseline never smokers or experimentation with smoking. The evidence from these studies was of low quality. Chou 2006 showed uncertainty of the effect of the program on primary prevention of smoking among baseline never smokers when compared to controls after 1 year of follow up (OR 1.08, 95% CI 0.71 -1.64). Wen 2010 reported a non significant impact on the probability of non-smokers starting to smoke when intervention group was compared to the control group at 1 year (adjusted OR 0.86 95% CI 0.54 – 1.38, P=0.54). Prokhorov 1994 showed a statistically significant decrease in the number of students experimenting with cigarettes after 4 years of the intervention but not after 7 years when the students receiving the intervention were compared to control groups. No numeric data were provided.

Secondary prevention

Three RCTs (N=5868) reported on secondary prevention of recent smoking among ever smokers (Chou 2006), or experimental/non smokers becoming regular smokers (Wen 2010, Lotrean 2010). The evidence from these studies was of moderate quality. Chou 2006 reported a non significant difference between program and control groups even after adjusting for overall school prevalence rates of smoking (OR 0.70, 95% CI 0.38– 1.30). Wen 2010 reported a statistically significant reduced probability of experimental smokers becoming regular smokers after 1 year follow up (adjusted OR 0.34, 95% CI 0.12–0.97, p=0.04). Lotrean 2010 reported a significant difference in the odds of a non smoker becoming a regular smoker with more in the control group taking up smoking compared to the intervention group (OR 2.23, 95% CI 1.29–3.85, p<0.01).

Smoking Rates

RCTs

Three studies (N= 11630) compared intervention to control and reported rates of smoking as an outcome. Stigler 2007 reported any use of tobacco; Seal 2006 reported both tobacco and other drug use, and Prokhorov 1994 reported age specific current use of tobacco. Seal 2006 reported a small and non-significant decrease on students' use of tobacco and drugs at post test among those receiving the interven-

tion compared to the control. Likewise Stigler 2007 reported small non significant differences in actual tobacco use though both groups had a decline in rates of tobacco use over 1 year. Prokhorov 1994 reported that 'age specific increase in smoking in the intervention district was lowered in boys by the third ($p > 0,001$) and the fourth year in girls ($p < 0,05$) as compared to the control district, and this difference remained significant until the end of the study'. No numeric data were provided.

One study (Reniscow 2008, N= 5266) compared harm minimisation and life skills to a control group. Reniscow 2008 showed a non significant increase in the 30-day smoking rates over 2 years when the groups receiving harm minimization or life skills training (17% at baseline, 20% at year 2 follow up for each of the two groups) were compared to the control group (18% at baseline, 24% at 2 year follow up). The net change in smoking rates after 2 years of follow up was 3% in schools receiving harm minimization and life skills training, and 6% in the control group. There was no significance in treatment by time interaction.

Non RCTs

5 studies reported smoking rates as an outcome. Three of these studies compared intervention to control group and reported smoking rates (N=4896). In particular, Allahverdipour 2009 reported that one year after the intervention that targeted substance abuse in general, there was a decrease in smoking rates from baseline compared to the control group (-16% vs. -3% respectively, $p < 0.001$). Harrabi 2008 reported smoking rates decreased in the two groups but the change was not statistically different (-1.5% in the intervention vs. -1.8% in the control group, $p = 0.62$). The Alexandrov 1992 reported that over 2 years smoking rates increased by 10.7% in the intervention group and increased by 22.7% over the last year in the control group ($p < 0.01$). Overall this study achieved approximately 10% reduction in smoking rates.

Two studies compared one intervention to another and a control group (N=3380). Lee 2007 found small non significant decreases in smoking behavior when each group was compared to the control (9.8% decrease in smoking rates in the schools receiving the school-wide smoking ban plus classroom smoking prevention curriculum and 8.1% decrease in the school-wide smoking ban only compared to 7.8% decrease in the control group).

The Emam Hadi 2008 study found statistically significant reduction in smoking rates between the control group and each of the 3 groups namely: poster group (mean difference -1.38 (SD 0.19) $p = 0.000$), knowledge (mean difference -2.18 (SD 0.21) $p = 0.000$) and life skills groups (mean difference -3.40 (SD 0.19) $p = 0.000$). The range and scale of the group scores were not clear.

Life skills

Three RCTs (N =9527) reported various outcomes related to life skills. Lotrean 2010 reported that at post test, students in the intervention group had higher levels of social self efficacy compared to the control group (Mean z score adjusted for baseline score 0.07 vs. -0.07, $p < 0.05$). There were non significant differences in emotional (Mean z score 0.06 vs. -0.05) and situational self-efficacies (Mean z score 0.05 vs. -0.05).

Seal 2006 showed statistically significant mean differences between intervention and control groups for life skills in terms of refusal skills (MD 4.7 SD 0.4, $p = 0.00$), decision-making (MD 4.8 SD 0.5, $p = 0.00$) and problem solving (no results presented). There was an improvement in mean scores over time in both groups. Stigler 2007 reported small non significant improvements in refusal skill (MD 0.11, $p = 0.66$), and normative expectations (Mean difference 0.73, $p = 0.25$). There was a small but statistically significant improvement in advocacy skill self-efficacy (Mean difference 1.32, $p = 0.03$).

Non RCTs

Lee 2007 reported outcomes related to life skills. This study reported a statistically significant difference in cigarette refusal techniques for the two groups compared to the control ($F = 4.91$, $p < 0.01$). The schools receiving the school-wide smoking ban plus classroom smoking prevention curriculum had a larger effect (adjusted mean 3.34) than the school-wide smoking ban only (adjusted mean 3.18) and the control group (adjusted mean 3.16).

Knowledge, attitudes and beliefs

3 RCTs (N= 10882) reported outcomes related to knowledge and attitudes. There was moderate quality evidence reflecting significant positive increase in knowledge. Two of the three studies reported a change in attitudes that were statistically significant. Only one study reported statistically significant positive changes in beliefs.

In particular, Stigler 2007 reported significant differences between the students in the intervention condition compared to the control condition for the following: knowledge about health effects of tobacco, belief in negative social consequences of tobacco use, reasons to use tobacco, social susceptibility to chewing and smoking tobacco. More students in the intervention group compared to the control group perceived fewer peers and adults around them smoked or chewed tobacco, felt that tobacco use was not socially acceptable especially among peers, were more confident to advocate for tobacco control, were more knowledgeable about policies to control tobacco and supported these policies too.

Seal 2006 showed a positive and significant impact of the life skills program on knowledge of health consequences, attitudes to tobacco and drug use prevention when compared to control.

Wen 2010 reported a greater increase in mean knowledge scores from baseline to 1 year follow up in the intervention groups compared to the control groups (Mean Difference 0.97 $p < 0.001$ in year 1 for Grade 7 class, and Mean difference 1.16 $p < 0.001$

for Grade 8 class). The changes in mean attitude scores were not significant after 1 year in both groups (mean difference -0.11, $p=0.878$ for Grade 7 class, and mean difference 0.99, $p=0.132$ for Grade 8 class).

Non RCTs

Four non randomized studies reported this outcome. Two of these (Harrabi and Munodawafa 1995) compared one intervention to a control group. The evidence from these studies was of low quality but showed a statistically significant increase in knowledge and positive change in attitudes.

In particular, Harrabi 2010 study reported a significant improvement in knowledge for two questions on the harm caused by tobacco when the intervention was compared to the control group. Munodawafa 1995 reported a statistically significant difference at post-test on knowledge of tobacco use for three of the four questions when the intervention and control groups were compared. However it was not clear if the improvement between the pre and post-test scores in each arm was statistically significant.

Two studies compared two or more groups with a control group (Lee 2007, Emam Hadi 2008). Emam Hadi 2008 reported a significant difference in knowledge about hazards of smoking and attitudes towards smoking between the study groups and control. Social skills training showed a larger increase in knowledge followed by the knowledge and finally the poster groups. Lee 2007 reported a significant difference in knowledge about the harm caused by tobacco between the three groups. The schools receiving the school-wide smoking ban plus classroom smoking prevention curriculum had a larger effect than the school-wide smoking ban only and the control group. There was a statistically significant difference in anti smoking attitude when the school-wide smoking ban plus classroom smoking prevention curriculum was compared with the control group. In each of these the effect was superior in the group receiving both the ban and school based curriculum compared to the control except for no smoking intention. The effect of the school-wide ban plus curriculum was more superior to the school-wide ban only for knowledge, no smoking intention and refusal techniques.

Others

Two studies with unclear risk of bias were not included in this analysis. Ekerbicer 2007 reported outcomes related to environmental exposure in the home. In this study when children with environmental tobacco exposure and receiving the intervention were compared to children also exposed to tobacco smoke but not receiving intervention (control group), there was no difference in the percentage of children whose urinary cotinine values were equal to 10ng/ml or less (79.5% versus 74.2%, $p>0,05$).

Zhang 1993 study was implemented in schools, but only data on the fathers' smoking status was reported. No data on the outcomes among the school children were

included, and we were not able to find any additional publication on this study. In this study, there was an 8.1% decrease in smoking rates among fathers receiving the intervention and 11.7% had quit smoking 6 months after the intervention. It is not clear if these findings were statistically significant.

Summary of Findings (See appendix 12 for summary tables):

School based interventions probably prevent progression to regular smoking among experimenters or non smokers (moderate quality evidence). School- based interventions may reduce overall smoking rates and may improve life skills such as social efficacy, refusal skills, and decision making (low quality evidence). School based interventions probably improve knowledge, attitudes and beliefs about the effects of tobacco smoking (moderate quality evidence). We are uncertain if school-based interventions prevent experimentation with cigarettes (low quality evidence). No adverse effects were reported in any of the studies included in this category.

Warnings against smoking

Population:

One individual randomized controlled study (Fathelrahman AI 2010) was conducted in Malaysia among male smokers. Participants were over 18 years of age and about half were smoking 11 to 20 cigarettes per day. The mean nicotine dependence score was 2.74 SD2.14 in the control and 3.46 SD2.47 in the intervention groups ($p=0.070$). Most had been smoking for over 10 years (50% in control group, 44.1% in intervention group). Most had a low (0-3) nicotine dependence score, measured on the Fagerstrom score ranging from 0-10.

Intervention

The participants evaluated cigarette pack labels and answered questions about smoking. The participants that were randomized to the intervention were provided with graphic mock up cigarette packs with the new warnings and the control group received the standard text based warning. Both groups were given packs at the same time and allowed 5 minutes to examine the packs before they were collected and participants asked to complete a questionnaire.

Comparators

The control group received cigarette packs with the standard text based warning.

Results

There was an improvement in knowledge scores of health risks from smoking when comparing the two groups (Mean difference 2.03, 95% CI 1.03 to 3.03, $p<0.001$). This study also showed greater increases in cognitive responses and interest in quitting smoking among the intervention group when compared to the control group.

In Summary

Only one small study conducted over a short time was included in this category. We are therefore not able to draw any conclusions about this type of intervention.

Discussion

This systematic review summarizes the evidence from randomised and non-randomised studies conducted in low- and middle-income countries on interventions for tobacco control. We included 45 randomised and non-randomised controlled trials that compared various tobacco control interventions to other interventions or no intervention. We attempted to categorise the included studies according to the WHO Framework for tobacco control (“MPOWER”). The included studies were mainly in the “O”-category (“Offering help for quitting smoking”). Within this broad group, we further categorised the interventions into 1) pharmacotherapy for smoking cessation, 2) interventions targeting pregnant women or their husbands, and 3) advice and support for smoking-cessation delivered in the community or through primary care services. We also included studies of school based interventions for tobacco control, as a fourth category and one study under the “W”- Warnings category.

In each of the four categories, the included studies varied greatly in terms of the purpose of the study, the content of the intervention, and the delivery mechanisms.

Our findings in relation to other systematic reviews

Pharmacotherapy for smoking cessation

Our findings on pharmacotherapy for smoking cessation conducted in LMIC are from few, small studies, but the results indicate that NRT or bupropion may help smokers quit and may decrease smoking rates. This is in line with the findings from systematic reviews that have included studies from both higher and lower-income countries (Mills EJ 2009, Stead LF 2008). Mills 2009 recorded a beneficial short term effect when NRT was compared to controls at 6 months after the quit date (96 trials, OR 1.92, 95% CI 1.73 to 2.14, $p < 0.0001$). A beneficial effect was also found when considering NRT as gum or cutaneous patch. Stead 2008 reported a beneficial effect of 50 – 70% from using any type of NRT compared to placebo or non-NRT control group in helping smokers to quit. Gourlay SG 2008 found a beneficial effect from using clonidine compared to placebo (n=6 studies, RR 1.63; 95% CI 1.22 to 2.18), but highlighted the high incidence of side effects such as sedation.

We found one small study with head to head comparisons of different pharmacotherapy and two other studies that combined NRT with psychological therapies com-

pared to psychotherapy or waiting control. We were uncertain of the effect of these interventions on smoking cessation as these were small studies with very few events. We are therefore not able to make conclusions about these interventions in low and middle income settings.

Overall, we found and included few small studies that focused on pharmacotherapy for smoking cessation in LMIC. Some other systematic reviews on pharmacotherapy for smoking cessation (Mills 2009, Stead 2008) likewise have included few studies conducted in LMICs. Pharmacotherapy is generally not available in many LMIC settings in spite of the available global evidence of its benefit in helping smokers to stop smoking. Pharmacotherapy for tobacco control may not be considered a priority in some LMIC settings given the limited resources for competing priorities. However, in these settings, it is important to consider which type of pharmacotherapy is most cost effective and how best to deliver this intervention to those that need it.

Interventions targeting pregnant women

Our findings indicate that in the short term, health education that targets smoking pregnant women may have a beneficial effect in helping them to stop smoking. Health education may result in more quit attempts and reduction in the amount of smoking. The health education provided in the three included studies varied in intensity from 2-3 minutes of counseling during prenatal visits, to four to six home visits for health education. It is however not clear how long after pregnancy these effects last. A Cochrane review that evaluated interventions to promote smoking cessation in pregnancy reported a significant beneficial effect (RR 0.94, 95%CI 0.92 – 0.96, Lumley J 2009). This review included several different interventions such as cognitive behavioural therapy, interventions based on stages of change, feedback of fetal health status or measurement of by-products of tobacco smoking to the mother, provision of rewards or incentives, or pharmacotherapy. The Cochrane-review included 2 studies from LMIC, and 70 from high-income countries. We did not find reason to expect differences in findings from high-income and low- and middle-income countries. However, we found very few studies that were conducted in low- and middle-income country settings. The interventions were the 5As approach (1 study), general health education around risk factors for poor pregnancy outcomes (1 study), and general health education round dangers of smoking targeting husbands of non smoking women. We were not certain of the effect of the intervention that uses pregnant women to help their husbands stop smoking. Only one study with few events was included and we are therefore not able to make conclusions about this intervention on smoking cessation. There was however some indication that this intervention may reduce smoking rates and increase quit attempts.

Advice and support for smoking-cessation delivered in the community or through primary care services

Our findings reflect uncertainty over the effect of health education delivered at the primary or community level for smoking cessation. This finding is surprising given the number of included studies (4 RCTs and 5 non RCTs) some of which were very large studies at the community level. On the other hand these findings require cautious interpretation as they were heterogeneous and reported few events (number of participants who quit smoking) compared to the overall number of participants in the study. We are also uncertain if high intensity education is more effective than low intensity interventions delivered at the community level. Only two studies included this comparison.

One systematic review reported a beneficial effect when physicians, or physicians supported by another health worker, provided brief and simple advice about quitting smoking (17 trials, RR 1.66, 95% CI 1.42 to 1.94) (Stead LF 2008). There was an additional benefit from intensive interventions compared to no advice interventions (11 trials RR 1.84, 95% CI 1.60 to 2.13). There was a small but significant advantage of intensive interventions over minimal intervention (11 trials, RR 1.37 95% CI 1.20 – 1.56). This review included controlled trials with at least 6 months of follow up (in the majority of the trials the outcomes assessment was done after a year or more). None of the 41 trials included were conducted in LMIC. The studies in our review differ in that we did not restrict studies to physicians but included nurses or health educators providing interventions in the clinic, community or home. We did not assess the intensity of interventions unless it was clearly stated by the author as the purpose of the study.

Our findings however, indicated health education may reduce smoking rates and improve self efficacy, knowledge and attitudes. These findings may be seen to support the notion that health education needs to be carefully orchestrated and directed at different levels in a relevant conceptual model (Fong 2006). In this perspective, health education is vital – not only because it may influence some psychosocial mediators of behavior change, but more so because it can pave the way for other targeted measures that focus on individual needs for sustained support for smoking cessation.

Interventions targeting schools

Our findings indicate that school based interventions probably prevent progression to regular smoking among experimenters or non smokers and may reduce overall smoking rates among those already smoking. School based interventions may improve knowledge, promote attitude changes, and improve life skills such as refusal skills. However we are uncertain that these interventions reduce experimentation with cigarettes.

The included studies were conducted mostly among high school students, a period when experimentation with tobacco is likely to occur. We did not assess if interventions that targeted younger students had a better outcome than those targeting older students who may have already experimented with cigarettes or become regular smokers. In addition, the studies were very heterogeneous in the mechanisms and intensity with which the interventions was delivered as well as the theoretical base on which the interventions were developed.

Several reviews on school based interventions to prevent tobacco use have been done. In an overview of reviews by Flay BR (Flay BR 2009, 13 reviews including studies mostly from high income countries) that focused on school-based smoking prevention programs, it was suggested that these programs can have significant short and long term effects if they include interactive social influences or social skills programs and involve up to 15 or more sessions going up to high school, delivered by peer leaders. Larger effects may be obtained by combining school based programs with community programs. These findings are somewhat more optimistic than the results from studies conducted in LMIC that we have identified, but may be explained by differences in types and intensity of the interventions.

Strengths and Limitations of this review

The strength of this report is the systematic review-process we employed. Two independent researchers using a set of pre-specified criteria carried out the inclusion and exclusion of the eligible studies. We included randomised and non-randomised controlled trials and assessed the quality of included studies and overall quality of the evidence in making our judgments.

The studies we included varied widely in their definition of abstinence. Most studies did not define an exact quit date or clarify the period of abstinence. Only one study clearly reported the continuous abstinence for 6 months and 1 year (Zheng 2007) and two others reported continuous abstinence at 3 months (Asfar 2008), and 1 month (Loke 2005). The other studies reported on point prevalence abstinence in the last week. In addition, the follow up period was shorter than 6 months for some studies e.g. those in the category on interventions for pregnant women or their smoking husbands. Many trials did not objectively verify the smoking status among those reporting abstinence.

We attempted to explore the context in which these studies were conducted to enable us gain further understanding into the results achieved by the various interventions. Most publications provided data on participants' baseline characteristics such as smoking rates, but insufficient data on the policy environment or other ongoing

interventions in the community at the time of the study. This limits our ability to further explore the interaction of various interventions in achieving tobacco control.

Our choice to limit the review to randomised and non-randomised studies can be criticized. Widely promoted tobacco control strategies such as taxation and bans on advertising have rarely been subjected to such evaluation methods, and one can reasonably argue that it makes little sense to demand a kind of methodological rigor that is not feasible in practice. On the other hand, the use of less stringent methods will necessarily reduce the reliability of the findings. For example, studies showing that cigarette prices and sales are inversely correlated constitute the main bulk of the evidence-base for the use of taxation to lower consumption of tobacco products. However, simply showing that the two variables (prices and sales) tend to go in opposite directions does not necessarily prove that the increase in price is the cause of lowered sales (Shadish, Cook and Campbell 2002). There are other possible explanations. For example, it could be the other way around i.e. that decreased sales are a trigger for price-increases (“reverse causality”), or it could be that a third factor is in play that is the cause of both the price-increase and the decrease of sales, e.g. a general trend in society against tobacco-use (“confounding”). Still, in many circumstances non-experimental research may generate convincing findings also about the relationship between a cause and an effect. Factors to consider when assessing claims of causality from non-experimental study findings include 1) Is there a strong association between the variables (e.g. price and sales)? 2) Do the findings consistently point in the same direction? 3) Does the assumed cause precede the effect, in time? 4) Is a dose-response relationship observed? 5) Does the idea of a causal relationship make sense? (Hill 1965). For taxation of tobacco products and bans on advertisements, most of these criteria seem to be fulfilled.

The reason we failed to identify experimental or quasi-experimental studies for several widely promoted tobacco control strategies, is most likely that such studies have not been conducted. This is no surprise as the same has been found in reviews where the authors also included research from high-income countries (e.g. bans on advertisements, Callinan 2002). Still, we cannot rule out the possibility of having missed some key evaluations. Possible reasons for that could be that we conducted only a limited search of the grey literature, and we did not include economics-research databases in our search for literature.

Conclusion

In low- and middle income countries

- Nicotine replacement therapy (NRT) or bupropion may help smokers to stop smoking and probably reduces smoking rates. NRT may help more smokers to stop smoking than naltrexone. We are uncertain if NRT helps more smokers to stop smoking than clonidine. We are uncertain that NRT when

combined with psychological techniques may help smokers stop smoking. We are uncertain if NRT combined with psychological techniques help more smokers to stop smoking than psychological techniques alone.

- Health education that targets smoking pregnant women probably helps pregnant women to stop smoking in the short term, and may result in one or more quit attempts or a reduction in the amount of smoking. We are uncertain if health education that targets smoking husbands of pregnant women helps the husbands to stop smoking. It however, may result in one or more quit attempts or a reduction in the amount of smoking.
- We are uncertain of the effect of health education at the primary care or community level on smoking cessation. Health education may decrease overall smoking rates, and may help increase self efficacy, and improve knowledge and attitudes. We are uncertain if high intensity health education is more effective than low intensity education for smoking cessation. High intensity education may however lead to a larger decrease in smoking rates than low intensity education. We are not certain of the effect of doctor's advice and active referral to a cessation clinic compared to doctor's advice and passive referral on smoking cessation.
- School based interventions probably prevent progression to regular smoking among experimenters or non smokers. School- based interventions may reduce overall smoking rates and may improve life skills such as social efficacy, refusal skills, and decision making. School based interventions probably improve knowledge, attitudes and beliefs about the effects of tobacco smoking. We are uncertain if school-based interventions prevent experimentation with cigarettes.

Need for further research

This review included 45 studies conducted in low- and middle-income countries. Most of the included studies were conducted in Asia (n=27), and a few in Europe (n=5), Latin America (n=5) and Africa (n=8). Within each category, the evidence base is however not very strong as most of these were small studies that addressed different questions and were implemented over short periods. Although we found no reason to believe there are differences in effects of interventions conducted in high income countries compared to low and middle-income settings, there is a need for more rigorous studies conducted in LMICs, with a particular focus on delivery strategies of interventions that have been successful in high income settings.

Some interventions such as those targeting the supply of tobacco, enforcing bans on tobacco advertising or raising taxes require further evaluation, especially in low- and middle income country settings where the legislation and enforcement of tobacco control varies widely. For control strategies that may be difficult to evaluate using

experimental methods, e.g. taxation and bans on smoking in public places, quasi-experimental study designs such as 1) non-randomised comparative studies and 2) interrupted time-series analyses should be considered. Researchers in the International Tobacco Control Policy Evaluation Project have suggested that “Combining these two strategies in a single study...” offers a higher degree of internal validity than either feature alone” (Fong 2006). We subscribe to that view.

Researchers need to better describe the context such as the policy environment within which these studies are done (Fong 2006). In addition, the assessment of outcomes such as knowledge and attitude, requires the use of validated instruments that will facilitate comparison across different settings. This information will enable those assessing or seeking to replicate similar programs to have a better understanding of the necessary conditions for success.

Implications for practice

The ultimate goal of all the interventions discussed here is to prevent the uptake of tobacco and control its use. Behaviour change is a complex process that involves several stages from having no desire to change, to active planning and implementation of plans for smoking cessation (Ward 2001). The processes involved in any one intervention are influenced by several factors such as the local culture, available social support, policy environment and other interventions. Health education provided alone or together with other interventions as part of a comprehensive public health policy can be directed towards different stages in a behavior change process. The complexity involved strongly encourages use of relevant theory and models that can guide the intervention planning.

Evidence from interventions that have been shown to be effective in high income countries may be applicable in low and middle income countries. LMIC-policymakers can base their tobacco control strategies on the global evidence-base, by adapting interventions that have been proven effective elsewhere. This adaptation must however rest on a careful analysis of contextual factors that must be in place in order to achieve a similar result. As tobacco control interventions are scaled up in LMIC, rigorous evaluation should be incorporated as a key component of the programs.

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Appendix

1. Glossary

LMIC	Low- and middle-income countries
RITC	Research for International Tobacco control
IDRC	International Development Research Centre
NRT	Nicotine replacement therapy
SE	Self efficacy helps smokers gain insight into their readiness to attempt to stop smoking
SoC	Stages of change outlines to smokers the notion of stages of change so they can evaluate their own progress and gain perspective on what they need to work towards
CCC	Cognitive counter conditioning is intended to reduce the pleasure in smoking as the participants focus on the negative aspects of smoking
ETS	Environmental tobacco smoke
WHO	World Health Organisation
CHD	Chronic heart disease
CVD	Cerebral vascular disease
COPD	Chronic obstructive pulmonary disease
5A model	5 step process that includes asking the patient about tobacco use, advising smokers to quit, assessing smokers willingness to make a quit attempt, assisting smokers with treatment and referrals and arranging follow-up contacts
EPOC	Effective Organisation and Care group, Cochrane Collaboration

2. Search Strategies

Tobacco and LMIC – Strategies 2009

	Tobacco CENTRAL (Tobacco group register submitted to Central)
	<p>#1 MeSH descriptor Developing Countries, this term only</p> <p>#2 MeSH descriptor Medically Underserved Area, this term only</p> <p>#3 MeSH descriptor Africa explode all trees</p> <p>#4 MeSH descriptor Asia explode all trees</p> <p>#5 MeSH descriptor South America explode all trees</p> <p>#6 MeSH descriptor Central America explode all trees</p> <p>#7 MeSH descriptor Latin America, this term only</p> <p>#8 ("American Samoa" or Argentina or Belize or Botswana or Brazil or Bulgaria or Chile or Comoros or "Costa Rica" or Croatia or Dominica or "Equatorial Guinea" or Gabon or Grenada or Hungary or Kazakhstan or Latvia or Lebanon or Libya or Lithuania or Malaysia or Mauritius or Mexico or Micronesia or Montenegro or Oman or Palau or Panama or Poland or Romania or Russia or Seychelles or Slovakia or "South Africa" or "Saint Kitts and Nevis" or "Saint Lucia" or "Saint Vincent and the Grenadines" or Turkey or Uruguay or Venezuela or Yugoslavia or Guinea or Libia or libyan or Mayotte or "Northern Mariana Islands" or "Russian Federation" or Samoa or Serbia or "Slovak Republic" or "St Kitts and Nevis" or "St Lucia" or "St Vincent and the Grenadines"):ti,ab,kw</p> <p>#9 (Albania or Algeria or Angola or Armenia or Azerbaijan or Belarus or Bhutan or Bolivia or "Bosnia and Herzegovina" or Cameroon or China or Colombia or Congo or Cuba or Djibouti or "Dominican Republic" or</p>

	<p>Ecuador or Egypt or "El Salvador" or Fiji or "Georgia (Republic)" or Guam or Guatemala or Guyana or Honduras or "Indian Ocean Islands" or Indonesia or Iran or Iraq or Jamaica or Jordan or Lesotho or "Macedonia (Republic)" or "Marshall Islands" or Micronesia or "Middle East" or Moldova or Morocco or Namibia or Nicaragua or Paraguay or Peru or Philippines or Samoa or "Sri Lanka" or Suriname or Swaziland or Syria or Thailand or Tonga or Tunisia or Turkmenistan or Ukraine or Vanuatu or Bosnia or "Cape Verde" or Gaza or Georgia or Kiribati or Macedonia or Maldives or "Marshall Islands" or Palestine or "Syrian Arab Republic" or "West Bank"):ti,ab,kw</p> <p>#10 (Afghanistan or Bangladesh or Benin or "Burkina Faso" or Burundi or Cambodia or "Central African Republic" or Chad or Comoros or "Democratic Republic of the Congo" or "Cote d'Ivoire" or Eritrea or Ethiopia or Gambia or Ghana or Guinea or "Guinea-Bissau" or Haiti or India or Kenya or Korea or Kyrgyzstan or Laos or Liberia or Madagascar or Malawi or Mali or Mauritania or Melanesia or Mongolia or Mozambique or Myanmar or Nepal or Niger or Nigeria or Pakistan or "Papua New Guinea" or Rwanda or Senegal or "Sierra Leone" or Somalia or Sudan or Tajikistan or Tanzania or "East Timor" or Togo or Uganda or Uzbekistan or Vietnam or Yemen or Zambia or Zimbabwe or Burma or Congo or Kyrgyz or Lao or "North Korea" or "Salomon Islands" or "Sao Tome" or Timor or "Viet Nam"):ti,ab,kw</p> <p>#11 (developing or less* NEXT developed or "third world" or "under developed" or "middle income" or low* NEXT income or underserved or "under served" or deprived or poor*) NEXT (count* or nation? or state? or population?):ti,ab,kw</p> <p>#12 (Africa or Asia or "South America" or "Latin America" or "Central America" or lmic</p>
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	<p>or lmics):ti,ab,kw</p> <p>#13 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12)</p> <p>#14 (sr-tobacco)</p> <p>#15 (#13 AND #14)</p>
Tobacco group register – MED-LINE	Tobacco MEDLINE Ovid
<p>1. SMOKING CESSATION</p> <p>2. SMOKING-CESSATION/ OR TOBACCO-USE-DISORDER/</p> <p>3. TOBACCO/</p> <p>4. NICOTINE/</p> <p>5. TOBACCO,-SMOKELESS/</p> <p>6. SMOKING/ prevention-and-control , therapy</p> <p>7. (QUIT\$ or STOP\$ or CEAS\$ or GIV\$) adj SMOK\$</p> <p>8. TOBACCO-SMOKE-POLLUTION/</p> <p>9. #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8</p> <p>10. SMOKING/</p> <p>11. #10 not #9</p> <p>12. PT=RANDOMIZED-CONTROLLED-TRIAL</p> <p>14. 13. PT=CONTROLLED-CLINICAL-TRIAL</p> <p>15. RANDOMIZED-CONTROLLED-TRIALS</p> <p>16. RANDOM-ALLOCATION</p> <p>18. 17. DOUBLE-BLIND-METHOD</p> <p>19. SINGLE-BLIND-METHOD</p> <p>20. PT=CLINICAL-TRIAL</p> <p>21. explode CLINICAL-TRIALS/</p> <p>22. (CLIN\$ adj TRIAL\$).TI.</p> <p>23. (CLIN\$ adj TRIAL\$).AB.</p> <p>24. PLACEBOS</p> <p>25. PLACEBO\$.TI.</p> <p>26. PLACEBO\$.AB.</p> <p>27. RANDOM\$.TI.</p> <p>28. RANDOM\$.AB.</p> <p>29. RESEARCH-DESIGN</p> <p>30. (SINGL\$ or DOUBL\$ or TREBL\$ or TRIPL\$) adj (BLIND\$ or MASK\$)</p>	<p>1 smoking cessation.tw. (9806)</p> <p>2 Smoking Cessation/ or "Tobacco Use Disorder"/ (16861)</p> <p>3 Tobacco/ (18037)</p> <p>4 Nicotine/ (17369)</p> <p>5 Tobacco, Smokeless/ (2142)</p> <p>6 Smoking/ (92948)</p> <p>7 ((QUIT\$ or STOP\$ or CEAS\$ or GIV\$) adj SMOK\$).tw. (5670)</p> <p>8 Tobacco Smoke Pollution/ (7353)</p> <p>9 or/1-8 (131989)</p> <p>10 randomized controlled trial.pt. (273632)</p> <p>11 controlled clinical trial.pt. (79523)</p> <p>12 randomized.ab. (183258)</p> <p>13 placebo.ab. (112974)</p> <p>14 drug therapy.fs. (1321276)</p> <p>15 randomly.ab. (132970)</p> <p>16 trial.ab. (190233)</p> <p>17 groups.ab. (912754)</p> <p>18 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 (2413865)</p> <p>19 Animals/ (4406090)</p> <p>20 Humans/ (10795333)</p> <p>21 19 not (19 and 20) (3296848)</p> <p>22 18 not 21 (2046585)</p> <p>23 9 and 22 (22574)</p> <p>24 2009\$.ed. (347511)</p> <p>25 23 and 24 (821)</p> <p>26 randomized controlled trial.pt. (273632)</p> <p>27 random\$.tw. (447721)</p> <p>28 intervention\$.tw. (321374)</p> <p>29 control\$.tw. (1780161)</p> <p>30 evaluat\$.tw. (1431789)</p>

31. #28.TI,AB.	31 or/26-30 (3353907)
32. (VOLUNTEER\$ or PROSPECTIV\$).TI.	32 Animals/ (4406090)
33. (VOLUNTEER\$ or PROSPECTIV\$).AB.	33 Humans/ (10795333)
34. explode EVALUATION-STUDIES/	34 32 not (32 and 33) (3296848)
35. explode CROSS-SECTIONAL-STUDIES/	35 31 not 34 (2622397)
36. PROSPECTIVE-STUDIES	36 9 and 35 (40777)
37. RETROSPECTIVE-STUDIES	37 2009\$.ed. (347511)
38. FOLLOW-UP-STUDIES	38 36 and 37 (1609)
39. explode HEALTH-EDUCATION/	39 25 or 38 (1905)
40. explode HEALTH-BEHAVIOR/	40 Developing Countries/ (51945)
41. explode COMMUNITY-HEALTH-SERVICES/	41 Medically Underserved Area/ (4237)
42. HEALTH-PROMOTION/	42 exp Africa/ or exp "Africa South of the Sahara"/ or exp Asia/ or exp South America/ or exp Latin America/ or exp Central America/ (550959)
43. explode BEHAVIOR-THERAPY/	43 (Africa or Asia or South America or Latin America or Central America).tw. (61939)
44. #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #29	44 (American Samoa or Argentina or Belize or Botswana or Brazil or Bulgaria or Chile or Comoros or Costa Rica or Croatia or Dominica or Equatorial Guinea or Gabon or Grenada or Hungary or Kazakhstan or Latvia or Lebanon or Libya or Lithuania or Malaysia or Mauritius or Mexico or Micronesia or Montenegro or Oman or Palau or Panama or Poland or Romania or Russia or Seychelles or Slovakia or South Africa or "Saint Kitts and Nevis" or Saint Lucia or "Saint Vincent and the Grenadines" or Turkey or Uruguay or Venezuela or Yugoslavia).sh,tw. or Guinea.tw. or Libia.tw. or libyan.tw. or Mayotte.tw. or Northern Mariana Islands.tw. or Russian Federation.tw. or Samoa.tw. or Serbia.tw. or Slovak Republic.tw. or "St Kitts and Nevis".tw. or St Lucia.tw. or "St Vincent and the Grenadines".tw. (360490)
45. #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41	45 (Albania or Algeria or Angola or Armenia or Azerbaijan or Belarus or Bhutan or Bolivia or "Bosnia and Herzegovina" or Cameroon or China or Colombia or Congo or Cuba or Djibouti or Dominican Republic or Ecuador or Egypt or El Salvador or Fiji or
46. #42 or #43	
47. (TG=ANIMAL) not ((TG=HUMAN) and (TG=ANIMAL))	
48. #44 not #45	
49. #46 and #9	
50. #46 and #11	

	<p>"Georgia (Republic)" or Guam or Guatemala or Guyana or Honduras or Indian Ocean Islands or Indonesia or Iran or Iraq or Jamaica or Jordan or Lesotho or "Macedonia (Republic)" or Marshall Islands or Micronesia or Middle East or Moldova or Morocco or Namibia or Nicaragua or Paraguay or Peru or Philippines or Samoa or Sri Lanka or Suriname or Swaziland or Syria or Thailand or Tonga or Tunisia or Turkmenistan or Ukraine or Vanuatu).sh,tw. or Bosnia.tw. or Cape Verde.tw. or Gaza.tw. or Georgia.tw. or Kiribati.tw. or Macedonia.tw. or Maldives.tw. or Marshall Islands.tw. or Palestine.tw. or Syrian Arab Republic.tw. or West Bank.tw. (190053)</p> <p>46 (Afghanistan or Bangladesh or Benin or Burkina Faso or Burundi or Cambodia or Central African Republic or Chad or Comoros or "Democratic Republic of the Congo" or Cote d'Ivoire or Eritrea or Ethiopia or Gambia or Ghana or Guinea or Guinea-Bissau or Haiti or India or Kenya or Korea or Kyrgyzstan or Laos or Liberia or Madagascar or Malawi or Mali or Mauritania or Melanesia or Mongolia or Mozambique or Myanmar or Nepal or Niger or Nigeria or Pakistan or Papua New Guinea or Rwanda or Senegal or Sierra Leone or Somalia or Sudan or Tajikistan or Tanzania or East Timor or Togo or Uganda or Uzbekistan or Vietnam or Yemen or Zambia or Zimbabwe).sh,tw. or Burma.tw. or Congo.tw. or Kyrgyz.tw. or Lao.tw. or North Korea.tw. or Salomon Islands.tw. or Sao Tome.tw. or Timor.tw. or Viet Nam.tw. (295420)</p> <p>47 ((developing or less\$ developed or third world or under developed or middle income or low income or underserved or under served or deprived or poor\$) adj (count\$ or nation? or state? or population?)).tw. (32435)</p> <p>48 (lmic or lmics).tw. (34)</p>
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	<p>49 or/40-48 (920381)</p> <p>50 39 and 49 (331)</p> <p>51 from 50 keep 1-331 (331)</p>
Tobacco group register – EMBASE	Tobacco EMBASE Ovid
<p>1. (RANDOM\$ OR FACTORIAL\$ OR (CROSSOVER\$ OR CROSS OVER\$ OR CROSS-OVER\$) OR PLACEBO\$ OR (DOUBL\$ adj BLIND\$) OR (SINGL\$ adj BLIND\$) OR ASSIGN\$ OR ALLOCAT\$ OR VOLUNTEER\$).TI, AB.</p> <p>2. CROSSOVER PROCEDURE/ OR DOUBLE-BLIND PROCEDURE/ OR RANDOMIZED CONTROLLED TRIAL/ OR SINGLE-BLIND PROCEDURE/</p> <p>3. #1 or #2</p> <p>4. SMOKING CESSATION.mp</p> <p>5. EXPLODE SMOKING CESSATION/</p> <p>6. EXPLODE SMOKING-/</p> <p>7. (QUIT\$ OR STOP\$ OR CEAS\$ OR GIV\$ OR PREVENT\$) ADJ SMOK\$</p> <p>8. (EXPLODE PASSIVE-SMOKING/) OR (EXPLODE SMOKING-HABIT/) OR (EXPLODE CIGARETTE-SMOKING/) OR (EXPLODE "SMOKING-CESSATION"/ALL SUBHEADINGS IN DEM,DER)</p> <p>9. #4 OR #5 OR #6 or #7 OR #8</p> <p>10. #3 and #9</p>	<p>1 (RANDOM\$ or FACTORIAL\$ or (CROSSOVER\$ or CROSS OVER\$ or CROSS-OVER\$) or PLACEBO\$ or (DOUBL\$ adj BLIND\$) or (SINGL\$ adj BLIND\$) or ASSIGN\$ or ALLOCAT\$ or VOLUNTEER\$).ti,ab. (635873)</p> <p>2 CROSSOVER PROCEDURE/ or DOUBLE-BLIND PROCEDURE/ or RANDOMIZED CONTROLLED TRIAL/ or SINGLE-BLIND PROCEDURE/ (195318)</p> <p>3 Time Series Analysis/ or intervention\$.tw. or control\$.tw. or evaluat\$.tw. or effect\$.tw. (4396479)</p> <p>4 1 or 2 or 3 (4603546)</p> <p>5 SMOKING CESSATION.mp. (19440)</p> <p>6 exp SMOKING CESSATION/ (17900)</p> <p>7 exp SMOKING/ (96978)</p> <p>8 ((QUIT\$ or STOP\$ or CEAS\$ or GIV\$ or PREVENT\$) adj SMOK\$).tw. (4785)</p> <p>9 exp PASSIVE-SMOKING/ or exp SMOKING-HABIT/ or exp CIGARETTE-SMOKING/ or exp "SMOKING-CESSATION"/ (55646)</p> <p>10 or/5-9 (106431)</p> <p>11 4 and 10 (58107)</p> <p>12 2009\$.em. (275877)</p> <p>13 11 and 12 (2245)</p> <p>14 Developing Country/ (21904)</p> <p>15 exp Africa/ or exp Asia/ or exp "South and Central America"/ (289727)</p> <p>16 (Africa or Asia or South America or Latin America or Central America).tw. (44731)</p> <p>17 (American Samoa or Argentina or Belize or Botswana or Brazil or Bulgaria or Chile or Comoros or Costa Rica or Croatia or Dominica or Equatorial Guinea or Gabon or Grenada or Hungary or Kazakhstan or Latvia or Lebanon or Libya or Lithuania or Malaysia</p>

	<p>or Mauritius or Mexico or Micronesia or Montenegro or Oman or Palau or Panama or Poland or Romania or Russia or Seychelles or Slovakia or South Africa or "Saint Kitts and Nevis" or Saint Lucia or "Saint Vincent and the Grenadines" or Turkey or Uruguay or Venezuela or Yugoslavia or Guinea or Libia or libyan or Mayotte or Northern Mariana Islands or Russian Federation or Samoa or Serbia or Slovak Republic or "St Kitts and Nevis" or St Lucia or "St Vincent and the Grenadines").sh,tw. (172123)</p> <p>18 (Albania or Algeria or Angola or Armenia or Azerbaijan or Belarus or Bhutan or Bolivia or "Bosnia and Herzegovina" or Cameroon or China or Colombia or Congo or Cuba or Djibouti or Dominican Republic or Ecuador or Egypt or El Salvador or Fiji or "Georgia (Republic)" or Guam or Guatemala or Guyana or Honduras or Indian Ocean Islands or Indonesia or Iran or Iraq or Jamaica or Jordan or Lesotho or "Macedonia (Republic)" or Marshall Islands or Micronesia or Middle East or Moldova or Morocco or Namibia or Nicaragua or Paraguay or Peru or Philippines or Samoa or Sri Lanka or Suriname or Swaziland or Syria or Thailand or Tonga or Tunisia or Turkmenistan or Ukraine or Vanuatu or Bosnia or Cape Verde or Gaza or Georgia or Kiribati or Macedonia or Maldives or Marshall Islands or Palestine or Syrian Arab Republic or West Bank).sh,tw. (101128)</p> <p>19 (Afghanistan or Bangladesh or Benin or Burkina Faso or Burundi or Cambodia or Central African Republic or Chad or Comoros or "Democratic Republic of the Congo" or Cote d'Ivoire or Eritrea or Ethiopia or Gambia or Ghana or Guinea or Guinea-Bissau or Haiti or India or Kenya or Korea or Kyrgyzstan or Laos or Liberia or Madagascar or Malawi or Mali or Mauritania or Melanesia or Mongolia or Mozambique or Myanmar or</p>
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	<p>Nepal or Niger or Nigeria or Pakistan or Papua New Guinea or Rwanda or Senegal or Sierra Leone or Somalia or Sudan or Tajikistan or Tanzania or East Timor or Togo or Uganda or Uzbekistan or Vietnam or Yemen or Zambia or Zimbabwe or Burma or Congo or Kyrgyz or Lao or North Korea or Salomon Islands or Sao Tome or Timor or Viet Nam).sh,tw. (174258)</p> <p>20 ((developing or less\$ developed or third world or under developed or middle income or low income or underserved or under served or deprived or poor\$) adj (count\$ or nation? or state? or population?)).tw. (24424)</p> <p>21 (lmic or lmics).tw. (32)</p> <p>22 or/14-21 (490889)</p> <p>23 13 and 22 (288)</p>
Tobacco group register – PsycInfo	Tobacco PsycInfo Ovid
<p>1. SMOKING CESSATION.mp or exp SMOKING CESSATION</p> <p>2. (ANTISMOKING or ANTI-SMOKING).mp.</p> <p>3. (QUIT\$ or CESSAT\$).mp.</p> <p>4. (ABSTIN\$ or ABSTAIN\$).mp.</p> <p>5. CONTROL\$ adj SMOK\$</p> <p>6. exp BEHAVIOR MODIFICATION/</p> <p>7. #2 or #3 or #4 or #5 or #6</p> <p>8. TOBACCO-SMOKING/</p> <p>9. (SMOK\$ OR CIGAR\$ OR TOBACCO\$).mp.</p> <p>10. PREVENTION/</p> <p>11. #8 or #9</p> <p>12. #7 and #11</p> <p>13. #10 and #11</p> <p>14. #1 or #12 or #13</p>	<p>1 SMOKING CESSATION.mp. or exp SMOKING CESSATION/ (7016)</p> <p>2 (ANTISMOKING or ANTI-SMOKING).mp. (501)</p> <p>3 (QUIT\$ or CESSAT\$).mp. (30407)</p> <p>4 (ABSTIN\$ or ABSTAIN\$).mp. (11743)</p> <p>5 (CONTROL\$ adj SMOK\$).tw. (196)</p> <p>6 exp BEHAVIOR MODIFICATION/ (33234)</p> <p>7 2 or 3 or 4 or 5 or 6 (72676)</p> <p>8 TOBACCO-SMOKING/ (15809)</p> <p>9 (SMOK\$ or CIGAR\$ or TOBACCO\$).mp. (29255)</p> <p>10 PREVENTION/ (15073)</p> <p>11 8 or 9 (29255)</p> <p>12 7 and 11 (9877)</p> <p>13 10 and 11 (992)</p> <p>14 1 or 12 or 13 (10537)</p> <p>15 2009\$.up. (75466)</p> <p>16 14 and 15 (413)</p>

**Tobacco and LMIC – Strategies 2011
CENTRAL (Cochrane Library DVD-ROM)**

#1 (Africa in Title, Abstract or Keywords or Asia in Title, Abstract or Keywords or Caribbean in Title, Abstract or Keywords or "West Indies" in Title, Abstract or Keywords or "South America" in Title, Abstract or Keywords or "Latin America" in Title, Abstract or Keywords or "Central America" in Title, Abstract or Keywords)

#2 (Afghanistan in Title, Abstract or Keywords or Albania in Title, Abstract or Keywords or Algeria in Title, Abstract or Keywords or Angola in Title, Abstract or Keywords or Antigua in Title, Abstract or Keywords or Barbuda in Title, Abstract or Keywords or Argentina in Title, Abstract or Keywords or Armenia in Title, Abstract or Keywords or Armenian in Title, Abstract or Keywords or Aruba in Title, Abstract or Keywords or Azerbaijan in Title, Abstract or Keywords or Bahrain in Title, Abstract or Keywords or Bangladesh in Title, Abstract or Keywords or Barbados in Title, Abstract or Keywords or Benin in Title, Abstract or Keywords or Byelarus in Title, Abstract or Keywords or Byelorussian in Title, Abstract or Keywords or Belarus in Title, Abstract or Keywords or Belorussian in Title, Abstract or Keywords or Belorussia in Title, Abstract or Keywords or Belize in Title, Abstract or Keywords or Bhutan in Title, Abstract or Keywords or Bolivia in Title, Abstract or Keywords or Bosnia in Title, Abstract or Keywords or Herzegovina in Title, Abstract or Keywords or Herzegovina in Title, Abstract or Keywords or Botswana in Title, Abstract or Keywords or Brazil in Title, Abstract or Keywords or Brasil in Title, Abstract or Keywords or Bulgaria in Title, Abstract or Keywords or "Burkina Faso" in Title, Abstract or Keywords or "Burkina Fasso" in Title, Abstract or Keywords or "Upper Volta" in Title, Abstract or Keywords or Burundi in Title, Abstract or Keywords or Urundi in Title, Abstract or Keywords or Cambodia in Title, Abstract or Keywords or "Khmer Republic" in Title, Abstract or Keywords or Kampuchea in Title, Abstract or Keywords or Cameroon in Title, Abstract or Keywords or Cameroons in Title, Abstract or Keywords or Cameron in Title, Abstract or Keywords or Camerons in Title, Abstract or Keywords or "Cape Verde" in Title, Abstract or Keywords or "Central African Republic" in Title, Abstract or Keywords or Chad in Title, Abstract or Keywords or Chile in Title, Abstract or Keywords or China in Title, Abstract or Keywords or Colombia in Title, Abstract or Keywords or Comoros in Title, Abstract or Keywords or "Comoro Islands" in Title, Abstract or Keywords or Comores in Title, Abstract or Keywords or Mayotte in Title, Abstract or Keywords or Congo in Title, Abstract or Keywords or Zaire in Title, Abstract or Keywords or "Costa Rica" in Title, Abstract or Keywords or "Cote d'Ivoire" in Title, Abstract or Keywords or "Ivory Coast" in Title, Abstract or Keywords or Croatia in Title, Abstract or Keywords or Cuba in Title, Abstract or Keywords or Cyprus in Title, Abstract or Keywords or Czechoslovakia in Title, Abstract or Keywords or "Czech Republic" in Title, Abstract or Keywords or Slovakia in Title, Abstract or Keywords or "Slovak Republic" in Title, Abstract or Keywords)

#3 (Djibouti in Title, Abstract or Keywords or "French Somaliland" in Title, Abstract or Keywords or Dominica in Title, Abstract or Keywords or "Dominican Republic" in Title, Abstract or Keywords or "East Timor" in Title, Abstract or Keywords or "East Timur" in Title, Abstract or Keywords or "Timor Leste" in Title, Abstract or Keywords or Ecuador in Title, Abstract or Keywords or Egypt in Title, Abstract or

Keywords or "United Arab Republic" in Title, Abstract or Keywords or "El Salvador" in Title, Abstract or Keywords or Eritrea in Title, Abstract or Keywords or Estonia in Title, Abstract or Keywords or Ethiopia in Title, Abstract or Keywords or Fiji in Title, Abstract or Keywords or Gabon in Title, Abstract or Keywords or "Gabonese Republic" in Title, Abstract or Keywords or Gambia in Title, Abstract or Keywords or Gaza in Title, Abstract or Keywords or Georgia in Title, Abstract or Keywords or Georgian in Title, Abstract or Keywords or Ghana in Title, Abstract or Keywords or "Gold Coast" in Title, Abstract or Keywords or Greece in Title, Abstract or Keywords or Grenada in Title, Abstract or Keywords or Guatemala in Title, Abstract or Keywords or Guinea in Title, Abstract or Keywords or Guam in Title, Abstract or Keywords or Guiana in Title, Abstract or Keywords or Guyana in Title, Abstract or Keywords or Haiti in Title, Abstract or Keywords or Honduras in Title, Abstract or Keywords or Hungary in Title, Abstract or Keywords or India in Title, Abstract or Keywords or Maldives in Title, Abstract or Keywords or Indonesia in Title, Abstract or Keywords or Iran in Title, Abstract or Keywords or Iraq in Title, Abstract or Keywords or "Isle of Man" in Title, Abstract or Keywords or Jamaica in Title, Abstract or Keywords or Jordan in Title, Abstract or Keywords or Kazakhstan in Title, Abstract or Keywords or Kazakh in Title, Abstract or Keywords or Kenya in Title, Abstract or Keywords or Kiribati in Title, Abstract or Keywords or Korea in Title, Abstract or Keywords or Kosovo in Title, Abstract or Keywords or Kyrgyzstan in Title, Abstract or Keywords or Kirghizia in Title, Abstract or Keywords or "Kyrgyz Republic" in Title, Abstract or Keywords or Kirghiz in Title, Abstract or Keywords or Kirgizstan in Title, Abstract or Keywords or "Lao PDR" in Title, Abstract or Keywords or Laos in Title, Abstract or Keywords or Latvia in Title, Abstract or Keywords or Lebanon in Title, Abstract or Keywords or Lesotho in Title, Abstract or Keywords or Basutoland in Title, Abstract or Keywords or Liberia in Title, Abstract or Keywords or Libya in Title, Abstract or Keywords or Lithuania in Title, Abstract or Keywords)

#4 (Macedonia in Title, Abstract or Keywords or Madagascar in Title, Abstract or Keywords or "Malagasy Republic" in Title, Abstract or Keywords or Malaysia in Title, Abstract or Keywords or Malaya in Title, Abstract or Keywords or Malay in Title, Abstract or Keywords or Sabah in Title, Abstract or Keywords or Sarawak in Title, Abstract or Keywords or Malawi in Title, Abstract or Keywords or Nyasaland in Title, Abstract or Keywords or Mali in Title, Abstract or Keywords or Malta in Title, Abstract or Keywords or "Marshall Islands" in Title, Abstract or Keywords or Mauritania in Title, Abstract or Keywords or Mauritius in Title, Abstract or Keywords or "Agalega Islands" in Title, Abstract or Keywords or Mexico in Title, Abstract or Keywords or Micronesia in Title, Abstract or Keywords or "Middle East" in Title, Abstract or Keywords or Moldova in Title, Abstract or Keywords or Moldovia in Title, Abstract or Keywords or Moldovian in Title, Abstract or Keywords or Mongolia in Title, Abstract or Keywords or Montenegro in Title, Abstract or Keywords or Morocco in Title, Abstract or Keywords or Ifni in Title, Abstract or Keywords or Mozambique in Title, Abstract or Keywords or Myanmar in Title, Abstract or Keywords or Myanma in Title, Abstract or Keywords or Burma in Title, Abstract or Keywords

or Namibia in Title, Abstract or Keywords or Nepal in Title, Abstract or Keywords or "Netherlands Antilles" in Title, Abstract or Keywords or "New Caledonia" in Title, Abstract or Keywords or Nicaragua in Title, Abstract or Keywords or Niger in Title, Abstract or Keywords or Nigeria in Title, Abstract or Keywords or "Northern Mariana Islands" in Title, Abstract or Keywords or Oman in Title, Abstract or Keywords or Muscat in Title, Abstract or Keywords or Pakistan in Title, Abstract or Keywords or Palau in Title, Abstract or Keywords or Palestine in Title, Abstract or Keywords or Panama in Title, Abstract or Keywords or Paraguay in Title, Abstract or Keywords or Peru in Title, Abstract or Keywords or Philippines in Title, Abstract or Keywords or Philipines in Title, Abstract or Keywords or Phillipines in Title, Abstract or Keywords or Phillippines in Title, Abstract or Keywords or Poland in Title, Abstract or Keywords or Portugal in Title, Abstract or Keywords or "Puerto Rico" in Title, Abstract or Keywords)

#5 (Romania in Title, Abstract or Keywords or Rumania in Title, Abstract or Keywords or Roumania in Title, Abstract or Keywords or Russia in Title, Abstract or Keywords or Russian in Title, Abstract or Keywords or Rwanda in Title, Abstract or Keywords or Ruanda in Title, Abstract or Keywords or "Saint Kitts" in Title, Abstract or Keywords or "St Kitts" in Title, Abstract or Keywords or Nevis in Title, Abstract or Keywords or "Saint Lucia" in Title, Abstract or Keywords or "St Lucia" in Title, Abstract or Keywords or "Saint Vincent" in Title, Abstract or Keywords or "St Vincent" in Title, Abstract or Keywords or Grenadines in Title, Abstract or Keywords or Samoa in Title, Abstract or Keywords or "Samoan Islands" in Title, Abstract or Keywords or "Navigator Island" in Title, Abstract or Keywords or "Navigator Islands" in Title, Abstract or Keywords or "Sao Tome" in Title, Abstract or Keywords or "Saudi Arabia" in Title, Abstract or Keywords or Senegal in Title, Abstract or Keywords or Serbia in Title, Abstract or Keywords or Montenegro in Title, Abstract or Keywords or Seychelles in Title, Abstract or Keywords or "Sierra Leone" in Title, Abstract or Keywords or Slovenia in Title, Abstract or Keywords or "Sri Lanka" in Title, Abstract or Keywords or Ceylon in Title, Abstract or Keywords or "Solomon Islands" in Title, Abstract or Keywords or Somalia in Title, Abstract or Keywords or Sudan in Title, Abstract or Keywords or Suriname in Title, Abstract or Keywords or Surinam in Title, Abstract or Keywords or Swaziland in Title, Abstract or Keywords or Syria in Title, Abstract or Keywords or Tajikistan in Title, Abstract or Keywords or Tadjhikistan in Title, Abstract or Keywords or Tadjikistan in Title, Abstract or Keywords or Tadjhik in Title, Abstract or Keywords or Tanzania in Title, Abstract or Keywords or Thailand in Title, Abstract or Keywords or Togo in Title, Abstract or Keywords or "Togolese Republic" in Title, Abstract or Keywords or Tonga in Title, Abstract or Keywords or Trinidad in Title, Abstract or Keywords or Tobago in Title, Abstract or Keywords or Tunisia in Title, Abstract or Keywords or Turkey in Title, Abstract or Keywords or Turkmenistan in Title, Abstract or Keywords or Turkmen in Title, Abstract or Keywords or Uganda in Title, Abstract or Keywords or Ukraine in Title, Abstract or Keywords or Uruguay in Title, Abstract or Keywords or USSR in Title, Abstract or Keywords or "Soviet Union" in Title, Abstract or Keywords or "Union of So-

viet Socialist Republics" in Title, Abstract or Keywords or Uzbekistan in Title, Abstract or Keywords or Uzbek in Title, Abstract or Keywords or Vanuatu in Title, Abstract or Keywords or "New Hebrides" in Title, Abstract or Keywords or Venezuela in Title, Abstract or Keywords or Vietnam in Title, Abstract or Keywords or "Viet Nam" in Title, Abstract or Keywords or "West Bank" in Title, Abstract or Keywords or Yemen in Title, Abstract or Keywords or Yugoslavia in Title, Abstract or Keywords or Zambia in Title, Abstract or Keywords or Zimbabwe in Title, Abstract or Keywords or Rhodesia in Title, Abstract or Keywords)

#6 ((developing in Title, Abstract or Keywords or less* next developed in Title, Abstract or Keywords or "under developed" in Title, Abstract or Keywords or underdeveloped in Title, Abstract or Keywords or "middle income" in Title, Abstract or Keywords or low* next income in Title, Abstract or Keywords or underserved in Title, Abstract or Keywords or "under served" in Title, Abstract or Keywords or deprived in Title, Abstract or Keywords or poor* in Title, Abstract or Keywords) and (countr* in Title, Abstract or Keywords or nation* in Title, Abstract or Keywords or population* in Title, Abstract or Keywords or world in Title, Abstract or Keywords))

#7 ((developing in Title, Abstract or Keywords or less* next developed in Title, Abstract or Keywords or "under developed" in Title, Abstract or Keywords or underdeveloped in Title, Abstract or Keywords or "middle income" in Title, Abstract or Keywords or low* next income in Title, Abstract or Keywords) and (economy in Title, Abstract or Keywords or economies in Title, Abstract or Keywords))

#8 (low* next gdp in Title, Abstract or Keywords or low* next gnp in Title, Abstract or Keywords or low* next "gross domestic" in Title, Abstract or Keywords or low* next "gross national" in Title, Abstract or Keywords)

#9 (low in Title, Abstract or Keywords and middle in Title, Abstract or Keywords and countr* in Title, Abstract or Keywords)

#10 (lmic in Title, Abstract or Keywords or lmics in Title, Abstract or Keywords or "third world" in Title, Abstract or Keywords or "lami country" in Title, Abstract or Keywords or "lami countries" in Title, Abstract or Keywords)

#11 ("transitional country" in Title, Abstract or Keywords or "transitional countries" in Title, Abstract or Keywords)

#12 (#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11)

#13 sr-tobacco in All Text

#14 (#12 and #13)

MEDLINE In-Process & Other Non-Indexed Citations (Ovid)

1. ((quit* or stop* or ceas* or giv* up or prevent*) and smoking).tw.
2. smoking cessation.tw.
3. or/1-2
4. Developing Countries.sh,kf.
5. (Africa or Asia or Caribbean or West Indies or South America or Latin America or Central America).hw,kf,ti,ab,cp.

6. (Afghanistan or Albania or Algeria or Angola or Antigua or Barbuda or Argentina or Armenia or Armenian or Aruba or Azerbaijan or Bahrain or Bangladesh or Barbados or Benin or Byelarus or Byelorussian or Belarus or Belorussian or Belorussia or Belize or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Brasil or Bulgaria or Burkina Faso or Burkina Fasso or Upper Volta or Burundi or Urundi or Cambodia or Khmer Republic or Kampuchea or Cameroon or Cameroons or Cameron or Camerons or Cape Verde or Central African Republic or Chad or Chile or China or Colombia or Comoros or Comoro Islands or Comores or Mayotte or Congo or Zaire or Costa Rica or Cote d'Ivoire or Ivory Coast or Croatia or Cuba or Cyprus or Czechoslovakia or Czech Republic or Slovakia or Slovak Republic or Djibouti or French Somaliland or Dominica or Dominican Republic or East Timor or East Timur or Timor Leste or Ecuador or Egypt or United Arab Republic or El Salvador or Eritrea or Estonia or Ethiopia or Fiji or Gabon or Gabonese Republic or Gambia or Gaza or Georgia Republic or Georgian Republic or Ghana or Gold Coast or Greece or Grenada or Guatemala or Guinea or Guam or Guiana or Guyana or Haiti or Honduras or Hungary or India or Maldives or Indonesia or Iran or Iraq or Isle of Man or Jamaica or Jordan or Kazakhstan or Kazakh or Kenya or Kiribati or Korea or Kosovo or Kyrgyzstan or Kirghizia or Kyrgyz Republic or Kirghiz or Kirgizstan or Lao PDR or Laos or Latvia or Lebanon or Lesotho or Basutoland or Liberia or Libya or Lithuania or Macedonia or Madagascar or Malagasy Republic or Malaysia or Malaya or Malay or Sabah or Sarawak or Malawi or Nyasaland or Mali or Malta or Marshall Islands or Mauritania or Mauritius or Agalega Islands or Mexico or Micronesia or Middle East or Moldova or Moldovia or Moldovian or Mongolia or Montenegro or Morocco or Ifni or Mozambique or Myanmar or Myanma or Burma or Namibia or Nepal or Netherlands Antilles or New Caledonia or Nicaragua or Niger or Nigeria or Northern Mariana Islands or Oman or Muscat or Pakistan or Palau or Palestine or Panama or Paraguay or Peru or Philippines or Philipines or Phillippines or Phillippines or Poland or Portugal or Puerto Rico or Romania or Rumania or Roumania or Russia or Russian or Rwanda or Ruanda or Saint Kitts or St Kitts or Nevis or Saint Lucia or St Lucia or Saint Vincent or St Vincent or Grenadines or Samoa or Samoan Islands or Navigator Island or Navigator Islands or Sao Tome or Saudi Arabia or Senegal or Serbia or Montenegro or Seychelles or Sierra Leone or Slovenia or Sri Lanka or Ceylon or Solomon Islands or Somalia or Sudan or Suriname or Surinam or Swaziland or Syria or Tajikistan or Tadzhikistan or Tadjikistan or Tadzhik or Tanzania or Thailand or Togo or Togolese Republic or Tonga or Trinidad or Tobago or Tunisia or Turkey or Turkmenistan or Turkmen or Uganda or Ukraine or Uruguay or USSR or Soviet Union or Union of Soviet Socialist Republics or Uzbekistan or Uzbek or Vanuatu or New Hebrides or Venezuela or Vietnam or

Viet Nam or West Bank or Yemen or Yugoslavia or Zambia or Zimbabwe or Rhodesia).hw,kf,ti,ab,cp.

7. ((developing or less* developed or under developed or underdeveloped or middle income or low* income or underserved or under served or deprived or poor*) adj (countr* or nation? or population? or world)).ti,ab.

8. ((developing or less* developed or under developed or underdeveloped or middle income or low* income) adj (economy or economies)).ti,ab.

9. (low* adj (gdp or gnp or gross domestic or gross national)).ti,ab.

10. (low adj3 middle adj3 countr*).ti,ab.

11. (lmic or lmics or third world or lami countr*).ti,ab.

12. transitional countr*.ti,ab.

13. or/4-12

14. 3 and 13

Medline Ovid

1 smoking cessation.tw. (9806)

2 Smoking Cessation/ or "Tobacco Use Disorder"/ (16861)

3 Tobacco/ (18037)

4 Nicotine/ (17369)

5 Tobacco, Smokeless/ (2142)

6 Smoking/ (92948)

7 ((QUIT\$ or STOP\$ or CEAS\$ or GIV\$) adj SMOK\$).tw. (5670)

8 Tobacco Smoke Pollution/ (7353)

9 or/1-8 (131989)

10 randomized controlled trial.pt. (273632)

11 controlled clinical trial.pt. (79523)

12 randomized.ab. (183258)

13 placebo.ab. (112974)

14 drug therapy.fs. (1321276)

15 randomly.ab. (132970)

16 trial.ab. (190233)

17 groups.ab. (912754)

18 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 (2413865)

19 Animals/ (4406090)

20 Humans/ (10795333)

21 19 not (19 and 20) (3296848)

22 18 not 21 (2046585)

23 9 and 22 (22574)

24 2009\$.ed. (347511)

25 23 and 24 (821)

26 randomized controlled trial.pt. (273632)

27 random\$.tw. (447721)

28 intervention\$.tw. (321374)
 29 control\$.tw. (1780161)
 30 evaluat\$.tw. (1431789)
 31 or/26-30 (3353907)
 32 Animals/ (4406090)
 33 Humans/ (10795333)
 34 32 not (32 and 33) (3296848)
 35 31 not 34 (2622397)
 36 9 and 35 (40777)
 37 2009\$.ed. (347511)
 38 36 and 37 (1609)
 39 25 or 38 (1905)
 40 Developing Countries/ (51945)
 41 Medically Underserved Area/ (4237)
 42 exp Africa/ or exp "Africa South of the Sahara"/ or exp Asia/ or exp South America/ or
 exp Latin America/ or exp Central America/ (550959)
 43 (Africa or Asia or South America or Latin America or Central America).tw. (61939)
 44 (American Samoa or Argentina or Belize or Botswana or Brazil or Bulgaria or Chile or
 Comoros or Costa Rica or Croatia or Dominica or Equatorial Guinea or Gabon or Grenada or
 Hungary or Kazakhstan or Latvia or Lebanon or Libya or Lithuania or Malaysia or Mauritius
 or Mexico or Micronesia or Montenegro or Oman or Palau or Panama or Poland or Romania
 or Russia or Seychelles or Slovakia or South Africa or "Saint Kitts and Nevis" or Saint Lucia
 or "Saint Vincent and the Grenadines" or Turkey or Uruguay or Venezuela or Yugosla-
 via).sh,tw. or Guinea.tw. or Libia.tw. or libyan.tw. or Mayotte.tw. or Northern Mariana Is-
 lands.tw. or Russian Federation.tw. or Samoa.tw. or Serbia.tw. or Slovak Republic.tw. or "St
 Kitts and Nevis".tw. or St Lucia.tw. or "St Vincent and the Grenadines".tw. (360490)
 45 (Albania or Algeria or Angola or Armenia or Azerbaijan or Belarus or Bhutan or Bolivia
 or "Bosnia and Herzegovina" or Cameroon or China or Colombia or Congo or Cuba or Dji-
 bouti or Dominican Republic or Ecuador or Egypt or El Salvador or Fiji or "Georgia (Repub-
 lic)" or Guam or Guatemala or Guyana or Honduras or Indian Ocean Islands or Indonesia or
 Iran or Iraq or Jamaica or Jordan or Lesotho or "Macedonia (Republic)" or Marshall Islands
 or Micronesia or Middle East or Moldova or Morocco or Namibia or Nicaragua or Paraguay
 or Peru or Philippines or Samoa or Sri Lanka or Suriname or Swaziland or Syria or Thailand
 or Tonga or Tunisia or Turkmenistan or Ukraine or Vanuatu).sh,tw. or Bosnia.tw. or Cape
 Verde.tw. or Gaza.tw. or Georgia.tw. or Kiribati.tw. or Macedonia.tw. or Maldives.tw. or
 Marshall Islands.tw. or Palestine.tw. or Syrian Arab Republic.tw. or West Bank.tw. (190053)
 46 (Afghanistan or Bangladesh or Benin or Burkina Faso or Burundi or Cambodia or Cen-
 tral African Republic or Chad or Comoros or "Democratic Republic of the Congo" or Cote
 d'Ivoire or Eritrea or Ethiopia or Gambia or Ghana or Guinea or Guinea-Bissau or Haiti or
 India or Kenya or Korea or Kyrgyzstan or Laos or Liberia or Madagascar or Malawi or Mali
 or Mauritania or Melanesia or Mongolia or Mozambique or Myanmar or Nepal or Niger or
 Nigeria or Pakistan or Papua New Guinea or Rwanda or Senegal or Sierra Leone or Somalia
 or Sudan or Tajikistan or Tanzania or East Timor or Togo or Uganda or Uzbekistan or Viet-

nam or Yemen or Zambia or Zimbabwe).sh,tw. or Burma.tw. or Congo.tw. or Kyrgyz.tw. or Lao.tw. or North Korea.tw. or Salomon Islands.tw. or Sao Tome.tw. or Timor.tw. or Viet Nam.tw. (295420)

47 ((developing or less\$ developed or third world or under developed or middle income or low income or underserved or under served or deprived or poor\$) adj (count\$ or nation? or state? or population?)).tw. (32435)

48 (lmic or lmics).tw. (34)

49 or/40-48 (920381)

50 39 and 49 (331)

51 from 50 keep 1-331 (331)

EMBASE (Ovid)

1. Smoking Cessation/

2. exp Smoking/

3. ((quit* or stop* or ceas* or giv* or prevent*) adj5 smoking).tw.

4. smoking cessation.tw.

5. or/1-4

6. Developing Country.sh.

7. (Africa or Asia or Caribbean or West Indies or South America or Latin America or Central America).hw,ti,ab.

8. (Afghanistan or Albania or Algeria or Angola or Antigua or Barbuda or Argentina or Armenia or Armenian or Aruba or Azerbaijan or Bahrain or Bangladesh or Barbados or Benin or Byelarus or Byelorussian or Belarus or Belorussian or Belorussia or Belize or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Brasil or Bulgaria or Burkina Faso or Burkina Fasso or Upper Volta or Burundi or Urundi or Cambodia or Khmer Republic or Kampuchea or Cameroon or Cameroons or Cameron or Camerons or Cape Verde or Central African Republic or Chad or Chile or China or Colombia or Comoros or Comoro Islands or Comores or Mayotte or Congo or Zaire or Costa Rica or Cote d'Ivoire or Ivory Coast or Croatia or Cuba or Cyprus or Czechoslovakia or Czech Republic or Slovakia or Slovak Republic or Djibouti or French Somaliland or Dominica or Dominican Republic or East Timor or East Timur or Timor Leste or Ecuador or Egypt or United Arab Republic or El Salvador or Eritrea or Estonia or Ethiopia or Fiji or Gabon or Gabonese Republic or Gambia or Gaza or Georgia Republic or Georgian Republic or Ghana or Gold Coast or Greece or Grenada or Guatemala or Guinea or Guam or Guiana or Guyana or Haiti or Honduras or Hungary or India or Maldives or Indonesia or Iran or Iraq or Isle of Man or Jamaica or Jordan or Kazakhstan or Kazakh or Kenya or Kiribati or Korea or Kosovo or Kyrgyzstan or Kirghizia or Kyrgyz Republic or Kirghiz or Kirgizstan or Lao PDR or Laos or Latvia or Lebanon or Lesotho or Basutoland or Liberia or Libya or Lithuania or Macedonia or Madagascar or Malagasy Republic or Ma-

aysia or Malaya or Malay or Sabah or Sarawak or Malawi or Nyasaland or Mali or Malta or Marshall Islands or Mauritania or Mauritius or Agalega Islands or Mexico or Micronesia or Middle East or Moldova or Moldavia or Moldovan or Mongolia or Montenegro or Morocco or Ifni or Mozambique or Myanmar or Myanma or Burma or Namibia or Nepal or Netherlands Antilles or New Caledonia or Nicaragua or Niger or Nigeria or Northern Mariana Islands or Oman or Muscat or Pakistan or Palau or Palestine or Panama or Paraguay or Peru or Philippines or Philipines or Phillipines or Phillippines or Poland or Portugal or Puerto Rico or Romania or Rumania or Roumania or Russia or Russian or Rwanda or Ruanda or Saint Kitts or St Kitts or Nevis or Saint Lucia or St Lucia or Saint Vincent or St Vincent or Grenadines or Samoa or Samoan Islands or Navigator Island or Navigator Islands or Sao Tome or Saudi Arabia or Senegal or Serbia or Montenegro or Seychelles or Sierra Leone or Slovenia or Sri Lanka or Ceylon or Solomon Islands or Somalia or Sudan or Suriname or Surinam or Swaziland or Syria or Tajikistan or Tadzhiistan or Tadjikistan or Tadzhiik or Tanzania or Thailand or Togo or Togolese Republic or Tonga or Trinidad or Tobago or Tunisia or Turkey or Turkmenistan or Turkmen or Uganda or Ukraine or Uruguay or USSR or Soviet Union or Union of Soviet Socialist Republics or Uzbekistan or Uzbek or Vanuatu or New Hebrides or Venezuela or Vietnam or Viet Nam or West Bank or Yemen or Yugoslavia or Zambia or Zimbabwe or Rhodesia).hw,ti,ab.

9. ((developing or less* developed or under developed or underdeveloped or middle income or low* income or underserved or under served or deprived or poor*) adj (countr* or nation? or population? or world)).ti,ab.

10. ((developing or less* developed or under developed or underdeveloped or middle income or low* income) adj (economy or economies)).ti,ab.

11. (low* adj (gdp or gnp or gross domestic or gross national)).ti,ab.

12. (low adj3 middle adj3 countr*).ti,ab.

13. (lmic or lmics or third world or lami countr*).ti,ab.

14. transitional countr*.ti,ab.

15. or/6-14

16. Randomized Controlled Trial/

17. Time Series Analysis/

18. random*.ti,ab.

19. intervention*.ti,ab.

20. control*.ti,ab.

21. evaluat*.ti,ab.

22. effect*.ti,ab.

23. impact.ti,ab.

24. or/16-23

25. 5 and 15 and 24

26. (201035* or 201036* or 201037* or 201038* or 201039* or 201040* or 201041* or 201042* or 201043* or 201044* or 201045* or 201046* or 201047* or 201048* or 201049* or 201050* or 201051* or 201052* or 2011*).em.

27. 25 and 26

28. limit 27 to embase

PsycINFO (Ovid)

1. Smoking Cessation/

2. Tobacco Smoking/

3. ((quit* or stop* or ceas* or giv* or prevent*) adj5 smoking).ti,ab.

4. smoking cessation.ti,ab.

5. or/1-4

6. Developing Countries.sh.

7. (Africa or Asia or Caribbean or West Indies or South America or Latin America or Central America).ti,ab,sh,hw.

8. (Afghanistan or Albania or Algeria or Angola or Antigua or Barbuda or Argentina or Armenia or Armenian or Aruba or Azerbaijan or Bahrain or Bangladesh or Barbados or Benin or Byelarus or Byelorussian or Belarus or Belorussian or Belorussia or Belize or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Bulgaria or Burkina Faso or Burkina Fasso or Upper Volta or Burundi or Urundi or Cambodia or Khmer Republic or Kampuchea or Cameroon or Cameroons or Cameron or Camerons or Cape Verde or Central African Republic or Chad or Chile or China or Colombia or Comoros or Comoro Islands or Comores or Mayotte or Congo or Zaire or Costa Rica or Cote d'Ivoire or Ivory Coast or Croatia or Cuba or Cyprus or Czechoslovakia or Czech Republic or Slovakia or Slovak Republic or Djibouti or French Somaliland or Dominica or Dominican Republic or East Timor or East Timur or Timor Leste or Ecuador or Egypt or United Arab Republic or El Salvador or Eritrea or Estonia or Ethiopia or Fiji or Gabon or Gabonese Republic or Gambia or Gaza or Georgia Republic or Georgian Republic or Ghana or Gold Coast or Greece or Grenada or Guatemala or Guinea or Guam or Guiana or Guyana or Haiti or Honduras or Hungary or India or Maldives or Indonesia or Iran or Iraq or Isle of Man or Jamaica or Jordan or Kazakhstan or Kazakh or Kenya or Kiribati or Korea or Kosovo or Kyrgyzstan or Kirghizia or Kyrgyz Republic or Kirghiz or Kirgizstan or Lao PDR or Laos or Latvia or Lebanon or Lesotho or Basutoland or Liberia or Libya or Lithuania or Macedonia or Madagascar or Malagasy Republic or Malaysia or Malaya or Malay or Sabah or Sarawak or Malawi or Nyasaland or Mali or Malta or Marshall Islands or Mauritania or Mauritius or Agalega Islands or Mexico or Micronesia or Middle East or Moldova or Moldovia or Moldovian or Mongolia or

Montenegro or Morocco or Ifni or Mozambique or Myanmar or Myanma or Burma or Namibia or Nepal or Netherlands Antilles or New Caledonia or Nicaragua or Niger or Nigeria or Northern Mariana Islands or Oman or Muscat or Pakistan or Palau or Palestine or Panama or Paraguay or Peru or Philippines or Philipines or Phillipines or Phillipines or Poland or Portugal or Puerto Rico or Romania or Rumania or Roumania or Russia or Russian or Rwanda or Ruanda or Saint Kitts or St Kitts or Nevis or Saint Lucia or St Lucia or Saint Vincent or St Vincent or Grenadines or Samoa or Samoan Islands or Navigator Island or Navigator Islands or Sao Tome or Saudi Arabia or Senegal or Serbia or Montenegro or Seychelles or Sierra Leone or Slovenia or Sri Lanka or Ceylon or Solomon Islands or Somalia or Sudan or Suriname or Surinam or Swaziland or Syria or Tajikistan or Tadzhikistan or Tadjikistan or Tadzhih or Tanzania or Thailand or Togo or Togolese Republic or Tonga or Trinidad or Tobago or Tunisia or Turkey or Turkmenistan or Turkmen or Uganda or Ukraine or Uruguay or USSR or Soviet Union or Union of Soviet Socialist Republics or Uzbekistan or Uzbek or Vanuatu or New Hebrides or Venezuela or Vietnam or Viet Nam or West Bank or Yemen or Yugoslavia or Zambia or Zimbabwe or Rhodesia).ti,ab,sh,hw.

9. ((developing or less* developed or under developed or underdeveloped or middle income or low* income or underserved or under served or deprived or poor*) adj (countr* or nation? or population? or world)).ti,ab.

10. ((developing or less* developed or under developed or underdeveloped or middle income or low* income) adj (economy or economies)).ti,ab.

11. (low* adj (gdp or gnp or gross domestic or gross national)).ti,ab.

12. (low adj3 middle adj3 countr*).ti,ab.

13. (lmic or lmics or third world or lami countr*).ti,ab.

14. transitional countr*.ti,ab.

15. or/6-14

16. 5 and 15

17. (201004* or 201005* or 201006* or 201007* or 201008* or 201009* or 201010* or 201011* or 201012* or 2011*).up.

18. 16 and 17

3. Excluded studies

Study First author (reference no.)	Cause for exclusion of study
Prokhorov 1994	This is a cohort study with only one group
Sankaranarayanan R	Outcome measures(Stage of oral cancers, proportion

	referred plus process measures) presented not relevant.
Thrasher 2007	This is more of a simulation
Unverdorben 2007	Simulation exposing smokers to electric heated cigarette smoking system to see effect on spiroergometry
Swaddiwudhipong 1993	Case control design
Tsai 2007	High income setting
Tzivony 1998	High income setting
Unverdorben 2007	Not relevant outcome
Zellweger 2005	Mainly high-income settings
Lwegaba 2005	Poor quality study, poor randomisation, very significant differences in control and intervention groups, posthoc reference of one intervention group as control
Heydari G 2010	Not a controlled study
Wang C 2009	Data presented includes Singapore, a high income setting and does not separate it from China and Thailand data
Bolliger CT 2010	Awaiting assessment – ongoing study
Kubik AK 2000	No relevant outcomes on smoking presented
Liu Y 2009	Study aimed to evaluate the effect of drugs on responses to smoking eg cravings/withdrawal but not intended to control or stop tobacco use
Stigler M 2010	Ongoing trial
Fong TF 2010	Not controlled trial
Chan SSC 2009	High income setting
Story J 1991	High income setting
Abdullah 2005	High income setting
Abramson 1994	High income setting
Carlini 2008	High Income setting
Cincripini 1995	High income setting
Cincripini 1997	Review – no relevant included studies
Croucher 2003	High income country
Hollis 2000	High Income setting
Ito 2006	High Income setting
Mathew 1995	Outcomes not relevant
Nishioka 1991	High income setting
Ralston S2008	High Income Setting

Chan 2003	High income setting
Thomas 2003	Outcome measures not relevant
Sykes 2001	High income setting
Hashibe 2000	Outcomes not relevant
Sankaranarayanan2000	Outcomes not relevant
Kadowaki 2000	High income setting
Ahluwalia 1998	High income setting
Nevid 1997	High income setting
Davis 1995	High income setting
Gofin 1986	High income setting
Kornitzer 1985	High income setting
Menotti 1983	High income setting
Abrahamson 1981	High income setting
Dramaix 1981	High income setting
Abramson 1979	High income setting
Harrell 1974	High income setting
Stepans 2006	High income setting
Richmond 1996	High income setting
Okamura 2004	High income setting
Chan SS2008	High income setting
Salieh 2006	Conference abstracts, no relevant abstract
van Greinsven F 2006	Not tobacco control
Alnasir FA 2004	Crosssectional design
Bharani A2004	Not tobacco control
Parker DR 2007	High income setting
Okuyemi KS 2007	High income setting
Andrews JO2007	High income setting
Polanska 2004	High income setting

4. Pharmacotherapy for smoking cessation

Objective and summary of interventions offered in the various studies

Author Year	Objective of Intervention	Summary of intervention
Ahmadi 2003	To evaluate the efficacy and safety of Nicotine replacement therapy compared to clonidine and naltrexone	3 groups: Nicotine gum group, Clonidine group, Naltrexone group receiving intervention for 24 weeks. Subjects were visited by an outreach worker once every week to discuss general health and adjustment and smoking in past week.
Ward 2001	To determine the success of an approach to smoking cessation based on NRT with the addition of 3 key psychological techniques - Stages of change, Self efficacy, cognitive counter conditioning technique	3 treatment groups 1) NRT plus Self Efficacy (SE) plus stages of change (SoC), 2) NRT plus SE plus SoC plus Cognitive Counter conditioning (CCC) 3) Waiting list control group. Each had group sessions - 2 hrs over 3 weeks - total 3 meetings, and another 2 hr meeting at 1 month. Followed up at 6 and 12 months at follow up meetings or home visit or telephone for those that did not attend.
Areechon 1988	To evaluate the effectiveness of nicotine chewing gum as a substitute for tobacco	Participants received active or placebo gum enough for 2-3 months. All were given leaflets on how to use the gum and lectured on benefits of the gum. Participants were seen weekly by physician, smoking status assessed after 6 months.
Baddeley 1988	To compare the usefulness of nicotine gum when freely chosen and paid for as an adjunct to psychological treatment, with psychological treatment only, in matched groups of heavy smokers who were motivated to stop	Heavy smokers who expressed desire for nicotine gum were in the experimental group matched closely by sex, no. of cigarettes per day, years of smoking, no. of attempts to quit smoking with another heavy smoker who desired psychological treatment. Those in intervention group Received gum, the psychological treatment group got 6 multi component sessions based on behaviour modification principles.
Singh P 2010	To assess efficacy of Bupropion in smoking cessation	First group received physician advice based on 5As, given bupropion 300mg for 7 weeks. Second group received physician advice based on 5As and placebo
Baltieri DA	To compare treatment outcomes and	3 groups - placebo, naltrexone and topiramate given for 12 weeks. All were encouraged to

2009	verify efficacy of naltrexone and topiramate among smoking and non smoking alcoholics	participate in alcoholics anonymous, all got standard brief cognitive interventions from their doctor at each visit.
Sun 2009	To assess social support and demographic factors influencing success of smoking cessation	12 weeks where all got one to one behavioral counselling for 10min by doctor trained in smoking cessation therapy. Intervention group got sublingual nicotine tablets.

5. Summary of Findings Tables - Pharmacotherapy

Nicotine replacement therapy and bupropion compared to Placebo for heavy smokers

Patient or population: Heavy smokers

Settings: Low and middle income countries - China, India, Thailand

Intervention: Nicotine Replacement Therapy or Bupropion

Comparison: Placebo

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Placebo	Nicotine Replacement Therapy or Bupropion				
Abstinence at 3 - 6 months self report, verified by breath carbon monoxide (Areechon 1988) Follow-up: 3-6 months	Study population		RR 2.03 (1.3 to 3.19)	440 (3 studies ³)	⊕⊕⊕⊖ low ^{1,2}	
	265 per 1000	538 per 1000 (344 to 845)				
	Low risk population					
	133 per 1000	270 per 1000 (173 to 424)				
	High risk population					

	366 per 1000	743 per 1000 (476 to 1000)			
Reduced smoking rates self report Follow-up: 1 month	Study population		RR 2.75 (1.68 to 4.51)	211 (1 study ⁵)	⊕⊕⊕⊖ moderate ⁴
	155 per 1000	426 per 1000 (260 to 699)			
Adverse effects	See comment	See comment	Minor adverse events were reported e.g. Insomnia, dry mouth or altered sensation, loss of appetite, nausea. Only insomnia sig. different in 1 study.		

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ Areechon: Method of randomisation and baseline characteristics are not clear. Had high drop out rates 28% with significant differences in the two groups. Study sponsored by manufacturers of Nicorette gum.

² Singh 2010: small study, few events, imprecision

³ Areechon 1988, Sun 2009, Singh 2010

⁴ Unclear method of concealment, self report of smoking status

⁵ Sun 2009

Nicotine gum and psychological treatment compared to psychological treatment for heavy smoking

Patient or population: Heavy smokers

Settings: South Africa

Intervention: nicotine gum and psychological treatment

Comparison: psychological treatment

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk psychological treatment	Corresponding risk nicotine gum and psychological treatment				
Abstinence carboxyhemoglobin Follow-up: 6 months	Study population		RR 1.83 (0.60 to 5.61)	23 (1 study ³)	⊕⊕⊕⊖ low ^{1,2}	
	273 per 1000	500 per 1000 (164 to 1000)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

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Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ Non random selection of participants, baseline differences in nicotine dependence scores and experimental group smoked more on average than control group.

² Imprecision round the estimate

³ Baddeley 1988

Nicotine replacement therapy combined with psychological techniques (SoC+SE) compared to waiting control for heavy smokers

Patient or population: Heavy smokers

Settings: Jamaica

Intervention: Nicotine replacement therapy combined with psychological techniques (SoC+SE)¹

Comparison: waiting control

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	waiting control	Nicotine replacement therapy combined with psychological techniques (SoC+SE)				
Abstinence at 6 months saliva cotinine test Follow-up: 6 months	Study population		RR 4.14 (0.57 to 30.09)	54 (1 study ⁴)	⊕⊕⊖⊖ low ^{2,3}	
	59 per 1000	244 per 1000 (34 to 1000)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

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Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ SoC: Stage of Change; SE: Self Efficacy

² Unclear method of sequence generation, allocation, and if baseline characteristics and outcomes were similar or not

³ 1 study with very few events; effect varies from lower effect of NRT plus psychological techniques over nothing to larger effect of NR plus psychological techniques

⁴ Ward 2001

Nicotine replacement therapy combined with psychological techniques (SoC+SE+CCC) compared to Waiting control for stopping heavy smoking

Patient or population: Heavy smoking

Settings: Jamaica

Intervention: Nicotine replacement therapy combined with psychological techniques (SoC+SE+CCC)¹

Comparison: Waiting control

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Waiting control	Nicotine replacement therapy combined with psychological techniques (SoC+SE+CCC)				
Abstinence salivary cotinine test Follow-up: 6 months	56 per 1000	292 per 1000 (41 to 1000)	RR 5.21 (0.73 to 37.32)	56 (1 study ⁴)	⊕⊕⊖⊖ low ^{2,3}	

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

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Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ SoC: Stage of Change; SE: Self efficacy; CCC: Cognitive counter conditioning

³ 1 small study with few events; effect varies from lower effect of NRT plus psychological techniques to larger effect of NRT plus psychological techniques compared to waiting control

⁴ Ward 2001

NRT compared to Clonidine for smoking cessation

Patient or population: Heavy Smokers

Settings: Iran

Intervention: NRT

Comparison: Clonidine

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the Comments evidence (GRADE)
	Assumed risk	Corresponding risk			
	Clonidine	NRT			
Abstinence self report and test verification (not clear which test) Follow-up: 6 months	193 per 1000	357 per 1000 (172 to 739)	RR 1.85 (0.89 to 3.83)	85 (1 study ³)	⊕⊕⊖⊖ low ^{1,2}

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ It was unclear how random allocation was achieved.

² Imprecision : Confidence interval varies from greater benefit of clonidine over NRT to 3 times greater effect in NRT group compared to clonidine group

³ Ahmadi 2003

NRT compared to Naltrexone for smoking cessation

Patient or population: Heavy smoking **Settings:** Iran

Intervention: NRT

Comparison: Naltrexone

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk Naltrexone	Corresponding risk NRT				
Abstinence self report and test verification (not clear which test used) Follow-up: 6 months	Study population 53 per 1000	382 per 1000 (116 to 1000)	RR 7.21 (2.18 to 23.83)	86 (1 study ³)	⊕⊕⊖⊖ low ^{1,2}	

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

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Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ Controlled clinical trial, not clear how randomisation was achieved,

² Imprecision: wide confidence interval

³ Ahmadi 2003

6. Interventions targeting pregnancy

Objectives and summary of interventions in included studies targeting Pregnancy

Author Year	Objective	Summary of Intervention
Loke 2005	To examine obstetricians' simple advice given to non-smoking pregnant women with the aim of helping their husbands to give up smoking	Obstetricians gave advice during prenatal sessions for 2-3 min and reminders for about 1.5 min on subsequent visits. Women received a) Standardised advice on facts about exposure to passive smoking, b) got health education booklets in chinese. c) Health reminders
Belizan 1995	To assess whether an intervention to educate the mother and the support person involves a change in health-	Components of intervention aimed to reduce stress, anxiety, inadequate health-related behaviour including smoking. 4 home visits at 22, 26, 30 and 34 weeks gestation with 2 more optional visits if needed. Received poster and booklet on healthy pregnancy.

related behaviour and use of health facilities.

Everett-Murphy K 2010 To evaluate effect of smoking cessation intervention based on best practice guidelines on quit rates of disadvantaged pregnant women Posters on the 5As were hang in examining rooms. Two peer counselors assisted the midwives to deliver the 5As. Provided a self help quit guide and leaflets in format of local newspaper.

7. Summary of Findings – Pregnant women or their smoking husbands

health education that includes information targeted at smoking compared to usual care for smoking in pregnant women

Patient or population: smoking in pregnant women

Settings: Latin America, South Africa

Intervention: health education that includes information targeted at smoking

Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk usual care	Corresponding risk health education that includes information targeted at smoking				
Abstinence self report Follow-up: 3-6 months ¹	Study population		RR 1.95 (1.28 to 2.99)	2230 (1 study ²)	⊕⊕⊕⊖ moderate	
	28 per 1000	55 per 1000 (36 to 84)				
	Low risk population					
	28 per 1000	55 per 1000				

		(36 to 84)			
Quit attempts Follow-up: 36-39 weeks	0.27 mean number of quit attempts	The mean quit attempts in the intervention groups was 1.28 higher (1.07 to 1.49 higher)		759 (1 study ⁴)	⊕⊕⊖⊖ low ³
Reduced smoking rates urinary cotinine levels Follow-up: 36 - 39 weeks	Study population 129 per 1000	241 per 1000 (174 to 334)	RR 1.87 (1.35 to 2.59)	759 (1 study ⁴)	⊕⊕⊖⊖ low ³

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ Follow up period was from enrollment to 36 weeks gestation

² Belizan 1995

³ Everett-Murphy 2010 was a non randomised trial with a historical cohort as the control group, had high drop out rates up to 34%.

⁴ Everett-Murphy 2010

Health education that includes information targeted at smoking husbands compared to usual care for pregnant non-smoking women

Patient or population: Smoking husbands of pregnant women

Settings: LMIC - China

Intervention: health education

Outcomes	Illustrative comparative risks* (95% CI)	Relative effect	No of Participants	Quality of the evidence	Comments
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	Assumed risk	Corresponding risk	(95% CI)	(studies)	(GRADE)
	Control	health education			
Abstinence	42 per 1000	60 per 1000	RR 1.43	758	⊕⊕⊕⊖
wife's report		(32 to 112)	(0.77 to 2.66)	(1 study)	low ^{1,2}
Follow-up: 3-5 months					
Proportion of quit attempts	224 per 1000	302 per 1000	RR 1.35	758	⊕⊕⊕⊖
wife's report		(237 to 385)	(1.06 to 1.72)	(1 study ³)	low ^{1,2}
Follow-up: 3-5 months					
Reduction in number of cigarettes smoked	177 per 1000	396 per 1000	RR 2.24	758	⊕⊕⊕⊖
wife's report		(310 to 510)	(1.75 to 2.88)	(1 study ³)	low ^{1,2}
Follow-up: 3-5 months					

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ Used mothers report of husbands smoking status and did not verify this

² Imprecision round the estimate of the measure of effect

³ Loke 2005

8. Interventions targeting the community or primary health care

Objectives, intervention population in the community/PHC studies

Author Year	Objective	Intervention	Population
Asfar 2008	To pilot test a clinic-based smoking cessation intervention and determine its feasibility	Brief intervention group received 1 single 45 minute educational/counseling session with a trained physician. Intensive intervention group received four 45 minute in person sessions with a trained physician giving the same as above. Additional stimulus control strategies were self monitoring and nicotine reduction/scheduled smoking and relapse prevention skills. Intensive group also received 6 brief telephone counseling sessions lasting about 10 min.	Mean age was 36.2 (SD12.1) in the brief intervention group, and 33.4 (SD9.7) in the intensive group. 64% participants smoked more than 20 cigarettes per day. 68% in brief intervention group, and 60% in intensive group had smoked for more than 10 years, 40% had tried to quit in the last 6 months (brief group), compared to 52% in the intensive group. Fagerstrom test for dependence was 5.16 (SD1.9, brief group) and 4.9 (SD2.5) intensive group.
Zheng 2007	To assess effectiveness of group smoking cessation intervention based on social cognitive theory among Chinese smokers	Had 8 community groups each with 13-15 members. Had 5 two hour sessions delivered by 3 health education professionals twice a week. Each session had 4/5 activities using standardized teaching materials. Shared success stories, learnt coping strategies, how to prevent relapse, had a graduation ceremony.	Mean age of participants was 56 years in intervention and 53 years in control groups. Mean age of smoking initiation approx. 24 years, mean duration of smoking approx. 30 years, and mean daily cigarette consumption 15. Mean number of previous quit attempts was 1, 71% in intervention and 81% in control

			had low to middle levels of smoking addiction. Almost 45% were in contemplation phase, almost 40% in pre-contemplation and about 15% preparation.
Jiang 2007	To examine the effect of a hospital-initiated home based multifaceted cardiac rehabilitation intervention on health behaviours and cardiac physiological risk parameters of patients with Coronary heart Disease (CHD)	12 week hospital initiated home based multifaceted cardiac rehabilitation program for enhanced self management and secondary prevention. Program started in hospital to 12 weeks post-discharge and included establishing knowledge and right attitude for self management, and support to family members.	Were mostly male (70%), mean age 62 years (SD7). About 40% were smokers.
Liu 2003	To evaluate the effects of community intervention on risk factors of cerebrovascular disease	Randomly sampled population and measured risk factors such as smoking rates, cholesterol, high density fat, blood sugar measures before and after intervention (3 years later). Gave some community education about blood pressure control, diabetes and hypertension treatment, stopping smoking, control of alcohol consumption and diet.	Population sample was from 35 - 74 years, community populations in 3 areas of China - Beijing, Shanghai and Changsha
Bovet 2002	To examine whether making smokers aware that they de-	Smokers undergoing ultrasonography who were found to have atherosclerotic	Mean age was between 39.2yrs in one group (ultrasound scan (US) with no

	veloped peripheral atherosclerosis would improve smoking cessation	plaques had two photographs taken, and given 5 min relevant explanation of plaques and their impact on health was given. Had 3 groups: a) smokers not randomised to US and not shown a plaque b) smokers randomised to US and no plaque seen c) smokers randomised to US and plaque seen. Smokers in all three groups were given quit-smoking counseling for 10 min.	plaques), 45.7 in no US group, and 48.9 in plaques group. Average number of cigarettes smoked per day in all groups was 10-12 cigarettes and only 10% of smokers smoked at least 20 cigarettes per day.
Puschel 2008	To compare the effect of a brief counseling intervention delivered by primary care providers to help women smokers quit compared to control group	Implemented over 18 months in 1 clinic (2 controls). Was based on 5A model delivered by nurse practitioner for smoking women of childbearing age while checking their vital signs.	Study participants were women, 25 years and older. About two thirds were married and were homemakers. 5% were recently pregnant, 14% were at the time of the study being treated for depression. In general, about half smoked fewer than 5 cigarettes per day.
Kar 2008	To assess the feasibility of an adapted WHO CVD risk management package in a primary care setting	A multipurpose health worker assessed risk of CVD by measuring systolic blood pressure, referral of suspected CVD cases to the physician, risk counseling and follow-up. Doctors at the health centers, examined patients to confirm health workers diagnosis and prescribe treatment according to scenario 2 of the CVD	Most participants were 30 - 49 yrs (about 61%). 31% smoked and/chewed tobacco at least once a day for the last 1 month, 23% were overweight (BMI $\geq 25\text{kg/m}^2$).

		risk management package and if needed referral to the tertiary level.	
Jackson 2004	To measure the effect of anti-smoking advice among primary care patients. Also compared variables such as cigarette consumption, state of change, knowledge and beliefs about smoking with quit rates	Used a questionnaire to identify non-smokers, current and ex-smokers and record smoking rates among patients waiting to see doctor. Smokers were assessed on stage of change and their opinion of the effect of smoking on their health. Intervention was 4 extra questions, a paragraph of standardized advice and a leaflet. . 5 Malay dollars for transport refund if they kept their appointment for 3 and 6 month follow up.	Patients attending primary health care, mean age 33 years. About 80% smoked cigarettes only. Mean number of cigarettes per day were 12 for intervention and 10 for control group. Most were in preparation stage of change (about 60%), Contemplation were almost 25%, pre-contemplation 15%.
Gunes 2007	To determine the a) smoking status of workers employed in a textile factory b) stages of smoking behaviour according to the trans theoretical model c)effect of the educational program about smoking cessation on stages of smoking behavior	Education was divided into 3 chapters of 45 minutes each, one session each week, a presentation with interactive education techniques. Education sessions were based on 'Life without smoking in 7 steps' a smoking cessation program by the American Lung Society.	Male factory workers with a mean age of 29.3 years (SD4.8). Current smokers were 65.9%, 6.8% had quit smoking for more than 6 months, 27.3% had never smoked.
Xie 2005	To study effects of comprehensive interventions in community on smoking,	Community intervention about Chronic obstructive pulmonary disease. Education given to advise against smoking	Participants had chronic conditions such as asthma and were identified from the general population. Mean age

	chronic bronchitis and asthma in rural Beijing	and improve kitchen ventilation, used leaflets and radio broadcasts. Competition between smokers to see who can smoke less, local doctors home visited heavy smokers. Gave them free patches to stop smoking.	in intervention district was for males 36 in control areas and for females was 37. Rates of smoking were about 67% for men, and about 10% for women.
Steenkamp 1991	To improve knowledge about coronary risk factors in two communities (including smoking), to influence attitudes and finally change behaviour in such a way that modified lifestyles would reduce the risk factor level of each community	Both the low and high intensity intervention areas got a mass media programme using small media e.g. posters, billboards, mailings, local newspapers aimed at whole community and covered risk factors like smoking, hyperlipidemia, hypertension, inactivity and stress. The high intensity area also received interpersonal intervention to high risk individuals e.g. smokers.	Men and women aged 15 - 64 years that were recruited by active postal campaign from the general population. The mean age was about 43 years (SD12), about 47% of men and 16% of women were smokers. Men smoked about 10 cigarettes per day and women about 2 cigarettes per day.
Ng 2010	To assess feasibility of delivering brief and diseases-centred smoking cessation interventions to patients with Diabetes in clinical settings	Doctor delivered brief message designed around 5As model linking diabetes complications to smoking. Patients given educational material and informed about cessation clinic in hospital. For the cessation clinic arm, the doctor gave message but also a written prescription for the cessation clinic. Those attending cessation clinic were given single ses-	Mean age was 58 in Doctor advise group (sd 1.7) and 55 in Cessation clinic group (sd 1.3). Mean age of starting smoking was 18 (sd 1.6) in doctor group and 20 in clinic group (sd 2.1). Mean number of cigarettes smoked per day before diabetes diagnosis was about 11 (sd 1). About 80% smoked daily in the last 6 months and about 40% had a quit at-

		sion individual counseling for smoking cessation.	tempt since the diabetes diagnosis
de Azevedo 2010	To compare low and high intensity treatments for smoking cessation compared to standard hospital treatment among hospitalised patients	Admitted patients were screened for smoking addiction, depression, alcohol addiction. Low intensity group got 15min individual counselling on stopping smoking, dangers of smoke, and benefits of quitting. High intensity - 30min individual counselling, performed motivational interview tailored to patient's goals for quitting smoking. Had 7 follow up telephone calls over 6 months, each lasting 10 min using standard form.	Hospitalized patients, mean age at initial smoking was 14 sd 5 (usual care) and about 16 for both High and low intensity groups. Mean number of years smoked was about 31 years in high and low intensity groups and 33 years in usual care. Mean number of cigarettes smoked per day in the last month was about 19 in the usual care and low intensity groups and about 17 (sd 11.7) in the high intensity groups. Most had moderate level of nicotine dependence in each group and had prior smoking cessation attempts
Moy 2006	To reduce the risks of chronic diseases	Intervention arm received one to one counseling twice a year, group teaching 3-4 times per year. General topics on nutrition, physical activity, risk factors for cardiovascular diseases, reducing cholesterol and weight management, smoke cessation, and stress management. Control group received minimal education by email, standard brochures,	Intervention group was slightly younger (43.9 years sd7.8). Among respondents, 41.7 % in intervention and 35.6% in control group smoked currently.

		and group sessions once yearly.	
Fang XH 1999	To evaluate the effectiveness of an intervention aimed at reducing multiple risk factors for stroke.	Managed subjects with Hypertension, heart disease or diabetes and provided health education including smoking cessation to the full community. Doctors visited clinic in the intervention cohort to treat patients which included pharmacological treatment for disease condition and lifestyle management.	Mean age was about 52 years sd 11, those less than 60 years were about 77% in intervention group and 72% in control. Prevalence of smoking was about 33% in both groups
McAlister 2000	To test feasibility and effectiveness of smoking reduction	Highly publicised smoking cessation competitions (Quit and win) combined with communication campaigns featuring stories about local role models who quit smoking. Interpersonal support for cessation provided through community networks including lay workers and health workers, distribution of leaflets to promote imitation of role models.	Random population sample, aged 25-64years. 47% of men interviewed smoked one or more cigarettes daily, 55% in neighboring district. Among women, rates were 6.3 - 8.3% in the two districts.

9. Summary of Findings: Advice and support at the community or primary care services

health education compared to usual care for smoking cessation

Patient or population: smokers

Settings: Seycelles, China(2), Turkey, Malaysia

Intervention: health education, plus cardiac rehabilitation (Jiang 2007), plus ultrasound of femoral veins (Bouvet 2002)

Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	usual care	health education, cardiac rehabilitation (Jiang 2007), plus ultrasound of femoral veins (Bouvet 2002)				
Abstinence at 3- 6 months	Study population		RR 2.14 (0.77 to 5.95)	836 (4 studies ⁵)	⊕⊕⊖⊖ low ^{1,2,3,4}	
self report, verified in 2 studies	89 per 1000	190 per 1000				
Follow-up: 3 - 6 months		(69 to 530)				
	Low risk population					
	20 per 1000	43 per 1000				
		(15 to 119)				
	High risk population					
	395 per 1000	845 per 1000				
		(304 to 1000)				
Abstinence (non RCTS)	Study population		RR 1.06 (0.86 to 1.31)	40854 (5 studies)	⊕⊕⊖⊖ low ^{4,6,7}	
self reports, largely not verified	53 per 1000	56 per 1000				
Follow-up: 0.25 - 8 years		(46 to 69)				
	Low risk population					
		0 per 1000				

		(0 to 0)			
	High risk population				
	256 per 1000	271 per 1000			
		(220 to 335)			
Abstinence after less intense education (Non RCTs) self report Follow-up: 0.5 - 6 years	Study population		RR 1.15	808	⊕⊕⊖⊖
	196 per 1000	225 per 1000	(0.85 to	(2 studies ¹⁰)	low ^{8,9}
		(167 to 306)	1.56)		
	Low risk population				
	185 per 1000	213 per 1000			
		(157 to 289)			
Abstinence after high intensity education (non RCTs) self report Follow-up: 0.5 - 6 years	High risk population				
	250 per 1000	288 per 1000			
		(212 to 390)			
	Study population		RR 1.34	754	⊕⊕⊖⊖
	201 per 1000	269 per 1000	(1 to	(2 studies ¹⁰)	low ^{8,9}
		(201 to 380)	1.89)		
	Low risk population				
	190 per 1000	255 per 1000			
		(190 to 359)			
	High risk population				
	250 per 1000	335 per 1000			

		(250 to 472)		
Smoking rates (RCTs)	The decrease in mean number of	The mean difference in number of cigarettes smoked was	225	⊕⊕⊕⊖
daily number of cigarettes smoked	cigarettes smoked was	9.80	(1 study ⁴)	moderate ¹¹
Follow-up: 6 months	1.71	(7.45 to 12.15 higher)		

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ No verification of smoking status (Bovet 2002, Jiang 2007), high drop out rates (about 60% in Jackson 2004)

² Study heterogeneity with 1 study favouring control, and 3 favouring experimental group.

³ Imprecision in round the overall estimate, also reflected in 3 of the individual studies

⁴ Zheng 2007 - generally well conducted study with a large effect obtained

⁵ Jackson 2004, Bovet 2002, Jiang 2007, Zheng 2007

⁶ All 5 were non randomised controlled trials with no verification of smoking status, high drop out rates Mc Alister (2000)

⁷ Residual heterogeneity, two big studies favouring control, 3 smaller studies favouring intervention group.

⁸ Both were non randomised studies, no verification of smoking status

⁹ Imprecision round the overall estimate

¹⁰ de Azevedo 2010, Steenkamp 1991

¹¹ Blinding and allocation concealment not clear, allocation not entirely random

Summary of findings continued: Community or primary care based interventions for smoking cessation

Patients or population: Smokers in Community or out patients, Factory workers (1 study), Security Guards (1 study)
Settings: China (4), Turkey, Chile, Brazil, Malaysia, S. Africa,
Intervention: Health education
Comparison: Usual care

Outcomes	Impact	Number of participants (studies)	Quality of the evidence (GRADE)	Comments
Smoking rates –Non RCT	5 of seven studies indicate a reduction in smoking rates although the possibility of chance findings could not be ruled out in three of these studies. 1 study reported no change in prevalence	80981 (7 studies ¹)	⊕⊕○○ Low	
Self efficacy- RCT	There were significant differences in emotional , social and skill scores and small non significant differences in relapse and attempt scores between the two groups	225 (1 study ²)	⊕⊕⊕○ Moderate	
Stage of Change - RCT	Increased participants in the intervention group moving to the action and maintenance stage than in the control group, but it was not clear if this difference was significant or not.	225 (1 study ²)	⊕⊕⊕○ Moderate	
Stage of Change – non RCT	There were no significant differences in the proportion of individuals in the pre-contemplative, contemplative and preparation stages of change between baseline and the final survey across the clinics in one study. Another study reported a significant difference in proportion preparing to quit between the intervention and control groups	973 (2 studies ³)	⊕⊕○○ Low	
Knowledge, attitudes and intentions	There were no significant differences in 2of 4 knowledge outcomes about smoking between the intervention and control. There was sig. difference in attitudes for one outcome and a positive change from baseline to final assessment in all clinics	773 (1 study ⁴)	⊕⊕○○ Low	

Adverse effects	No study reported this outcome
<p>p: p-value GRADE: GRADE Working Group grades of evidence (see above and last page)</p> <ol style="list-style-type: none"> 1. Fang 1999, Moy 2006, Liu 2003, Xie 2005. Non randomized studies, self reports for assessing smoking status 2. Zheng 2007. Blinding and allocation concealment not clear, method of allocation not entirely random 3. Puschel 2008, Gunes 2007. Non random allocation, heterogeneous results. Not clear if baseline characteristics were similar in Gunes 2007. 4. Puschel 2008. Non random allocation, high risk of bias from assessment of these outcomes 	

Doctors advice and active referral to a cessation clinic compared to doctors advice and passive referral for heavy smoking

Patient or population: Diabetic patients that smoke

Settings: Indonesia

Intervention: doctors advice and active referral to a cessation clinic

Comparison: doctors advice and passive referral

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk doctors advice and passive referral	Corresponding risk doctors advice and active referral to a cessation clinic				
Abstinence (RCT) self report Follow-up: 6 months	Study population 303 per 1000	370 per 1000 (191 to 715)	RR 1.22 (0.63 to 2.36)	71 (1 study ²)	⊕⊕⊕⊖ low ¹	

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ Imprecision round the estimate, smoking assessed by self report

² Ng 2010

Intensive compared to brief interventions for control of tobacco smoking

Patient or population: Smokers

Settings: Iran **Intervention:** Intensive health education

Comparison: Brief health education

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk brief interventions	Corresponding risk intensive				
Abstinence (RCTs) self report Follow-up: 3 months	Study population 160 per 1000	40 per 1000 (5 to 333)	RR 0.25 (0.03 to 2.08)	50 (1 study ³)	⊕⊕⊕⊖ low ^{1,2}	

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio;

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

¹ High drop out rates (36% drop out mostly in the group receiving intensive intervention), method of randomisation not clear

² Imprecision round the estimate

³ Asfar 2008

11. Interventions targeting schools

Objectives, interventions and population in the included studies

Author year	Objective	Intervention	Population
Chou 2006	To evaluate the effectiveness of a smoking prevention program. Primarily aimed to prevent initiation of smoking and prevent continuation or escalation of smoking behaviour among adolescents who already tried to smoke	Provided a curriculum in Chinese including a public commitment in front of their classmates not to smoke, discussion of the negative social and physical consequences of smoking. Also emphasised avoidance of household exposure to tobacco smoke. All participating schools received 13 consecutive 45 min classroom lessons with one lesson each week.	7th grade students, average age was 12.5 years, half were boys.
Stigler 2007	To prevent and reduce many forms of tobacco	a) 7 classroom activities (curriculum) - small groups of 10-15 led by student	Students in 6th to 9th grade (n=8,369). 16 schools in Delhi and 16

	use among youth in India	peers. b) School posters designed to complement classroom activities c) postcards were hand delivered to parents by students. d) peer-led health activism. Intervention lasted 4 months, more than 15hrs of activity. Had manuals for teachers and peer leaders, game boards, game cards, interschool competitions and handbooks for students.	in Chennai. Mean age was 11 years (in 6th grade), 12.1 (7 th grade) 12.8 (8th grade), and 13.9 years (9th grade).
Seal 2006	To reduce the prevalence of tobacco, drug and alcohol use among young people	Program provided information and skills related to drug and tobacco use such as effects of drugs, self awareness skills, decision-making, problem solving, stress and coping skills, refusal skills. Taught using instruction, demonstration, feedback, role playing, presentation, games. Also used videotapes and a life skills booklet.	Students in grade 7 - 12 (Mean age was about 15 years, SD2), most were boys (89%).
Prokhorov 1994	To develop a school-based tobacco control education program	School based anti tobacco intervention was implemented at 3 levels: students, teachers + school medical personnel, family. Developed age appro-	School children in grade 4 to grade 10

priate activities: grade 4 and 5 focused on incompatibility of smoking with prestigious professions and sports performance Grade 6-8: focused on immediate health consequences of tobacco use, physical appearance, facts about passive smoking; for Grade 9 and 10 - chemistry, physics, biology and anatomy lessons to show mechanisms of tobacco-attributable damage and remote health consequences and harm of parental tobacco use on foetus and newborn children. Used demonstrations, films, slide shows, posters, drawing competitions among others.

Ekerbicer 2007	To determine the self reported environmental tobacco smoke (ETS) exposure status of primary school students in grade 3-5, to verify self reported exposure levels with data from a biomarker of ex-	Students with confirmed ETS were randomly assigned - group 1 - parents were interviewed on phone by psychologist trained in smoking addiction. Emphasized ETS exposure consequences and where to get help for quitting. Group 2 - parents informed by small brief note "Your child's expo-	Students in 3-5th grade (9-11years of age) attending 3 private schools. 59.9% reported environmental tobacco exposure (ETS) at home, 42.7% from both parents, 38.4% from father, 12.7% from 3 or more household members and 6.2% from mother. Of the exposed children 62.9% were ex-
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	posure and to develop tools for preventing school children from passive smoking	sure to tobacco smoke was detected by a urine test". Notes were signed by parents and sent back. Urinary cotinine tests were repeated 9 months later 1st test and 7 months after counseling session with parents in Group 1.	posed to 1-3 cigarettes per day, 36.1% from 4 or more.
Zhang 1993	To increase public knowledge of health consequences of cigarette smoking, promote healthier attitudes among elementary school students and motivate fathers to quit smoking	A tobacco use prevention curriculum was incorporated into the health education programs in schools. Schools were encouraged to implement smoking control policies to severely limit or restrict smoking in schools and teachers encouraged to be non-smoking role models. For students whose fathers smoked, monitored father smoking status by asking daily whether they had smoked, recording responses in a chart and submitting monthly reports to school. Cessation materials based on stages of change theory were developed and distributed by students to their fathers.	Students in grade 1 - 7, also included fathers of students
Allahverdipour	To design and implement	Intervention group had 60 minute	Participants were 10th graders, aged

H 2009,	<p>a skill-based intervention for urban Iranian high school students that specifically incorporated the following social resistance skills training components: 1) teaching students to recognise high risk situations e.g. where they experience peer pressure to smoke, drink or use illicit drugs, increasing the awareness of media influences and refusal skills training</p>	<p>peer led group sessions, twice a week over 3 months. Programme aimed to increase knowledge focusing on side effects and consequences of substance abuse. Also developed cognitive-behavioural skills, self control skills, assertiveness techniques, peer resistance and drug refusal skills, decision making skills and interpersonal communication skills. Other components included group discussion, peer health education and behavioural rehearsal.</p>	<p>15 - 18 years, mean age 16 years. Most students were 16 years (61%).</p>
Lee 2007	<p>To explore the impacts of a school-wide no smoking strategy and a classroom-based smoking prevention curriculum on smoking-related knowledge, attitude, behaviour and skill of junior high school students</p>	<p>One group received a school wide no smoking strategy and classroom based smoking prevention curriculum, another group received only school-wide no smoking strategy and another served as a control group and received no intervention.</p>	<p>Were mostly from 7th and 8th grade, and few (14.9%) were ninth grade</p>

Wen X 2010	To reduce the prevalence of adolescent smoking at school level and prevent the initiation and escalation of smoking at individual level	Had 5 different levels of intervention: individual, group (peer and family), school, community and population. Included health education as part of the curriculum, environmental activities such as no-smoking school policy, anti-smoking posters, no sale of cigarettes in groceries round school, involved parents e.g. in antismoking communication.	7th and 8th grade students, ages ranged from 11 to 16 years, mean 13.4years. At start 19.9% reported ever smoking and 4.5% were regular smokers.
Reniscow 2008	To test efficacy of two contrasting approaches to school-based smoking prevention compared to standard health education	Designed curricular adapted from the Life skills training program and Australian Keep left (Harm Minimization program. Curriculum consisted of 8 units for grades 8 and 9, content focused on building general and substance use specific like skills including decision making, stress and affect management, assertive communication and resisting peer pressure. Harm Minimization included 8 units for grades 8 and, it uses decision making framework for reducing physical, social and psychologic harms asso-	Grades 8 and 9, mean age 14 years sd 1.2 and half were male. About 60% were African, 26% coloured. 28.6% had ever used cigarettes, 15% had smoked in the last month and 4% were heavy smokers

		ciated with tobacco and drug use.	
Lotrean 2010	To assess effects of school based smoking prevention programme using both video and peer-led discussion groups	Once weekly sessions, each for 45 min for 5 weeks using a video peer led strategy. Used video adapted to culture and context of 13-14 adolescents in Romania. Themes were - reasons for smoking, short and long term effects, peer pressure and skills to resist it, indirect pressure from adverts and adults	Mean age was 13.7 (sdo.3), both males and females,7.7% were smokers at baseline and prevalence was similar in both intervention and control groups
Emam Hadi 2008	To compare different methods in reducing the students tendency to smoke	Social skills training group and increased knowledge group had a 6 session curriculum, each lasting 45min (1 session per week for 1.5months). Program taught skills to effectively confront social effects of smoking and increase students ability to fight. Knowledge program - focused on short and long term effects of smoking. Poster group - had posters hang in their schools related to the same subject.	7th and 8th grade students, ages ranged from 11 to 16 years, mean 13.4years. At start 19.9% reported ever smoking and 4.5% were regular smokers.
Harrabi 2010	To evaluate a school-based intervention pro-	Program lasted one school year, educative actions about CVD risk factors:	Grades 8 and 9, mean age 14 years sd 1.2 and half were male. About 60%



	<p>gram to prevent cardiovascular risk factors among children</p>	<p>tobacco use, physical activity and health diet. Interventions included: i) 60 min theory session on one of three items (tobacco prevention, healthy diet or physical activity), providing the cognitive behavioural components of health knowledge and health promoting concepts. II) in the next 4 weeks, student projects to enable self research on subject iii) 4 weeks later, students made presentations in a 60min session and discussed with classmates and teacher. Also had interclass sport tournaments, discussions in health club, had presentations at end of school year, and best production was awarded.</p>	<p>were African, 26% coloured. 28.6% had ever used cigarettes, 15% had smoked in the last month and 4% were heavy smokers</p>
<p>Munodawafa 1995</p>	<p>To assess the impact of health instruction on knowledge targeting the prevention of drug abuse, of AIDS and other STDs among a selected sample of rural secondary school</p>	<p>Developed curriculum and educational materials on drug use and abuse concentrated on a) potential short and long-term effects b) social influence of acquisition, maintenance and cessation c) social pressure resistance through problem solving and decision</p>	<p>Participants were pupils from form 2 and 3 classes (equivalent to grade 9 and 10 USA)</p>

	pupils in Zimbabwe using student nurses	making. Curriculum was implemented over 7 weeks and delivered by student nurses.	
Alexandrov 1992	To assess epidemiological aspects on prevalence of precursors of atherosclerosis and CHD among school children	Intervention was mainly directed at preventing lipid spectrum disturbances and included rationalization of dietary habits and routines for work and rest. Children with high blood pressure or dyslipidemia had individual counseling with parents, all others had general sessions. Children and parents received booklets on rational nutrition and smoking hazards.	Mean age was 13.7 (sdo.3), both males and females,7.7% were smokers at baseline and prevalence was similar in both intervention and control groups

12. Summary of findings: School-based Interventions

School - based interventions for preventing and controlling smoking				
<p>Patients or population: High school students, Ages 11 – 18yrs Settings: China(2), India, Iran, Thailand, Taiwan, Zimbabwe, Russia (2), Tunisia (2), Romania(1), S.Africa Intervention: School based activities such as teaching on effects of tobacco, posters, peer – led activism, drama etc, messages to parents Comparison: Usual curriculum that may or may not include information on effects of tobacco</p>				
Outcomes	Impact	Number of participants (studies)	Quality of the evidence (GRADE)	Comments

Primary prevention of smoking	2 RCTs showed uncertainty round the estimate of effect. 1 study showed a decreased rate of experimenting with cigarettes after 4 years but not after 7 years.	7888 (3 studies ¹)	⊕⊕○○ Low	Prevent experimenting with smoking
Secondary prevention of smoking	3 RCTs showed reduced odds of becoming a regular smoker among the intervention group compared to the control. 2 of 3 of these findings were statistically significant.	5868 (3 studies ²)	⊕⊕⊕○ Moderate	Prevent experimenting or non smokers from regular smoking
Smoking rates	2 RCTs found non significant decreases in smoking rates. One RCT showed an increase in smoking rates but age specific increases were lower in the intervention groups. 1 RCT found non significant increases in smoking rates for both harm minimisation group and life skills training compared to control	16896 (4 studies ³)	⊕⊕○○ Low	
Smoking rates – non RCTs	2 non RCTs reported decreases in smoking rates over time; only one of these results was statistically significant. One study reported an increase in smoking rates over time, but an overall decrease when intervention compared to control. 1 non RCT found non sig. decreases in smoking for school ban plus curriculum as well as school ban only compared to control. 1 non RCT found significant reduction in smoking rates for poster group, knowledge and life skills groups compared to control.	8276 (5 studies ⁴)	⊕⊕○○ Low	
Life skills-RCTs	Significant improvements were reported for social efficacy (1 RCT), refusal skills, decision making, problem solving (1 RCT), and advocacy skills (1RCT). There were small non significant improvements in emotional and situational efficacies (1RCT), refusal skills, normative expectations (1 RCT)	9527 (3 studies ⁵)	⊕⊕○○ Low	Some RCTs reported more than one measure of life skills.
Life Skills-non RCTs	1 non RCT found a significant difference in cigarette refusal for the school ban plus curriculum group as well as the ban only group compared to the control.	469 (1 study ⁶)	⊕⊕○○ Low	

Knowledge, attitudes and beliefs-RCTs	<p>3 RCTs showed statistically significant increases in knowledge.</p> <p>Two of three studies reported a change in attitudes that were statistically significant. Only one study reported statistically significant positive changes in beliefs.</p>	<p>10882 (3 studies^a)</p>	<p> Moderate</p>
Knowledge, attitudes and beliefs-non RCTs	<p>4 non RCTs reported improvements in knowledge. One of these studies was not clear if the improvement between pre and post test was statistically significant. One study showed significant differences in knowledge especially social skills training group and knowledge groups over the poster and control groups. One study showed significant differences in knowledge and attitudes especially in the ban plus school curriculum group compared to ban only and control groups.</p>	<p>7367 (4 studies^a)</p>	<p> Low</p>
<p>p: p-value GRADE: GRADE Working Group grades of evidence (see above and last page)</p> <ol style="list-style-type: none"> 1. Wen 2010, Chou 2006, Prokhorov 1994. 2 RCTs had unclear risk of bias as methods used to achieve random allocation were not clear. Results heterogeneous. 2. Wen 2010, Chou 2006, Lotrean 2010. 1 RCTs had unclear risk of bias as methods used to achieve random allocation were not clear. 3. Seal 2006, Stigler2007, Prokhorov 1994, Reniscow 2008. Unclear methods for random allocation in all four studies. Seal 2006 included only 2 schools, not clear how they were selected. Inconsistency as one study showed increasing rates of smoking over time. 4. Harrabi 2008, Alexandrov 1992, Allahverdipour 2009, Lee 2007, Emam Hadi 2008. Non-random selection of schools, two with only 2 participating schools (Harrabi 2008, Allahverdipour 2009). 5. Lee 2007. Non random selection of 4 schools of which 1 was control. 6. Stigler 2007, Seal 2006, Lotrean 2010. 2 RCTs had unclear risk of bias as methods used to achieve random allocation were not clear. Seal 2006 included only 2 schools, not clear how they were selected. Some of the outcomes were non significant reflecting imprecision; each study measured one or more of these outcomes. 7. Seal 2006, Stigler2007, Wen 2010. 2 RCTs had unclear risk of bias as methods used to achieve random allocation were not clear. Seal 2006 included only 2 schools, not clear how they were selected 8. Munodawafa 1995, Harrabi 2008, Lee 2007, Emam Hadi 2008. Nonrandom selection of schools, one with only 2 participating schools (Harrabi 2008), one with 4 schools one of which is control (Lee 2007), short follow up in Munodawafa 1995 (7 weeks post intervention). 			

13. Risk of Bias assessments of included studies

Study	Seq	All	Base	Bs char	Sel out	Blind	Conta	Incomp	Other*	Overall	
Ahmadi J 2003	Unclear	Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	None	Unclear	
Areechon 1988	Unclear	Unclear	Unclear	Unclear	Yes	Unclear	Yes	Yes	Conflict	High	High drop- out rates, sponsored by Nicorette gum
Zheng 2007	Yes	Unclear	Yes	No	Yes	Unclear	unclear	yes	None	Low Risk	
Puschel 2008	No	No	Yes	No	Yes	Unclear	Unclear	No	None	High	non random allocation
Bovet 2002	No	Unclear	Yes	Yes	Yes	Yes	Yes	Yes	None	High	Non random allocation of control group
Belizan 1995	Not clear	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	None	High	Follow up only to end of pregnancy, no verification of smoking
Asfar2008	Not clear	Not clear	Not clear	yes	yes	yes	Unclear	yes	None	High	Drop- out rate was high (56% completed in intervention arm), method of randomisation not clear
Ward 2001	Unclear	Unclear	Unclear	Unclear	Yes	Unclear	Unclear	Yes	None	Unclear	
Steenkamp 1991	No	No	Yes	Yes	Yes	Yes	No	No	None	High risk	Non random allocation of 3 units
Gunes 2007	Unclear	No	Unclear	Unclear	Yes	No	Yes	Yes	None	High risk	Non random allocation, not clear if baseline characteristics similar
Baddeley 1988	No	No	No	Yes	Yes	Unclear	Unclear	Yes	None	High risk	Non random allocation, baseline differences

Jackson 2004	Yes	Unclear	Yes	Yes	Yes	Unclear	No	No	None	High risk	high drop- out rate (about 70%)
Jiang 2007	Yes	Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	None	Low risk	
Loke 2005	Yes	Yes	Yes	Yes	Yes	No	Unclear	Yes	None	High risk	Report husbands smoking without verification,
Kar 2008	No	No	No	Unclear	Yes	Unclear	Yes	Yes	None	High risk	Non random allocation, not clear if baseline characteristics similar
Xie 2005	Unclear	Unclear	Unclear	No	Yes	Yes	No	Yes	None	Unclear	
Liu 2003	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	
Munodawafa 1995	No	No	Yes	Yes	Yes	Unclear	Unclear	Yes	None	High	non random allocation, follow up was short - only 7 weeks long
Chou 2006	Unclear	Unclear	Unclear	No	Yes	Unclear	Unclear	Yes	None	Unclear	
Stigler 2007	Unclear	Unclear	Yes	Unclear		Yes	Unclear	Yes	None	Unclear	
Seal 2006	Unclear	Unclear	Yes	Yes	Yes	Unclear	No	Yes	None	Unclear	
Reddy 2002	Unclear	Unclear	Unclear	Yes	Yes	Unclear	Yes	Unclear	None	Unclear	
Ekerbicer 2007	Unclear	Unclear	Yes	Unclear	Yes	Unclear	Yes	Yes	None	Unclear	
Chen 2007	No	No	No	Yes	Yes	Unclear	No	Yes	None	High	Non random allocation
Lee 2007	No	Yes	No	No	Yes	Unclear	Yes	Yes	None	High	non random allocation
Prokhorov 1994	Unclear	Yes	Unclear	Unclear	Unclear	Unclear	Yes	Unclear	None	Unclear	
Zhang 1993	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	No	None	Unclear	

Allahverdipour 2009	No	No	No	Yes	Yes	Unclear	Unclear	Yes	None	High	non random allocation
Moy F 2006	No	Unclear	Unclear	Yes	Yes	Unclear	Unclear	Yes	None	High	Non-random allocation, only 2 groups, no verification of smoking status.
Singh P 2010	Unclear	Unclear	Yes	Yes	Yes	Yes	Yes	Yes	None	Unclear	Not clear how randomisation was achieved
Fathelrahman 2010	No	Unclear	Yes	Yes	Yes	Unclear	Unclear	Yes	None	Unclear	
Sun HQ 2009	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	Yes	None	Unclear	
Harrabi 2010	No	Unclear	Unclear	No	Yes	Unclear	Unclear	Unclear	None	High	Non random allocation
Everett-Murphy 2010	No	No	Yes	No	Yes	Yes	Yes	No	None	High	non random allocation, high drop- out rates (34%)
Emam Hadi 2008	No	No	Unclear	Unclear	Yes	Unclear	Unclear	Unclear	None	High	non random allocation, not clear of there were baseline differences between study groups
McAlister2000	No	No	Unclear	Unclear	Unclear	Unclear	Unclear	No	None	High	No random allocation, 2 units selected, not clear if baseline outcomes were similar, no verification of smoking status, high drop- out rates
Reniscow 2008	Unclear	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	None	Low	
Ng 2010	Unclear	Unclear	Yes	Yes	Yes	No	Unclear	Yes	None	Unclear	
De Azevedo 2010	No	Yes	Yes	No	Yes	No	Unclear	No	None	High	Non random allocation of the control group, no blinding of the study assessors and no verification of smoking status

Lotrean 2010	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	None	Low	
Alexandrov 1992	No	Unclear	Yes	Unclear	Yes	Unclear	Unclear	No	None	High	Non random allocation of 2 districts
Baltieri 2009	Unclear	Unclear	Yes	Yes	Yes	Yes	Unclear	No	None	High	very high drop- out rates (48.15% smokers in naltrexone group, 34.2% in topiramate group and 63.16% on placebo dropped out of the study (p0,04)
Wen 2010	Yes	Yes	No	Yes		Yes	Yes	Yes	None	Low	
Fang 1999	Unclear	Unclear	Yes	No	Yes	No	Unclear	No	None	High	Non random allocation, baseline characteristics not similar, no verification of smoking status, no blinding of assessors

Legend:

- Seq: Sequence Generation- Was the allocation sequence adequately generated?
All: Allocation concealment- Was the allocation adequately concealed?
Base: Baseline outcomes – Were baseline outcome measurements similar?
Bs char: Baseline characteristics – Were baseline characteristics similar?
Sel out: Selective reporting of Outcomes – Was the study free from selective outcome reporting?
Blind: Blinding – Was knowledge of the allocated interventions adequately prevented during the study?
Conta: Contamination- Was the study adequately protected against contamination?
Incomp: Incomplete reporting - were incomplete outcome data adequately addressed?
Other*: Conflict of Interest declared?
Overall: Overall assessment of risk of bias